Saudi Society for Clinical Chemistry

7th Annual Conference

3rd International Meeting on Clinical Chemistry & Laboratory Medicine

30th Nov – 3rd Dec 2021

ABSTRACT BOOK

INFO@SSCC.MED.SA

SSCC.MED.SA

@sa.sscc

+966 504957748

Introduction and Welcome

Dear Colleagues,

We are pleased to host the 3rdInternational Meeting in Clinical Chemistry & Laboratory Medicine & 7thAnnual Meeting Saudi Society for Clinical Chemistry with an education and scientific programs paired with industry workshops from 30 November - 3 December 2021.

The virtual meeting is designed to meet the needs of laboratory Physicians, Supervisors, Directors, and Managers, as well as pathologists and other laboratory professionals overseeing or carrying out Clinical Chemistry, Toxicology, Clinical Pathology and Point-of-Care Testing.

The scientific program features experts from International Federation of Clinical Chemistry and Laboratory Medicine, USA, Europe, the Middle East and Saudi Arabia, sharing recent advances and innovations. Scientific conference attendees will listen and network with experts in the field and engage with their peers for a unique learning experience. Furthermore, the scientific program will feature the latest updates of clinical testing including:

- Pre-conference workshop on Toxicology, keynote presentation on evidence base laboratory medicine, biomarkers of diseases, laboratory management, quality and general chemistry, special sessions dedicated to pre-analytical management and low carbs and protein electrophoresis updates on reporting and Post conference workshop on POCT
- Dedicated session for young scientist and poster presentation
- Four industry workshops including: Automation, POCT, Novel biomarkers of diseases, and New technology for red cell analysis

The meeting is a learning and sharing platform for all laboratory workers to advance professionally and develop solution for daily practice in the laboratory. We would like to take this opportunity to extend our gratitude to the Saudi Commission for Health Specialties, our speakers, and moderators for their support to Saudi Society for Clinical Chemistry. We also like to offer special thanks to our sponsors for their participation and support for the conference.

On behalf of Saudi Society for Clinical Chemistry, we wish you a successful meeting and look forward seeing you again in 2022.

Dr. Samia Sobki
SSCC President

Management Board for Saudi Society for Clinical Chemistry

2018 – 2022

❖ Dr. Samia Sobki, *PSMMC, Riyadh, KSA*	President
❖ Dr. Ali Al Othaim, *NGHA, Riyadh, KSA*	Vice President
❖ Dr. Zuhier Awan, *KAU, Jeddah, KSA*	Secretary of the board
❖ Mr. Nawaf Al Otaibi, *NGHA, Riyadh, KSA*	Treasurer
❖ Dr. Salam Saadeddin, *PSMMC, Riyadh, KSA*	Chairman of the Scientific Committee
❖ Dr. Ali Al Shingiti, MOH, *Riyadh, KSA*	Member
❖ Prof. Dr. Khaled Al Harbi, *KSU, Riyadh, KSA*	Member
❖ Dr. Gihan Gawish, *Al-Imam Uni., Riyadh, KSA*	Member
❖ Dr. Waleed Al-Omaim, *KFSHRC, Riyadh, KSA*	Member

IFCC Representative to SSCC

❖ Dr. Anwar Borai, *KAMC, Jeddah, KSA*

30th Nov – 3rd Dec 2021

Organizing Committee

❖ Dr. Ali Al Othaim	Chairman
❖ Prof. Dr. Khaled Al Harbi	Member
❖ Dr. Waleed Tamimi	Member
❖ Mr. Nawaf Al Otaibi	Member
❖ Ms. Maha Alayda	Admin Assistant
❖ Ms. Mesaila Mungcal	Conference Secretary

Scientific Committee

❖ Dr. Salam Saadeddin	Chairman
❖ Dr. Zuhier Awan	Member
❖ Dr. Anwar Borai	Member
❖ Dr. Ali Al Shingiti	Member
❖ Dr. Waleed Tamimi	Member

Website Management Committee

❖ Mr. Nawaf Al Otaibi	Member
❖ Mr. Ali Al Hamad	Member
❖ Ms. Maha Alayda	Admin Assistant

Scientific Speakers Day (1)

- **Prof. Abderrazek Hedhili, AFCB Representative,** *Professor of Toxicology, University of Pharmacy of Monastir –Tunisia*
- **Dr. Ahmed Al-Asmari,** *Consultant Forensic Toxicology, King Abdul-Aziz Hospital –Jeddah*
- Dr. Ahmed Abo-Khatwa, *Emeritus Prof. of Biochemistry, Biochemistry Department, Faculty of Science, King Abdul-Aziz University – Jeddah*
- **Dr. Youssef Sari,** *Professor, Department of Pharmacology & Experimental Therapeutics, College of Pharmacy & Pharmaceutical Sciences, The University of Toledo – Ohio*
- **Mr. Magbool Oraiby,** *Laboratory Specialist, Poison Control & Forensic Medicine Chemistry Center – Jazan, Poison Control & Forensic Medicine Chemistry Center - Jazan*
- **Dr. Torky Zoghaibi,** *Assistant Prof. (Forensic Science) /Senior Specialist, Faculty of Applied Medical Science, Department of Medical Laboratory Technologies, King Abdul-Aziz University - Jeddah*
- **Dr. Asim Jilani,** *Consultant Forensic Toxicologist, Poison Control & Forensic Medicine Chemistry Center – Makkah Al-Mukarmah*
- **Dr. Amin Khattab,** *Consultant Forensic Toxicologist, Poison Control & Forensic Medicine Chemistry Center*
- **Dr. Farouq Alzahrani,** *Consultant Forensic Toxicologist, Medical Department at Presidency State Security*
- **Dr. Abdulaziz Aldlgan,** *Consultant Forensic Toxicologist, Security Forces Hospital, Toxicology Lab -Riyadh*
- **Dr. Mansour Al-zahrani,** *Forensic Toxicologist Senior Specialist, Poison Control & Forensic Medicine Chemistry Center*
- **Mr. Sami Al-Ghamdi,** *Forensic Toxicologist Senior Specialist, Poison Control & Forensic Medicine Chemistry Center – Jeddah*
- **Mr. Abdulaziz Aldubayyan,** *Department of Analytical, Environmental and Forensic Sciences, Faculty of Health Sciences & Medicine, King College London, London, UK - Toxicology Department, Prince Sultan Military Medical City*
- **Ms. Asia AL-Harbi,** *Toxicologist/Medical Researcher, Center of Excellence in Genomic Medicine Research, King Abdulaziz University - Jeddah*
- **Ms. Mashel Al-Asmari,** *Saudi Scientific Working Group for Forensic Toxicology, Poison Control & Forensic Medical Chemistry – Jeddah*
- **Ms. Huda Alkhalaf,** *Laboratory Specialist, Central Military Laboratory & Blood Bank/Toxicology, Prince Sultan Military Medical City –Riyadh*
- **Mr. Abdulrahman Assiri,** *Laboratory Specialist, Assir Poison Control and Forensic Medical Chemistry Center –Abha*
- **Ms. Salma Alsayed,** *Pathology & Laboratory Department, Prince Mohammed Bin Abdulaziz Hospital, Ministry National Guard Health Affair-Al Madinah,*

Scientific Speakers Day (2)

- **Prof. Annalise E. Zemlin,** *Head of Division; Chemical Pathology, IFCC C-EBLM – South Africa*
- **Dr. Nawal Basri,** *Medical Director, Medina Dialysis Center, Ministry of National Guard Health Affairs (MNGHA)*
- **Dr. Anwar Borai,** *Clinical Scientist, Clinical Chemistry, King Abdulaziz Medical City-Jeddah*
- **Dr. Majed Al Hudhud,** *Consultant Ob/Gyn and IVF and Head of Ob/Gyn, Department & IVF Services, Dr Sulaiman Al Habib Medical Group, Arryan Hospital, Riyadh, Saudi Arabia*
- **Dr. Damien Gruson,** *Professor, Head of the department of clinical biochemistry, Cliniques Universitaires Saint-Luc, Brussels, -Belgium*
- **Dr. Nafila Riyami,** *Senior Consultant, Medical Biochemistry, Sultan Qaboos university, Hospital, SQU-Oman*
- **Dr Waleed Tamimi,** *Head of Clinical Chemistry Lab, King Abdulaziz Medical City - Riyadh*
- **Mr Jaffar Khiary,** *Acting Head, Department of Pathology & Laboratory Medicine, King Faisal Specialist Hospital & Research Center*
- **Dr. Amani Gusti,** *Senior Specialist Clinical Chemistry, Emergency Laboratory, King Fahd Armed Forces Hospital – Jeddah*
- **Mr. Abubaker Yagoot,** *Supervisor Biochemistry, King Abdul-Aziz Medical City, National Guard Health Affairs-Jeddah*

Scientific Speakers Day (3)

- **Mr. Abdulla Alkhashan,** *Director General, Alborg Diagnostic, KSA*
- **Dr. Samer Ellaham,** *Director of Accreditation, Quality and Safety Institute, Cleveland Clinic - Abu Dhabi*
- **Dr. Vinita Thakur,** *Division Chief, Clinical Biochemist & POCT Scientific Lead, Memorial University, Health Science Center, Eastern Health Authority –Canada*
- **Dr. Slavka Penickova,** *Director/Clinical Biologists, LHUB-ULB Medical Chemistry Laboratory, Brussels, Belgium*
- **Dr. Laila Abdulwareth,** *National Reference Laboratory, Deputy ED & Chief Scientific Officer – Abu Dhabi*
- **Dr. Fahad Alshahrani,** *Consultant Family Medicine, Department of Family Medicine & Primary Health Care, King Abdulaziz Medical City –Riyadh*
- **Dr. Sumaya Aljenedil,** *Consultant Chemical Pathologist Clinical Lipidologist, King Faisal Specialist Hospital and Research Centre – Riyadh*
- **Dr. Ioanna Skountzou**, *Consultant, Jeddah Regional Lab, Associate Professor, Department of Microbiology and Immunology, Emory University School of Medicine Atlanta, GA*
- **Mr. Rayyan Al-Sulaimani,** *King Abdullah Medical City- Holy Capital (KAMC)*
- **Dr. Ahmed Alayouby,** *Consultant OBGYN, Al Yamama Hospital, Riyadh*
- **Dr. Ammar Tonkal,** *Senior Internal Medicine Resident, KFAFH, -Jeddah*
- **Dr. Abdulhadi Bima,** *Chemical Pathology Consultant, Clinical Biochemistry Laboratory, King Abdul-Aziz University Hospital*
- **Dr. Christopher McCudden,** *Clinical Biochemist, Division of Biochemistry, The Ottawa Hospital Associate Professor & Vice Chair, Department of Pathology & Laboratory Medicine, University of Ottawa, Medical/Scientific Director of Information Services & Information Technology & Deputy Chief Medical/Scientific Officer, Eastern Ontario Regional Laboratory Association – Canada*
- **Dr. Ronald A. Booth, FCACB,** *Clinical Biochemist, EORLA & The Ottawa Hospital. Associate Professor, Department of Pathology and Laboratory Medicine, University of Ottawa., The University of Ottawa, The Ottawa Hospital and Eastern Ontario Regional Laboratory Association (EORLA) – Canada*

Scientific Speakers Day (4)

- **Mr. Tony Cambridge,** *Lead Biomedical Scientist Pathology Management, University Hospitals NHS Trust – UK*
- **Dr. Adil Khan,** *Medical Director of POCT and Clinical Chemistry & Associate Professor of Pathology, Department of Pathology & Laboratory Medicine, Temple University Lewis Katz School of Medicine, Philadelphia, PA. USA*
- **Dr. Vinita Thakur,** *Division Chief/Clinical Biochemist & POCT Scientific Lead, Memorial University, Health Science Center, Eastern Health Authority – Canada*
- **Mr. Ayman Al Hayek,** *Head of Diabetes Education and Insulin Pump Unit, Department of Endocrinology and Diabetes, Diabetes Treatment Center, Prince Sultan Military Medical City*
- **Prof. Dalal Nemenqani,** *Professor & Consultant of Pathology & Dean of the College Medicine Taif University*
- **Prof. Rania Al Sharkawy,** *Prof. of Chemical Pathology, Medical Research Institute, Alexandria University – Egypt*

Moderators

- **Dr.Maram Alotaiby,** *General Supervisor for Laboratory Services, Blood Transfusion and Forensic Medicine Services, Ministry of Health*
- **Dr. Ali Al Othaim,** *SSCC Vice President*
- **Dr. Salah Al Menshawi,** *Toxicology Consultant Head of Toxicology Department in Comprehensive Specialized Clinical Security forces in Jeddah*
- **Prof. Yousef Sari,** *Department of Pharmacology & Experimental Therapeutics, College of Pharmacy & Pharmaceutical Sciences, The University of Toledo – Ohio*
- **Dr. Ahmad Al Asmari,** *Consultant Forensic Toxicology, King Abdul-Aziz Hospital –Jeddah*
- **Dr. Waleed Al Omaim**, *Consultant Chemical Pathology, Section Head of Automated Core Facility /POCT, Department of Pathology and laboratory Medicine King Faisal Specialist Hospital & Research Center, Riyadh*
- **Prof. Khalid Al-Harbi**, *Professor and Consultant in Medical Molecular Genetics in King Saud University*
- **Dr. Nashaat Nafouri,** *Chair, Health Care, Saudi Quality Council*
- **Dr. Abdullah Turjoman,** *Consultant Clinical Chemist, Lab Director, Prince Mohammad bin Abdulaziz Hospital, Riyadh*
- **Dr. Ali Mahazri,** *Assistant Professor in Laboratory Medicine Department/Head of Basic Sciences Department, Albaha University*
- **Dr. Zuhier Awan,** *MD, MSc, PHD, FRCPC, FAACC, Secretary General of Saudi Society for Clinical Chemistry*
- **Dr. Salam Saadeddin,** *Consultant Clinical Scientist, Clinical Chemistry Division / CML&BB, Prince Sultan Military Medical City, Riyadh*
- **Dr. Saeed Alrashedi,** *Consultant Clinical Laboratory Scientist, Head of Specimen Processing, Send out, Phlebotomy & POCT, King Fahad Medical City – Riyadh*

Industry Workshop 1 Speakers

- **Mr. Ayman Enayah,** *Field Application Specialist, Bio-Rad Laboratories*
- **Dr. Vladimir Sashkov,** *Interim EMA Head of Medical Affairs, Becton Dickinson, Dubai*
- **Mr. Ahmad Abbas,** *Workflow & Informatics (WITS) Manager MEA, Beckman Coulter MEA – United Arab Emirates*
- **Mr. Mahmoud Zaghloul,** *Saudi Arabia Country Sales Manager, Thermo Fisher Scientific CDD*
- **Mr. Shailesh Damale,** *Deputy Manager; Application support, Shimadzu Middle East and Africa, Dubai*
- **Dr. Frank Kühlwein,** *Head, International Sales, Chromsystems GMBH*
- **Dr. Lenard Muller,** *Global Marketing Manager of Plasma Protein at Siemens Healthineers*
- **Dr. Fadel Alhabibi,** *Head of Virology Department, Regional Lab and Blood Bank in Riyadh*

Industry Workshop 2 Speakers

- **Dr. Richard van Wijk**, *University Medical Center Utrecht, Utrecht, The Netherlands*

Industry Workshop 3 Speakers

- **Dr. Steven Ness,** *Director, Medical & Scientific Affairs*
- **Mr. Rani Besisou,** *Medical Affairs Manager, Roche Diagnostics – Riyadh, Saudi Arabia*
- **Dr. Paul Jarvis,** *Director of Global Medical Affairs, Abbott, Consultant Emergency Medicine Calderdale & Huddersfield NHS Foundation Trust, UK*
- **Dr. Nedim Albayrak,** *Head of Medical Affairs, Integrated Diagnostic Solution, Eastern Europe, Middle East & Africa, Becton Dickinson & company*

Industry Workshop 4 Speakers

- **Dr. Valentina Pigazzo,** *Clinical Specialist Acute Care Diagnostics, Werfen EEMEIA*
- **Dr. Dennis Begos,** *Medical Director, Medical Scientific Affairs, Nova Biomedical – USA*

Industry Workshops Moderators

- **Dr. Ali Al Shanguity,** *SSCC Board Member*
- **Dr Abdullah Almshari,** *Prince Sultan Military Medical City, Riyadh*
- **Dr. Walaa Mohammed Saeed,** *Assistant Professor in Clinical Biochemistry, Vice Dean of Applied Medical Science College, Taibah Unibersity*
- **Ms. Najwa Adlan,** *Core Lab& Blood Bank Supervisor, Al-Dara Hospital And Medical Center, Riyadh, KSA.*

Scientific Program

DAY 1 Schedule (PRE-CONFERENCE): Tuesday, 30th November 2021

Workshop – Toxicology

1:00 pm – 1:10 pm	**Opening Remarks**	**Dr. Maram Alotaiby** *General Supervisor for Laboratory Services, Blood Transfusion and Forensic Medicine services, MOH*
1:10 pm – 1:20 pm	**Welcome Speech**	**Dr. Ali Al Othaim** *SSCC Vice President*
Time		**Speakers**
Keynote Lecture AFCB		
1:20 pm – 2:00 pm	Male Infertility & Trace Metals	**Prof. Abderrazek Hedhili** *Professor of Toxicology* *University of Pharmacy of Monastir -Tunisia*
SESSION 1 **Old Problems & New Challenges** **Moderator: Dr. Salah Al Menshawi** *Toxicology Consultant, Head of Toxicology Department in Comprehensive Specialized Clinical Security forces in Jeddah*		
2:00 pm – 2:20 pm	Drug Related Deaths in Jeddah, Saudi Arabia: A Forensic Carboxyhemoglobin Autopsy-Based Study	**Dr. Ahmed Al-Asmari** *Consultant Forensic Toxicology* *King Abdul-Aziz Hospital -Jeddah*
2:20 pm – 2:40 pm	A Post DDT Era	**Dr. Ahmed Abo-Khatwa** *Emeritus Prof. of Biochemistry* *King Abdul-Aziz University - Jeddah*
2:40 pm – 3:00 pm	An Episode of Phosphine Poisoning	**Dr. Ahmed Abo-Khatwa** *Emeritus Prof. of Biochemistry* *King Abdul-Aziz University - Jeddah*
3:00 pm – 3:20 pm	Chronic Inhalation of Pod-based E-cigarette Aerosols on Inflammatory Biomarkers in Central Nervous Peripheral Systems	**Prof. Youssef Sari** *College of Pharmacy & Pharmaceutical Sciences* *The University of Toledo - Ohio*
3:20 pm – 3:40 pm	The Role of Poisons Control Center in Emergency Toxicology	**Mr. Magbool Oraiby** *Laboratory Specialist* *Poison Control & Forensic Medicine Chemistry Center - Jazan*
3:40 pm – 4:00 pm	Direct Analysis in Real Time (DART) Applications in Forensic Toxicology	**Dr. Torki Alzughaibi** *Assistant Prof. (Forensic Science)/Senior Specialist* *King Abdul-Aziz University - Jeddah*
4:00 pm – 4:15 pm	Question and Answer	
4:15 pm – 4:30 pm	Break	
SESSION 2 **Modern Forensic Toxicology & Mass Spectrometry Application** **Moderator: Prof. Yousef Sari** *Department of Pharmacology & Experimental Therapeutics, College of Pharmacy & Pharmaceutical Sciences, The University of Toledo – Ohio*		
4:30 pm – 4:50 pm	The Value of High Resolution LC/MS in Forensic and Clinical Toxicology Laboratory	**Dr. Asim Jilani** *Consultant Forensic Toxicologist* *Poison Control & Forensic Medicine Chemistry Center*
4:50 pm – 5:10 pm	Silica Monolithic Column Coated with Graphene as Drugs Extraction and Clean Up Procedure	**Dr. Amin Khattab** *Consultant Forensic Toxicologist* *Poison Control & Forensic Medicine Chemistry Center*
5:10 pm – 5:30 pm	Testing Human Hair for Cannabis	**Dr. Farouq Alzahrani** *Consultant Forensic Toxicologist* *Medical Department at Presidency of State Security*
5:30 pm – 5:50 pm	New Challenges in Forensic Toxicology: Focus on New Psychoactive Substances	**Dr. Abdulaziz Aldlgan** *Consultant Forensic Toxicologist* *Security Forces Hospital, Toxicology Lab -Riyadh*

Scientific Program

SESSION 2 (continued.) **Modern Forensic Toxicology & Mass Spectrometry Application** **Moderator: Prof. Yousef Sari** *Department of Pharmacology & Experimental Therapeutics, College of Pharmacy & Pharmaceutical Sciences, The University of Toledo – Ohio*		
5:50 pm – 6:10 pm	Forensic Toxicology and Doping Control Drugs Related Analysis	**Dr. Mansour Al-zahrani** *Forensic Toxicologist Senior Specialist* *Poison Control & Forensic Medicine Chemistry Center*
6:10 pm – 6:30 pm	Testing of GHB in Hair Using GC-MS/MS	**Mr. Sami Al-Ghamdi** *Forensic Toxicologist Senior Specialist* *Poison Control & Forensic Medicine Chemistry Center*
6:30 pm – 6:45 pm	Question & Answer	
6:45 pm – 7:00 pm	Break	
SESSION 3 **Young Scientist** **Moderator: Dr Ahmad Al Asmari** *Consultant Forensic Toxicology, King Abdul-Aziz Hospital –Jeddah*		
7:00 pm – 7:20 pm	Application of Validated LC-MS/MS Method for the Detection of Synthetic Stimulants in Suspicious Urine Samples from Riyadh, Saudi Arabia	**Mr. Abdulaziz Aldubayyan** *Toxicology Department* *Prince Sultan Military Medical City*
7:20 pm – 7:40 pm	A survey on public awareness of the relationship of heavy metals: lead & mercury to autism in KSA	**Ms. Asia AL-Harbi** *Toxicologist/Medical Researcher* *King Abdulaziz University – Jeddah*
7:40 pm – 8:00 pm	Victims of chemical and biological warfare	**Ms. Mashael Al-Asmari** *Saudi Scientific Working Group for Forensic Toxicology*
8:00 pm – 8:20 pm	Detection of Amphetamines in Dried Blood spots	**Ms. Huda Alkhalaf** *Laboratory Specialist* *Prince Sultan Military Medical City –Riyadh*
8:20 pm – 8:40 pm	The global deadly trend of Novel Synthetic Opioids	**Mr. Abdulrahman Assiri** *Laboratory Specialist, Assir Poison Control and Forensic Medical Chemistry Center -Abha*
8:40 pm – 9:00 pm	Ethyl Glucoronide and Ethyl Sulfate: Ethanol Biomarkers and their Role in Forensic Toxicology Analysis	**Ms. Salma Alsayed** *Toxicology, Senior Specialist* *Prince Mohammed Bin Abdulaziz Hospital-Al Madinah,*
9:00 pm – 9:15 pm	Question & Answer	
9:15 pm – 9:30 pm	Closing	

Scientific Program

DAY 2 Schedule (CONFERENCE): Wednesday, 1st December 2021

1:00 pm – 1:15 pm	**Opening Remarks**	**Dr. Samia Sobki** *SSCC President*
Time		**Speakers**
CONFERENCE **IFCC Keynote Lecture**		
1:15 pm – 2:00 pm	Clinical Decision Limits in Evidence Based Laboratory Guidelines	**Prof. Annalise E. Zemlin** *Head of Division; Chemical Pathology* *IFCC C-EBLM – South Africa*
SESSION 4 **Biomarkers of Diseases** **Moderator: Dr. Waleed Al Omaim** *Consultant Chemical Pathology, S Head of Automated Core Facility /POCT, Department of Pathology and laboratory Medicine, King Faisal Specialist Hospital & Research Center, Riyadh*		
2:00 pm – 2:25 pm	Biomarkers of Kidney Diseases	**Dr. Nawal Basri** *Medical Director, Medina Dialysis Center* *Ministry of National Guard Health Affairs (MNGHA)*
2:25 pm – 2:50 pm	The Potential Utility of Exosomes in Diabetes as Early Biomarkers and Treatment	**Dr. Anwar Borai** *Clinical Scientist, Clinical Chemistry* *King Abdulaziz Medical City-Jeddah*
2:50 pm – 3:15 pm	Anti-Mullerian Hormone (AMH) in the Assessment of Fertility & Beyond	**Dr. Majed Al Hudhud** *Consultant Ob/Gyn and IVF and Head of Ob/Gyn* *Dr Sulaiman Al Habib Medical Group, Riyadh*
3:15 pm – 3:40 pm	Biomarkers of Heart Failure	**Dr. Damien Gruson** *Professor, Head of the department of clinical biochemistry* *Cliniques Universities Saint-Luc, Brussels, -Belgium*
3:40 pm – 4:05 pm	Post –Covid Syndrome: Clinical manifestation and Biochemical Markers	**Dr. Nafila Riyami** *Senior Consultant, Medical Biochemistry* *Sultan Qaboos university , Hospital, SQU-Oman*
4:05 pm – 4:15 pm	Question and Answer	
4:15 pm – 4:30 pm	Break	
SESSION 5 **Pre-analytical Group** **Moderator: Prof. Khalid Al Harbi** *Professor and Consultant in Medical Molecular Genetics in King Saud University*		
4:30 pm – 4:55 pm	Improving Patient Safety by Control of Pre-analytic Errors in Clinical Laboratory	**Dr. Waleed Tamimi** *Head of Clinical Chemistry Lab* *King Abdulaziz Medical City - Riyadh*
4:55 pm – 5:20 pm	CBAHI requirements in pre-analytical clinical laboratory	**Mr. Jaffar Khiary** *Acting Head* *Department of Pathology & Laboratory Medicine* *King Faisal Specialist Hospital & Research Center*
5:20 pm – 5:45 pm	Reducing errors of samples and improving Quality in the Pre-analytical phase: The role of the Laboratory Medicine	**Dr. Amani Gusti** *Senior Specialist Clinical Chemistry* *Emergency Laboratory* *King Fahd Armed Forces Hospital – Jeddah*
5:45 pm – 6:10 pm	The Need for Quality Control for Serum Indices Detection	**Mr. Abubaker Yagoot** *Supervisor Biochemistry* *King Abdul-Aziz Medical City, National Guard Health Affairs-Jeddah*
6:10 pm – 6:25 pm	Question & Answer	
6:25 pm – 6:40 pm	Break	

Scientific Program

DAY 3 Schedule (CONFERENCE): Thursday, 2nd December 2021

Time		Speakers
SESSION 6 **Laboratory Management** **Moderator: Dr. Nashaat Nafouri** *Chair, Health Care* *Saudi Quality Council*		
1:00 pm – 1:30 pm	THE Role of Private Healthcare in Realization of KSA Healthcare Transformation	**Mr. Abdulla Alkhashan** *Director General* *Alborg Diagnostic, KSA*
1:30 pm – 2:00 pm	Artificial Intelligence in the Clinical Laboratory	**Prof. Samer Ellaham** *Director of Accreditation, Quality and Safety Institute* *Cleveland Clinic - Abu Dhabi*
SESSION 7 **Quality & General Chemistry** **Moderator: Dr. Abdullah Turjoman** *Consultant Clinical Chemist, Lab Director, Prince Mohammad bin Abdulaziz Hospital - Riyadh*		
2:00 pm – 2:20 pm	Lean Six Sigma Approach in Quality Control Cost Management: A Study from Canadian Province of Newfoundland and Labrador	**Dr. Vinita Thakur** *Clinical Biochemist & POCT Scientific Lead* *Memorial University, Health Science Center–Canada*
2:20 pm – 2:40 pm	HbA1c : not just a number	**Dr. Slavka Penickova** *Director/Clinical Biologists, LHUB-ULB Medical Chemistry Laboratory, Brussels, Belgium*
2:40 pm – 3:00 pm	Tests to Evaluate Immunological Response to SARS-CoV2 and Correlates of Immunity: The Abu Dhabi Experience	**Dr. Laila Abdulwareth** *National Reference Laboratory* *Deputy ED & Chief Scientific Officer – Abu Dhabi*
3:00pm – 3:20 pm	Osteoporosis: Overview and Update	**Dr. Fahad Alshahrani** *Consultant Family Medicine* *King Abdulaziz Medical City -Riyadh*
3:20 pm – 3:40 pm	Post Bariatric Surgery Metabolic Complication	**Dr. Sumaya Aljenedil** *Consultant Chemical Pathologist Clinical Lipidologist* *King Faisal Specialist Hospital & Research Centre - Riyadh*
3:40 pm – 4:00 pm	Current status of COVID vaccines and their efficacy against variants	**Dr. Ioanna Skountzou** *Consultant Clinical Pathology, Jeddah Regional Laboratory, Jeddah, Saudi Arabia*
4:00 pm – 4:15 pm	Question and Answer	
4:15 pm – 4:30 pm	Break	
SESSION 8 **Low Carbohydrate Session** **Moderator: Dr. Ali Mahazri** *Assistant Professor in Laboratory Medicine Department /Head of Basic Sciences Department* *Albaha University*		
4:30 pm – 5:00 pm	Insulin Resistance Conundrum	**Mr. Rayyan Al-Sulaimani** *King Abdullah Medical City- Holy Capital (KAMC)*
5:00 pm – 5:30 pm	Water Fasting Therapy	**Dr. Ahmed Alayouby** *Consultant OBGYN, Al Yamama Hospital, Riyadh*
5:30 pm – 6:00 pm	T2DM reversal evidence based	**Dr. Ammar Tonkal** *Senior Internal Medicine Resident* *KFAFH, -Jeddah,*
6:00 pm – 6:35 pm	Type Two diabetes reversal and how to sustain (case series)	**Dr. Abdulhadi Bima** *Chemical Pathology Consultant* *King Abdul-Aziz University Hospital*
6:35 pm – 6:45 pm	Question and Answer	
6:45 pm – 7:00 pm	Break	

SESSION 9 **Protein** **Moderator: Dr. Zuhier Awan** *MD, MSc, PHD, FRCPC, FAACC* *Secretary General of Saudi Society for Clinical Chemistry*		
7:00 pm – 7:25 pm	Contemporary Practice in Serum Protein Electrophoresis	**Dr. Christopher McCudden** *Associate Professor of Pathology & Laboratory Medicine, University of Ottawa, Canada*
7:25 pm – 7:50 pm	Protein Electrophoresis: Recommendations for Standardize Reporting with Case Studies	**Dr. Ronald A. Booth, FCACB** *Associate Professor of Pathology and Laboratory Medicine, University of Ottawa, Canada.*
7:50 pm – 8:00 pm	Question and Answer	
Closing Session **Moderator: Dr. Salam Saadeddin** *Consultant Clinical Scientist* *Clinical Chemistry Division / CML&BB* *Prince Sultan Military Medical City, Riyadh*		
8:55 pm – 9:25 pm	Poster Presentation/ Awarding	**Dr. Salam Saadeddin** *Consultant Clinical Scientist* *Clinical Chemistry Division / CML&BB* *Prince Sultan Military Medical City, Riyadh*
9:25 pm – 9:40 pm	SSCC Report 2021	**Dr. Samia Sobki** *SSCC President*

Scientific Program

DAY 4 Schedule POST-CONFERENCE: Friday, 3rd December 2021
Workshop – POCT

Time		Speakers
SESSION 10 **POCT** **Moderator: Dr. Saeed Alrashedi** *Consultant Clinical Laboratory Scientist, Head of Specimen Processing/Send out/ Phlebotomy & POCT, King Fahad Medical City – Riyadh*		
4:00 pm – 4:20 pm	Effective Governance of POCT Services	**Mr. Tony Cambridge** *Lead Biomedical Scientist Pathology Management University Hospitals NHS Trust - UK*
4:20 pm – 4:40 pm	HOW TO TROUBLE SHOOT INACCURATE POINT-OF-CARE TEST RESULTS	**Dr. Adil Khan** *Associate Professor of Pathology Temple University, Philadelphia, USA*
4:40 pm – 5:00 pm	Development of Lean Provincial POCT Framework for the Installation of Blood Gas Analyzers within the Canadian Province of Newfoundland and Labrador	**Dr. Vinita Thakur** *Division Chief/Clinical Biochemist & POCT Scientific Lead Memorial University, Health Science Center – Canada*
5:00 pm – 5:20 pm	Evolving Role of Optimum Diabetes Care in Form of Low-Carbohydrate Diet Focused Education, Flash Glucose Monitoring System in Pre-Diabetes Individuals.	**Mr. Ayman Al Hayek** *Department of Endocrinology and Diabetes, Diabetes Treatment Center, Prince Sultan Military Medical City*
5:20 pm – 5:40 pm	Point of care testing, Quality and accreditation	**Prof. Dalal Nemenqani** *Professor & Consultant of Pathology & Dean of the College Medicine Taif University*
5:40 pm – 6:00 pm	POCT Current Practices and Future Perspective: The Egyptian Experience	**Prof. Rania Al Sharkawy** *Prof. of Chemical Pathology Medical Research Institute, Alexandria University - Egypt*
6:00 pm – 6:15 pm	Question and Answer	
6:15 pm – 6:30 pm	Closing Remarks	

Industry Workshops Program

Schedule INDUSTRY WORKSHOPS: WEDNESDAY, 1ST DECEMBER 2021

Opening Remarks		
Time		**Speakers**
Workshop 1 **Automation** **Moderator: Dr. Ali Al Shangiti** *SSCC Board Member*		
6:40 pm – 7:00 pm	Considerations When Looking QC for Multiple Instruments	**Mr. Ayman Enayah** *Field Application Specialist* *Bio-Rad Laboratories*
7:00 pm – 7:20 pm	Pre-analytical Errors and Quality Indicators	**Dr. Vladimir Sashkov** *Interim EMA Head of Medical Affairs* *Becton Dickinson, Dubai*
7:20 pm – 7:40 pm	How to Automate Sample Workflow Today & Tomorrow	**Mr. Ahmad Abbas** *Workflow & Informatics (WITS) Manager MEA* *Beckman Coulter MEA – United Arab Emirates*
7:40 pm – 8:00 pm	The Importance of Automated Toxicology Drug Screening	**Mr. Mahmoud Zaghloul** *Saudi Arabia Country Sales Manager* *Thermo Fisher Scientific CDD*
8:00 pm – 8:20 pm	Forensic Toxicology and MS applications	**Mr. Shailesh Damale** *Deputy Manager; Application support* *Shimadzu Middle East and Africa, Dubai*
8:20 pm – 8:40 pm	"Most recent innovations in clinical diagnostics for the Analysis of 48 Amino Acid Analysis in Serum/Plasma and Urine via LC-MS – Solutions for the Clinical laboratory."	**Dr. Frank Kühlwein** *Head, International Sales* *Chromsystems GMBH*
8:40 pm – 9:00 pm	FLCs, SAA and Protis Software	**Dr. Lenard Muller** *Global Marketing Manager of Plasma Protein at Siemens Healthineers*
9:00 pm – 9:20 pm	COVID-19 S-RBD IgG test Application in Epidemic	**Dr. Fadel Alhabibi** *Head of Virology Department, Regional Lab and Blood Bank in Riyadh*
9:00 pm – 9:15 pm	Question and Answer	
9:15 pm – 9:25 pm	Closing Remarks	

Schedule INDUSTRY WORKSHOPS: Thursday, 2nd December 2021

Workshop 2 **Laser Optical Rotational Red Cell Analyzer (LORRCA)** **Moderator: Dr Abdullah Almshari** *Prince Sultan Military Medical City, Riyadh*		
8:15 pm – 8:45 pm	Determining novel biomarkers for sickle cell disease and other hereditary hemolytic anemia's using the Lorrca instrument.	**Dr. Richard van Wijk** *University Medical Center Utrecht, Utrecht, The Netherlands*
8:45 pm – 8:55 pm	Question and Answer	

Industry Workshops Program

Schedule INDUSTRY WORKSHOPS/LECTURE: FRIDAY, 3rd DECEMBER 2021

Workshop 3 **New Biomarkers of Diseases** **Moderator: Dr Walaa Mohammed Saeed** *Associate Professor in Clinical Biochemistry, Vice Dean of Applied Medical Science College at Taibah University*		
7:00 pm – 7:20 pm	Clinical Utility of Prostate Health Index	**Dr. Steven Ness** *Director, Medical & Scientific Affairs* *Beckman Coulter*
7:20 pm – 7:45 pm	PVKA II: Biomarkers for HCC	**Mr. Rani Besisou** *Medical Affairs Manager* *Roche Diagnostics – Riyadh, Saudi Arabia*
7:45 pm – 8:10 pm	Adopting a new TBI 'Traumatic Brain Injury' test in the Emergency Department	**Dr. Paul Jarvis** *Director of Global Medical Affairs, Abbott* *Consultant Emergency Medicine Calderdale & Huddersfield NHS Foundation Trust, UK*
8:10 pm – 8:30 pm	Covid-19 (SARS-CoV-2) Rapid Antigen Testing During the Covid-19 Pandemic	**Dr. Nedim Albayrak** *Head of Medical Affairs* *Integrated Diagnostic Solution, Eastern Europe, Middle East & Africa* *Becton Dickinson & Company*
8:30 pm – 8:45 pm	Question and Answer	
8:45 pm – 9:00 pm	Break	

Workshop 4 **POCT** **Moderator: Ms. Najwa Adlan** *Core Lab& Blood Bank Supervisor, Al-Dara Hospital And Medical Center, Riyadh, KSA*		
9:00 pm – 9:20 pm	Role of POCT in Acute Care Diagnostics	**Dr. Valentina Pigozzo** *Clinical Specialist Acute Care Diagnostics* *Werfen EEMEIA*
9:20 pm – 9:40 pm	The Importance of Accurate Glucose Measurement in Clinically Ill Patient	**Dr. Dennis Begos** *Medical Director, Medical Scientific Affairs* *Nova Biomedical - USA*
9:40 pm – 9:50 pm	Question & Answer	
9:50 pm – 10:00 pm	Closing Remarks	**Dr. Salam Saadeddin** *Consultant Clinical Scientist* *Chairman of The Scientific Committee, SSCC*

Scientific Oral Presentation Abstracts

Male Infertility & Trace Metals

Prof. Abderrazek Hedhili

Professor of Toxicology
University of Pharmacy of Monastir –Tunisia

Introduction: In Tunisia during the past two decades, we have observed an increase in the incidence of male infertility. This pathology could be linked to various etiologies, endocrine, genetic, immunological, infectious, genetic and / or to environmental and food chemical contaminations (pesticides, solvents, trace elements, etc.).

Objectives: To explore the effects of four metals (pb, Cd, Zn and Cu) and their possible impacts on the reproductive function disturbances, the hormonal functions by FSH, LH, Prolactin and Testosterone explorations, the nuclear quality of sperm (DNA fragmentation, chromatin condensation and MSOME (morphology of spermatozoa and organelles) and the eventual oxidative stress perturbation.

Materials and methods: 152 voluntary patients suffering from male infertility, aged between 30 to 55 years and exposed to trace metals (Pb, Cd, Zn and Cu) were explored. The Pb, cd, Zn and Cu were determined respectively by Flame and Flameless atomic absorption spectrophotometers. All other parameters (hormones, semen analysis, etc.) were analyzed by specific methods.

Results: The results of this study are shown mainly for pb and Cd.

- Deleterious effects on hormones FSH, LH, prolactin and testosterone
- The morphology of the spermatozoa has been altered (50% of patients),
- Increased DNA fragmentation.
- A positive correlation between the concentration of cd and pb and the de-condensation of chromatin.

Conclusion: This preliminary study has demonstrated the reprotoxic effect, for cd and pb) and requires its extension to an environmental and food exploration in order to determine the possible implication of environmental pollution and food contamination in the genesis of male infertility.

Scientific Oral Presentation Abstracts

Drug Related Deaths in Jeddah, Saudi Arabia: A Forensic Carboxyhemoglobin Autopsy-Based Study

Dr. Ahmed Al-Asmari
Consultant Forensic Toxicology
King Abdul-Aziz Hospital –Jeaddah

Background: Carbon monoxide (CO) poisoning is a prevalent global cause of death. This is the first epidemiological study investigating the relationship between CO poisoning (silent killer) and the cause of death in autopsy forensic samples received from 2009 to 2020 at the Poison Control and Forensic Medical Chemistry Center, Jeddah, Saudi Arabia.

Methods: The cause of death was classified based on the carboxyhemoglobin saturation level (COHb) in the postmortem blood samples. In 170 post-mortem cases, the level of COHb was positive.The double-wavelength spectrophotometric method was used to quantify the COHb and the samples were confirmed by another spectrophotometer techniques AVOXmeter 4000 system.

Results: Just more than half (58%) of the deaths were due to CO intoxication, and the median level of the COHb in the postmortem blood samples was 56%. The study confirmed that the cause of the death in 15% of the sample were classified as CO-related intoxication (median COHb 21%), and 27% had no relation with CO intoxication or undetermined cause of death (COHb level ≤10%). The manner of death was classified as accidental, suicidal, homicidal, natural or unknown cause of death. The majority (72%) of the causes of death was accidental death, 10% due to suicide, 4% to homicide and 5% to natural death with no relationship to CO poisoning. The manner of deaths were unknown in 15 cases due to a lack of information.

Conclusion: Although CO poisoning globally appears to decline, the rate in Jeddah remained stable through the study period. Safety and preventive educational interventions are required to reduce CO poisoning.

Scientific Oral Presentation Abstracts

Chronic Inhalation of Pod-based E-cigarette Aerosols on Inflammatory Biomarkers in Central Nervous Peripheral Systems

Dr. Youssef Sari

Professor, Department of Pharmacology & Experimental Therapeutics
College of Pharmacy & Pharmaceutical Sciences
The University of Toledo – Ohio

Electronic cigarettes (e-cigs) use has been dramatically increased recently, especially among youths. Previous studies from our laboratory showed that chronic exposure to e-cigs, containing low concentration of nicotine, was associated with dysregulation of glutamate transporters and neurotransmitter levels in the brain of mouse model. In this study, we evaluated the effect of one- and three-months continuous exposure to e-cig vapor (JUUL pods), containing high nicotine concentration, on the expression of glutamate receptors and transporters and mailnly the associated neuroinflammatory markers in drug reward brain regions such as nucleus accumbens (NAc) core (NAc-core), NAc shell (NAc-shell) and hippocampus (HIP) in female C57BL/6 mice. We revealed that three months exposure to mint or mango flavored-JUUL (containing 5% nicotine, 59 mg/ml) induced upregulation in metabotropic glutamate receptor 1 (mGluR1) and postsynaptic density protein 95 (phosphorylated and total PSD95) expression, and downregulation of mGluR5 and glutamate transporter 1 (GLT-1) in the NAc-shell. In addition, three months exposure to JUUL was associated with upregulation of mGluR5 and GLT-1 expression in the HIPP. It is important to note that changes in glutamate homeostasis with chronic exposure to e-cigs may lead to the induction of proinflammatory factors. Thus, we demonstrated in this study that mice exposed to JUUL Mango and JUUL Mint for one month had significantly increased TNF-α expression in the NAc-core and NAc-shell, with elevation in IL-1β as well. NAc-shell also showed significantly increased levels of IL-6 and HMGB-1 for both flavors. There were no significant changes in the hippocampus. There were significantly increased levels of TNF-α in the NAc-core and NAc-shell for both Mint- and Mango-exposed JUUL mice for three months. NAc-shell also showed significantly increased levels of IL-1β, IL-6, HMGB-1, and RAGE after three months of JULL exposure, while the hippocampus showed significantly decreased levels of HMGB-1 for both flavors. These findings demonstrated that one- and three-month exposure to e-cig vapor containing high nicotine concentrations induced differential effects on glutamatergic system as well as induction of proinflammatory markers in the NAc subregions and HIP, suggesting dysregulation of glutamatergic activity is associated with the induction of neuroinflammation in mesolimbic brain regions.

Scientific Oral Presentation Abstracts

The Role of Poisons Control Center in Emergency Toxicology

Mr. Magbool Oraiby

Laboratory Specialist,
Poison Control & Forensic Medicine Chemistry Center – Jazan

This presentation is a brief description of the role of poison control, medical and forensic chemistry centers in Kingdom of Saudi Arabia in emergency toxicology management including detection of intoxicating materials and the protocols of treating and managing such cases. There are a number of poisons control centers distributed almost in every region in the country. Each has its crucial role in emergency toxicology. However, this presentation focuses on the role of Jazan poison control center in emergency toxicology. It covers many aspects regarding emergency toxicology service including types of cases, management, case reports and some statistical data demonstrating various emergency toxicology parameters. Detailed explanation of each point will be introduced with real cases to demonstrate how poisons control centers play important roles in saving lives. On the other hand, most late slides will focus on the participation of Jazan poisons control center in science. A number of published papers and case studies will be exposed to share knowledge and information to make experiments we gain available for our colleagues. The presentation conclusion includes summary of overall speech with some recommendations.

Scientific Oral Presentation Abstracts

Direct Analysis in Real Time (DART) Application in Forensic Toxicology

Dr. Torky Zoghaibi

Assistant Prof. (Forensic Science)/Senior Specialist
Faculty of Applied Medical Science
Department of Medical Laboratory Technologies
King Abdul-Aziz University – Jeddah

Direct Analysis in Real Time (DART) is an ambient ionization technique that allows for mass spectrometric results without the need for sample preparation. It is capable of analyzing samples in gaseous, liquid or solid forms all while producing results rapidly within seconds. DART has been validated for use in numerous forensic analyses including, but not limited to, for the screening of controlled substances. It has been proven to be a capable tool for analyzing explosives, inks, and polymers such as fibers. This talk will focus mainly on the novel clinical and forensic toxicology applications that have been developed over the past few years.

Scientific Oral Presentation Abstracts

The Value of High-Resolution LC/MS in Forensic and Clinical Toxicology Laboratory

Dr. Asim Jilani

Consultant Forensic Toxicologist
Poison Control & Forensic Medicine Chemistry Center – Makkah Al-Mukarmah

The toxicology screening of biological samples to detect drugs or toxic substance is an important in both forensic and clinical toxicology. In clinical toxicology, drug screening can be a very useful tool for improving patient care and treatment guiding for patients of being intoxicated by specific substances. This analysis process is often restricted to very short time (two hours) for sample transportation, sample preparation, analysis and reporting results. For drug screening, immunoassay technology is the main technology used in the clinical laboratory. It is easy to automate on traditional platforms and fast technologies. But, there are many inherent limitations with immunoassays technology including limited specificity and sensitivity which can lead to both false negative and false positive results. Moreover, there is a significant gap time between the new drugs and the release of commercial reagent for detection. Chromatography coupled with mass spectrometry (MS) has significant attention over the last decade as an analytical technique that can be overcome the challenges of drug screening in clinical toxicology. Demonstrating both high specificity and sensitivity in drug detection and also allows methods to be rapidly updated for new drugs. Currently, liquid chromatography (LC) or gas chromatography (GC) are the most commonly used separation techniques in clinical toxicology lab. Using GC-MS is more complex than LC-MS and labor-intensive sample preparation requirements for that non-volatile, highly polar or thermally unstable compounds. High Resolution liquid chromatography–mass spectrometry (LC–MS) offered simple and rapid sample preparation for the most analytes. In addition, high resolution provides very accurate screening method for non-targeted screening with minimize matrix effects. Therefore, High Resolution LC–MS can offer comprehensive with rapid drug screening solutions and that increase its value in the clinical toxicology as laboratory setting.

Scientific Oral Presentation Abstracts

Silica Monolithic Column Coated with Graphene as Drugs Extraction and Clean Up Procedure

Dr. Amin Khattab

Consultant Forensic Toxicologist
Poison Control & Forensic Medicine

The physiochemical properties of silica monolith make it an ideal base material for drugs extracting, pre-concentrating and separation from biological samples which can interact not only with molecules but also with ions and atoms. However, the fabrication of silica monoliths still has some problems, such as cost, limited capacity and fabrication and modification methodology, which can be time consuming and labor intensive. Structure evolution of silica monolith was studied in microwave and conventionally processed samples over the temperature range from 25 to 70 oC. The samples were produced using sol-gel process. The microwave procedure was performed using a single mode cavity at 2.45GHz. Characterization of produced silica monoliths were carried out using a variety of techniques, including Scanning Electron Microscopy (SEM) analysis, EDX analysis, BET and BJH analysis. The data obtained showed that structural differences do exist between conventional and microwave processed samples. It was found however, that microwave based fabrication offered a significantly quicker (11 min) gelation process, compared to those obtained using the thermal heated oven methodology (4,320 min).

The silica monolithic surfaces were modified with graphene which received a thermal treatment at different programmed powers. Using graphene-silica monolith makes the extraction of non-polar, polar, very polar and water-soluble analytes, based on both hydrophobic and electronic interactions, easy and simple.

Finally, this technique makes the modified silica monolithic column capable to extract selected drugs of abuse from biological samples and produce qualitative and quantitative results at the same time.

Scientific Oral Presentation Abstracts

Testing Human Hair for Cannabis

Dr. Farouq Alzahrani

Consultant Forensic Toxicologist
Medical Department at Presidency State Security

Background/Introduction: Hair analysis for cannabinoids is extensively applied in workplace drug testing, although valid data on incorporation of the main analytical targets, Δ9-tetrahydrocannabinol (THC) and 11-nor-9-carboxy-THC (THC-COOH), into human hair is widely missing. Furthermore, Δ9-tetrahydrocannabinolic acid A (THCA-A), the biogenetic precursor of THC, is found in the hair of persons who solely handled cannabis material which complicates the result interpretation. The Society of Hair Testing (SoHT) in 2012 recommended very low concentration at 100 pg/mg of THC as a screening cut-off in hair and 0.2 pg/mg of THC-COOH as a confirmation cut-off. The aims of this work was first to review the literature the analytical methods employed for the analysis of cannabinoids in human hair and were to develop and validate quantitative analytical procedures for the determination of Δ9-THC, cannabidiol (CBD), cannabinol (CBN), 11-hydroxy-tetrahydrocannabinol (11-OH-THC) and 11-nor-9- Carboxy-THC (THC-COOH) in hair using GC-EI-MS and 2D GC-NCI-MS, and to apply these methods to the analysis of hair collected from addicts enrolled in a detoxification program in Saudi Arabia.

Validated Analytical Method: Hair samples were collected from 20 cannabis users admitted to a detoxification ward in Al-Amal addiction hospital, Jeddah, Saudi Arabia. A 40-50 mg aliquot of sample was firstly washed using deionized water and then two times with dichloromethane (3mL of each solvent), for 3 min under sonication, and then dried overnight at room temperature. The sample preparation was based on an alkaline hydrolysis (1ml, 1M NaOH) of hair samples followed by liquid–liquid extraction (LLE) of cannabinoids under basic conditions using only 1.5 mL hexane/ethyl acetate mixture. The organic layer was then transferred into silanised high recovery vials and derivatised with 30 µl of BSTFA with 1% TMCS. To extract THC-COOH, the remaining LLE aqueous layer and/or Sample 'B' digest was acidified first using acetic acid and then introduced onto the hydrophobic/anion exchange solid-phase extraction (SPE) extraction cartridges. Eluent was then dried and derivatised with TFAA and HFIP. Agilent GC-EI-MS equipped with DB-5MS and 2D GC-NCI-MS equipped with an ultra-inert column DB-5MS, as a primary column, and HP-17MS as analytical column, were used for analysis.

Result: THC-COOH was present in more hair specimens than Δ9-THC with 12 specimens (44.4%) having only THC-COOH, one (3.7%) only Δ9-THC and 3 (11.1%) with both. Δ9-THC was detected in 4 hair samples at concentrations ranging from 0.10 to 0.33 ng/mg (mean = 0.16, median 0.11). CBD had a high detection rate with 14 positive samples (51.8%) at concentrations ranging from 0.2 to 4.4 ng/mg (mean = 1.07, median 0.45). CBN was detected in 4 hair samples at concentrations ranging from 0.31 to 1.02 ng/mg (mean = 0.54, median 0.41) 11-OH-THC was not detected in the above-described range. The main metabolite THC-COOH had the highest detection rate of all cannabinoids and was detected in 15 hair samples at concentrations ranging from 1.0 to 7.01 pg/mg (mean = 2.58, median 2.14).

Conclusion/Discussion: Significant lowering of limits of detection was possible to achieve by using the silanised high recovery vials and ultra-inert analytical column. CBD and THC-COOH have the highest detection rate.

Scientific Oral Presentation Abstracts

New Challenges in Forensic Toxicology: Focus on New Psychoactive Substances

Dr. Abdulaziz Aldlgan

Consultant Forensic Toxicologist
Security Forces Hospital, Toxicology Lab –Riyadh

Recently new molecules have appeared in the illicit market, claimed to contain "non-illegal" compounds, although exhibiting important psychoactive effects; this class of compounds are commonly known as New Psychoactive Substances (NPS). They represent an emerging drug problem in many countries. They include, among other, synthetic cannabinoids and cathinones. The speed of the emergence of NPS has resulted in several analytical challenges for clinical and forensic laboratories. One of the major points of concern depends on the substantial ineffectiveness of the current methods of toxicological screening of biological samples to identify the new compounds entering the market. These limitations emphasize an urgent need to increase the screening capabilities of the toxicology laboratories, and to develop rapid, versatile yet specific assays able to identify new molecules. In addition, these compounds introduce different challenges in the interpretation of results for NPS-related deaths. To overcome these emerging challenges, different strategies have been suggested.

Scientific Oral Presentation Abstracts

Forensic Toxicology and Doping Control Drugs Related Analysis

Dr. Mansour Al-zahrani

Forensic Toxicologist Senior Specialist
Poison Control & Forensic Medicine Chemistry Center –
Al-Madinah Almunoarah

In the last decade, high-performance liquid chromatography/tandem mass spectrometry (LC/MS/MS) combined with electrospray ionization (ESI) has been widely used for determining low concentrations of steroids, and derivatization has often been employed to enhance detection. In the present study, endogenous steroids were extracted using a Strata-XL polymeric reverse phase cartridge. The isolated steroids were reacted with 2-hydrazino-1- methylpyridine (HMP) at 50 °C for 30 min. A liquid chromatography-tandem mass spectrometry (LC-MS/MS) was used in a positive mode with multiple reaction monitoring (MRM) for the quantification of testosterone (T) and its precursor, dehydroepiandrosterone (DHEA), in saliva samples collected from twenty young Saudi professional soccer players. The analytes were separated on an ACE Ultracore 2.5 Superphenylhexyl column (150 × 3.0 mm id). The extraction recovery during the pre-treatment was >89% and gave <±20% for inter- and intra-assay precision and accuracy. The limits of quantification (LOQ) were found to be 20 pg/mL for (T and DHEA) and 50 pg/mL for Epitestosterone (EPI). The results showed no significant variation in the concentration of T between pre and post training, whereas DHEA was significantly increased after short-term exercise. These results could indicate that there is no correlation between T and its precursor DHEA level following short term physical activity. EPI concentrations could not be detected with a LOQ of 50 pg/mL in the saliva samples.

Scientific Oral Presentation Abstracts

Testing of GHB in Hair Using GC-MS/MS

Mr. Sami Al-Ghamdi

Forensic Toxicologist Senior Specialist
Poison Control & Forensic Medicine Chemistry Center – Jeddah

Gamma-hydroxybutyrate (GHB) is a substance naturally present within mammalian species. Although GHB used clinically since the 1960s as an intravenous anesthetic, is used as an illicit drug and is implicated in drug-facilitated sexual assault. A confirmation procedure for the identification and quantification of gamma-hydroxybutyric acid (GHB) in hair is presented. This method detect GHB direct without conversion of GHB to This method is unique in that it does not involve the conversion of GHB to the gamma-butyrolactone (GBL). Hair samples were extracted by methanolic incubation procedure followed by liquid extraction (LLE), ethyl acetate evaporated and derivatized with N, O-bis(trimethylsilyl)trifluoroacetamide (BSTFA) with 1% trimethylchlorosilane (TMCS), and analyzed by gas chromatography-mass spectrometry Tripple Quadrupole (GC-MS/MS) . Quantification was performed using multi reaction monitoring (MRM), using GHB-D6 internal standard. This method provides excellent linearity and sensitivity for GHB in hair.

Scientific Oral Presentation Abstracts

Application of Validated LC-MS/MS Method for the Detection of Synthetic Stimulants in Suspicious Urine Samples from Riyadh, Saudi Arabia

Mr. Abdulaziz Aldubayyan

Department of Analytical, Environmental and Forensic Sciences, Faculty of Health Sciences & Medicine
King College London, London -UK
Toxicology Department
Prince Sultan Military Medical City

Introduction: Synthetic stimulants, also known as synthetic cathinones, currently represent the predominant (sub)-class of new psychoactive substances (NPS) in illicit drug markets. Despite increased concerns of constant introduction of new analogues with varied effects and potencies, these drugs are not commonly assayed in routine drug testing and may go undetected. This study presents a validated liquid chromatography-tandem mass spectrometry (LC-MS/MS) method for the detection and quantification of 26 synthetic stimulants and metabolites in human urine, of which some analytes are currently encountered in toxicology casework.

Methods: The method was satisfactorily validated for all analytes using the Scientific Working Group for Forensic Toxicology (SWGTOX) guideline. Evaluated parameters were all achieved acceptable values. Potential use of synthetic stimulants was investigated in suspicious clinical and forensic urine samples originating from workplace drug testing, pre-employment and A&E where previous immunoassay analysis yielded a presumptive positive result for amphetamine but subsequently a negative LC-MS/MS confirmation for this analyte.

Results: Three of the 52 analyzed urine samples were found to contain at least one target analyte and the results also indicate polydrug use of synthetic stimulants with other classical stimulant drugs.

Conclusion: Confirmatory urine analyses for suspicious stimulant drug use should extend beyond classical stimulants to cover a broad range of NPS and their metabolites in order to report any otherwise potentially undetected/new analyte.

Scientific Oral Presentation Abstracts

A survey on public awareness of the relationship of heavy metals: lead & mercury to Autism in KSA

Ms. Asia AL-Harbi
Toxicologist/Medical Researcher
Center of Excellence in Genomic Medicine Research
King Abdulaziz University – Jeddah

Autism spectrum disorder (ASD) is a neurodevelopmental disorder that causes behavior abnormalities. The affected individual shows delay in speech and problems in social interactions. ASD is prevalent in 1-2% of the population worldwide affecting males four times more as compared to the females. In the current study, data of 158 autistic children was collected from various regions of Saudi Arabia. A questionnaire-based cross-sectional study was conducted to determine the effect of lead and mercury on autism in Saudi Arabia. An electronic questionnaire was sent to 158 autistic children families and distributed through social media. The results showed that ASD was affected males three times more than the females. Children of age 6-10 were found to be more affected with ASD than other age groups. Most of the children were diagnosed at the age of 1-5 years while genetic testing was done for only 17.9% of the studied cases. Factors involved in the onset of autism included exposure to environmental pollutants, use of canned foods, dental amalgam fillings, obesity and smoking. Most of the parents were found to be unaware of the role of heavy metals in ASD and sources of these pollutants. Additionally, testing for the presence of heavy metals was done in only 14.3% of the studied children. These results show that there is a lack of awareness and insufficient knowledge about autism among parents. Thus, there is a need for creating further awareness among the people regarding toxic effect of heavy metal pollutants and sources of these pollutants.

Scientific Oral Presentation Abstracts

Stability of Amphetamines in Dried Blood Spots Using GC-MS Method

Ms. Huda Alkhalaf
Laboratory Specialist
Central Military Laboratory & Blood Bank/Toxicology
Prince Sultan Military Medical City –Riyadh

Research Problem: The stability of drugs in biological fluids is a great important for interpretation of analytical results. Recently, analysis of dried blood spots (DBS) is an increasingly accepted method in therapeutic drug monitoring. Contrary to whole blood, DBS sampling is easier, allows storage without additional cooling, and decreases the risk of infections with blood-borne viruses. Consequently, stability studies of amphetamine, methamphetamine (MA), methylendioxy-amphetamine (MDA), methylendioxy-methaphetamine (MDMA), and methylendioxy-ethylamphetamine (MDEA) in DBS are required. The Samples: Human blank blood and spiked drug samples were used for this study.

Scientific Oral Presentation Abstracts

The Global Deadly Trend of Novel Synthetic Opioids

Mr. Abdulrahman Assiri

Laboratory Specialist
Assir Poison Control and
Forensic Medical Chemistry Center -Abha

Novel Psychoactive Substances (NPS) are chemically altered compounds that produced in the laboratory. In the last few years, a couple of hundreds of newly created compounds have been spread all around the world. One important class of the NPS is the Novel Synthetic Opioids (NSO), which produced to mimic the effects of morphine and heroin. However, interestingly enough, they exert a much higher potency. They include the fentanyl-based compounds and non-fentanyl compounds. Considering the large number of reported fatalities involving these compounds within the last couple of years, therefore, it is crucial to accurately identify the physical, chemical and pharmacological properties of these NSO. This vital task would help clinicians who treat the opioid intoxication cases as well as toxicologists who detect and quantitate these compounds in biological matrices. This article aims to review some fatality reports associated with NSO discussing them from toxicological, metabolic and analytical perspectives.

Scientific Oral Presentation Abstracts

Ethyl Glucuronide and Ethyl Sulfate: Ethanol Biomarkers and their Role in Forensic Toxicology Analysis

Ms. Salma Alsayed

Pathology & Laboratory Department
Prince Mohammed Bin Abdulaziz Hospital
Ministry National Guard Health Affair-Al Madinah,

Interpreting alcohol results in postmortem specimens is a well-known problematic in forensic postmortem toxicology investigations. Postmortem fermentation of alcohol can occur in the body immediately after death, during transport of biological specimens, and during storage of the body or specimens before testing. The source of alcohol postmortem is interpreted in three main ways: antemortem alcohol ingestion; postmortem alcohol synthesis in the body; and ante- or postmortem alcohol formation by microorganisms. The presence of bacteria and glucose in the corporal specimens and suitable ambient temperature are known to create conditions conducive to alcohol synthesis in a dead body.

Postmortem ethanol testing uses ethanol biomarkers with the purpose of verifying that ethanol was ingested antemortem rather than having been synthesized after death by microorganisms.

Ethanol biomarkers can be classified to direct and indirect biomarkers. Indirect biomarkers include gamma-glutamyltransferase (GGT), carbohydrate deficient transferrin (CDT %), Aspartate Aminotransferase (AST), Alanine Aminotransferase (ALT) and mean corpuscular volume (MCV) used for detecting alcohol intake, while direct biomarkers EtG, EtS are useful to determine current alcohol use. They are more sensitive than indirect biomarkers for determining chronic alcohol consumption.

EtG and EtS are formed by glucuronidation and sulfonation of the ethanol. These metabolites are formed from ethanol, are not influenced by liver disease, and are detectable in a variety of biological specimens and tissues. They reach a maximum blood concentration 3–5 hours post ethanol intake. EtG and EtS are both nonvolatile, stable, and water soluble. Their concentration in urine reaches a maximum at around 22–48 h after alcohol consumption.

Interpretation of postmortem ethanol findings are affected by different factors that occur in the body after death due to complex physicochemical and environmental processes. The most important factors are the distribution of ethanol between blood, bodily fluids, and tissues, the case history which includes information about alcohol ingestion, the postmortem interval (PMI), and the circumstances surrounding of the body after death. Further, data on the presence of any other putrefaction products in blood (e.g., n-propanol) are necessary. The postmortem changes effects could be either hot or humid climate, open wounds, the location of a body in an open area or closed environment, infections, sepsis, and body fat.

The absence of EtG could be due to postmortem degradation, but its presence, as well as that of EtS, provides evidence that ethanol was consumed before death.

EtG and EtS sample types for laboratory investigation may be in the form of bodily fluids, and/or other tissues specimens. Sample types may be blood, urine, hair, vitreous humor and other biological fluids and tissues. They can be analyzed directly or may need pretreatment. There are many methods used for investigating alcohol biomarkers EtG and EtS. LC-MS/MS is one of the most precise and sensitive method.

Scientific Oral Presentation Abstracts

Clinical Decision Limits in Evidence Based Laboratory Guidelines

Prof. Annalise E. Zemlin

Head of Division; Chemical Pathology
IFCC C-EBLM – South Africa

Studies have found that laboratory results may assist in up to 70% of decisions made regarding patient care. Evidence-based medicine (EBM) is defined as the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. Evidence-based laboratory medicine or EBLM is a separate branch of EBM which focuses on the evaluation and use of laboratory tests with an overall aim of improving patient outcomes. Clinical guidelines are systematically developed statements to assist clinician and patient decisions for specific clinical circumstances. Reference intervals are interpretative tools used to assist clinicians understand laboratory results and are derived from distribution of results obtained from a reference (healthy) population. Clinical decision limits are thresholds used to define the presence of absence of disease and are used in evidence-based guidelines. The standardization of an assay is defined as the concept whereby agreement of test results is achieved by establishing traceability to higher order reference materials and measurement procedures. This begs the question – "Should we be giving clinicians definite cut offs in clinical guidelines that are not comparable between assays?"

Scientific Oral Presentation Abstracts

Biomarkers of Kidney Diseases

Dr. Nawal Basri
Medical Director, Medina Dialysis Center
Ministry of National Guard Health Affairs (MNGHA)

Acute kidney injury (AKI) and chronic kidney disease (CKD) are serious conditions that impact a significant number of people globally.

Biomarkers of kidney can help in diagnosis, evaluate pathogenic processes or pharmacological responses to therapeutic interventions, and determine prognosis of kidney diseases.

Biomarkers can be proteins, lipids, microRNAs, genes, metabolites, proteomic patterns, or cells present in blood or urine.

Conventional biomarkers for kidney functions and damage include serum creatinine (SCr), urine microscopy, creatinine based estimated glomerular filtration rate (eGFR) equations and urinary protein excretion, remains the most commonly used biomarker of kidney diseases despite their known limitations.

Most recently, novel biomarkers have been rigorously investigated as possible biomarkers for AKI, CKD, Nephrotoxic agents as well as glomerular and tubulointerstitial kidney disease.

These kidney biomarkers and their significance in clinical practice will be highlighted here.

Scientific Oral Presentation Abstracts

The Potential Utility of Exosomes in Diabetes as Early Biomarkers and Treatment

Dr. Anwar Borai

Clinical Scientist, Clinical Chemistry
King Abdulaziz Medical City-Jeddah

Diabetes is a metabolic disease characterized by hyperglycemia and its complications and therefore, maintenance of glucose homoeostasis is the target of diabetes treatment.

Recently, evidence showed that the small vesicles of exosomes released by different cells can be utilized as a potential novel biomarker in early diagnosis of diabetes and its associated complications

Evidence also show that exosomes can be used as a potential therapeutic tool in diabetes and its complications.

Scientific Oral Presentation Abstracts

Anti-Mullerian Hormone (AMH) in the Assessment of Fertility & Beyond

Dr. Majed Al Hudhud

Consultant Ob/Gyn and IVF and Head of Ob/Gyn
Department & IVF Services, Dr Sulaiman Al Habib Medical Group, Arryan Hospital, Riyadh, Saudi Arabia

Variations in the AMH decline trajectory in the general population do not support the accurate prediction of menopause

- The ability to predict pregnancy in infertility treatment and natural conception is poor, while a nomogram integrating serum AMH as a stimulation protocol is useful for avoiding poor and/or hyper-responses.

- Improvements in measuring very low concentrations of serum AMH may be capable of distinguishing women with poor ovarian function

- Age-independent standardization of AMH values may be helpful for comparing ovarian reserves among women at different ages

Scientific Oral Presentation Abstracts

Biomarkers of Heart Failure

Prof. Damien Gruson

Professor, Head of the department of clinical biochemistry
Cliniques Universitaires Saint-Luc, Brussels, Belgium

Biomarkers play an important role for the diagnosis and prognosis of heart failure (HF), a disease with high morbidity and mortality as well as a huge impact on healthcare budgets. The measurement of biomarkers is now part of the standards of care and natriuretic peptides are widely used in clinical practice as cardiac markers for early diagnosis, prognosis and for the monitoring of treatment efficiency of HF. More personalized risk assessment of patients with HF is important to develop more tailored based care and for a better allocation of resources. It is therefore important for the sub-phenotyping of HF patients to demonstrate the activation of pathophysiological pathways engaged in the worsening of HF. The sub-phenotyping of patients can lead therefore to a more personalized selection of the treatment. Several biomarkers from different pathophysiological pathways are involved in cardiac remodeling and the evaluation of their circulating levels might provide new insights to the course of the disease and to guide prognostication and therapeutic selection of HF patients

Scientific Oral Presentation Abstracts

Post-COVID Syndrome: Clinical Manifestation and Biochemical Markers

Dr. Nafila Riyami

Senior Consultant & Assistant Head of Clinical Biochemistry Department
Sultan Qaboos University Hospital

The COVID-19 or Sars-COV-2 novel virus continues to infect and affect millions of people around the world. Fortunately, most patients have survived the infection and have recovered completely to resume their normal lives. A proportion of patients, however, go on to suffer a constellation of signs and symptoms that has been named Post Covid Syndrome or Long Covid. This talk will discuss the main clinical manifestations associated with the Post Covid-19 syndrome, the biochemical changes and markers associated with it and proposed hypotheses of suspected underlying causes of the syndrome. A local prospective study looking at Post Covid recovered cases is also discussed.

Scientific Oral Presentation Abstracts

Improving Patient Safety by Control of Pre-analytic Errors in Clinical Laboratory

Dr Waleed Tamimi

Head of Clinical Chemistry Lab
King Abdulaziz Medical City , Riyadh

Medical errors are the 8th leading cause of death. These errors cost $17 billion in USA per year. Up to 15% of patients in five countries in past two years got incorrect test results or delays in being notified of abnormal test results. “Between 32 and 75% of all test errors occur in the preanalytical phase.”

The preanalytical phase is an important component of total laboratory quality.

A wide range of variables that affect the result for a patient from whom a specimen of blood or body fluid has been collected, including the procedure for collection, handling, and processing before analysis, constitute the preanalytical phase.

Physiologic variables, such as lifestyle, age, and sex, and conditions such as pregnancy and menstruation, are some of the preanalytical phase factors.

Endogenous variables such as drugs or circulating antibodies might interact with a specific method to yield spurious analytic results.

The preanalytical phase variables affect a wide range of laboratory disciplines.

Most errors affecting laboratory test results occur in the pre-analytical phase, primarily because of the difficulty in achieving standardized procedures for sample collection.

However, good practices and compliance with the new strategies for error prevention can lead to a substantial reduction in pre-analytical errors.

“Most errors within the preanalytical phase result from system flaws and insufficient audit of the operators involved in specimen collection and handling responsibilities.” “..most of them result from poor system design whereby the designers simply expect too much of the users.”

“The great majority of these errors, however, occur for individual or system design defects in extra analytical phases of the total test in process, especially in the preanalytical phase…”

In this prospective, we will discuss the preanalytical variation and how to improve the patient safety by overcoming these issues.

Scientific Oral Presentation Abstracts

Reducing Errors of Samples and Improving Quality in the Pre-analytical Phase: The role of the Laboratory Medicine

Dr. Amani Gusti

Senior Specialist Clinical Chemistry
Emergency Laboratory
King Fahd Armed Forces Hospital - Jeddah

In a clinical laboratory services pre-analytical phase has plays an important role in term of quality and patient safety. Pre-analytical phase is a phase before analyzing sample in laboratory which includes patient preparation, sampling, labeling, sample transportation, sample storage, and preservation of samples that might influence the laboratory results. The pre-analytical phase is also a source for most laboratory diagnostic errors with some of the greatest challenges for laboratory professionals. Laboratory errors can occur either in pre-analytical, analytical, or post analytical phases but the most frequently errors occur in pre-analytical phase. The good news is that these errors can be minimized by forward-thinking healthcare professionals who are proactive in finding collaborative solutions to overcome them.

This presentation will review the main quality improvement efforts in pre-analytical phase will be discussed to minimize pre-analytical error. The presentation will also review How to meet an accreditation of pre-analytical requirements in clinical laboratories.

Scientific Oral Presentation Abstracts

The Role of Private Healthcare in Realization of KSA Healthcare Transformation

Mr. Abdulla Alkhashan

Director General
Alborg Diagnostic, KSA

Vision 2030 was built on 3 pillars that draw on our intrinsic strengths of being in the heart of the Arab and Islamic Worlds, the investment powerhouse and being the hub connecting three continents of the old world. These pillars are a Vibrant Society, a Thriving Economy, and an Ambitious Nation. These three pillars were cascaded down to 6 level 1 "overarching objectives", 27 level 2 "branch objectives and 96 Level 3 "strategic objectives". The health care system heavily charged with the realization of Level 2 Strategic Objective of raising the standards of our health service, the Level 3 goals of easing access to it, ensuring better value and strengthening prevention against the main threats to our health. Furthermore, the health care system also aims to make a significant contribution to Level 2 Strategic Objective of Promote a healthy lifestyle.

The private sector is considered the main engine for social and economic reforms to transform the economy toward multidimensional growth with improved competitiveness. By bringing both the public and private sectors together, it is expected to contribute to sustainable development. This will improve the level of care, increase patient satisfaction, and reduce financial risks in the public sector.

The private sector is preferred due to its management efficiency and therefore, there will be an increasing reliance on private actors to provide finance, and supply health care goods and services. The government of Saudi Arabia has taken consistent efforts to privatize its health care sector. This has come about through economic reforms, policies that favour the development of the private sector, and the development of PPPs. Successive regimes have continued to make and implement policies that push for the private sector's increasing engagement in health care services, evidenced by the fact that the sector now caters to more than one third of the country's total medical care needs.

While the public sector remains vital in its role to finance and deliver health care, it also plays a crucial part in ensuring universal health coverage. The government, therefore, needs to remobilize its public health care sector to fulfil its duties.

Scientific Oral Presentation Abstracts

Artificial Intelligence in the Clinical Laboratory

Prof. Samer Ellaham

Director of Accreditation, Quality and Safety Institute
Cleveland Clinic - Abu Dhabi

Artificial intelligence (AI) in the healthcare sector is receiving attention from researchers and health professionals. AI in healthcare describes the use of machine-learning algorithms and software, or artificial intelligence (AI), to mimic human cognition in the analysis, presentation, and comprehension of complex medical and health care data. Specifically, AI is the ability of computer algorithms to approximate conclusions based solely on input data. The daily operation of clinical laboratories will be drastically impacted by artificial intelligence AI will also expand the scope of laboratory medicine. The application of AI to large clinical datasets generated through increased automation will lead to the development of new diagnostic and prognostic models. Together, automation and artificial intelligence will support the move to personalized medicine. Changes in pathology and clinical doctoral scientist training will be necessary to fully participate in these changes Increased healthcare demand has placed pressure on laboratory medicine to improve turnover and optimize efficiency using digitalization, automation, and AI. Laboratorians need to understand the utility of AI, its limitations and implementation. The management of big data requires ready access and accurate and contextual analysis. AI uses complex algorithms and data from medical and laboratory data to mimic human analysis and this requires accurate and reliable data. The role of AI in laboratory medicine is rapidly expanding owing to recognition of its potential to improve detection, laboratory workflows, decision support and reduce costs and increase efficiency.

Scientific Oral Presentation Abstracts

Lean Six Sigma Approach in Quality Control Cost Management: A Study from Canadian Province of Newfoundland and Labrador

Dr. Vinita Thakur

Division Chief, Clinical Biochemist & POCT Scientific Lead
Memorial University, Health Science Center
Eastern Health Authority –Canada

Objective: To analyze the cost incurred on the procurement of quality control material and develop an Individualized Quality Control Plan (IQCP) using Lean Six Sigma Strategy. Background: Eastern Health Clinical Biochemistry Laboratory is highly organized, ISO 15189 plus accredited lab catering to a large population of the province of Newfoundland and Labrador. The laboratory functions as a core facility for smaller sites within Eastern Health. Immense increases in costs for quality control and calibration materials were noted and therefore it was mandated that a cost analysis of current QC practices should be done, and lean processes should be introduced in the department to cut down on unnecessary expenditures.

Material & Methods: A project charter based on DMAIC process was developed and a six-sigma team was constituted. A responsibility chart was prepared to assign duties to each team member and explain them their role within the team. Regular Starburst Brainstorming sessions were organized every month to discuss process map of the project. Work Breakdown Structure was developed. SWOT analysis, SIPOC Diagram and Critical to Quality (CTQ) tree were augmented in define phase. In measurement phase, lean six sigma tools were used to review and measure defects in QC procedure and investigate the undue increase in purchase cost of quality control material. Data was analyzed. Changes in procedures were suggested. Risk assessment was done for these changed procedures and QC processes were redesigned based on team's inputs. SOPs were redrafted and data on preventable wastage and cost saving was collected. Monitoring of effectiveness of these changed procedures was done in control phase. Results: Eastern Health is investing large sum of money on procurement of the quality control material. Estimated annual cost for these purchases were at the tune of CAD 400,000. Review of quality control processes showed several defects in these processes like non optimized use of auto analyzers, programming of several low volume tests on more than one analyzer, performance of low volume tests on multiple sites within the city, QC frequency not based on work volume, More QC attempts than required, especially for low volume tests e.g. 10 to 100 QC attempts per one patient test for urine chemistries and 5-10 QC attempts to one patient test for therapeutic drug assays, More QC repeats, QC material use greatly exceeded that needed to complete tests and the high number of calibrations for these chemistries. The processes were reorganized, and an Individualized Quality Control Plan was developed by optimizing defective processes to expect substantial impact on the reduction in usage of QC material thus cutting down the cost incurred on their purchases. Conclusions: Lean six sigma strategies have capabilities to stratify the processes for improving clinical laboratory efficiency and reducing the expenditure appreciably. It is desirable to use lean methods as a tool for continuous quality improvement in these clinical labs.

Scientific Oral Presentation Abstracts

HbA1c : not just a number

Dr. Slavka Penickova

Director/Clinical Biologists
LHUB-ULB Medical Chemistry Laboratory, Brussels, Belgium

HbA1c is an analyte, which is important for diagnosing and monitoring diabetes mellitus, a disease that is widespread throughout the world. Many biological and analytical interferences can be encountered during this analysis. Analytical interferences depend on the method used. Biological interference is the result of individual patient factors. In the case of glycated hemoglobin testing, all factors that significantly alter the half-life of red blood cells could cause such interference. The most important biological interferences, such as hemoglobinopathies in the homozygous state, are detectable by the capillary electrophoresis method for HbA1c analysis. Clinical biologists should be aware of other biological interferences, not detectable by this technique, and request other blood tests, such as hemoglobin, iron, reticulocytes, etc, if suspected.

In our laboratory routine, we found that a combination of the HbA1c test method was ideal. We recommend two methods with complementary analytical interferences, where one of them detects different variants of the hemoglobin chains.

Scientific Oral Presentation Abstracts

Tests to Evaluate Immunological Response to SARS-CoV2 and Correlates of Immunity: The Abu Dhabi Experience

Dr. Laila Abdulwareth

National Reference Laboratory
Deputy ED & Chief Scientific Officer – Abu Dhabi

Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) previously known as novel coronavirus 2019 (nCOV-2019) is the aetiological agent of the Coronavirus Disease 2019 (COVID-19). Both cell-mediated and humoral immune response play important role in preventing infections with SARS-CoV2 virus.

Among the coronavirus SARS-CoV-2 structural proteins, the Spike (S) and the Nucleocapsid (N) proteins are the main immunogens. The S protein contains a receptor-binding domain (RBD), which is responsible for recognizing the cell surface receptor, angiotensin converting enzyme-2 (ACE2). It is found that the RBD of the SARS-CoV-2 S protein strongly interacts with the human ACE2 receptor leading to endocytosis into the host cells of the deep lung and viral replication. Based on that many of the commercial SARS-CoV-2 serological assays that detect antibodies specific to these viral proteins/domains are now targeting the S1 and/or S2 subunits.

Neutralizing antibodies (NAbs) are considered the key protection against COVID-19, but till now the SARS-CoV-2 NAb response remains poorly documented and it is still unknown how long naturally exposed and vaccinated patients will be protected against new infection.

To date, limited data are available correlating commercially available assays with the presence of neutralizing antibodies. Additionally, data from standard serologic tests do not inform whether the antibodies are neutralizing and can prevent reinfection. The worldwide availability of COVID-19 vaccine, also urge the considerable interest in identifying high-affinity neutralizing antibodies to SARS-CoV-2 to assess immune status and to evaluate vaccine responses.

This presentation will discuss the cellular as well as the humoral response to SARS-CoV2 infection, our experience in the Emirate of Abu Dhabi to define immune correlates and seroprevalence studies.

Scientific Oral Presentation Abstracts

Osteoporosis: Overview and Update

Dr. Fahad Alshahrani

Consultant Family Medicine
Department of Family Medicine & Primary Health Care
King Abdulaziz Medical City -Riyadh

Osteoporosis -related to various factors including menopause and aging.it consider as the most common chronic metabolic bone disease, which is characterized by increased bone fragility. With an aging population and longer life span, osteoporosis is increasingly becoming a global epidemic. Currently, it has been estimated that more than 200 million people are suffering from osteoporosis. According to recent statistics from the International Osteoporosis Foundation, worldwide, 1 in 3 women over the age of 50 years and 1 in 5 men will experience osteoporotic fractures in their lifetime. Every fracture is a sign of another impending one. Osteoporosis has no clinical manifestations until there is a fracture. Fractures cause significant morbidity as well as mortality. Moreover, osteoporosis results in a decreased quality of life, increased disability-adjusted life span, and big financial burden to health insurance systems of countries that are responsible for the care of such patients. With an early diagnosis of this disease before fractures occur and by assessing the bone mineral density and with early treatment, osteoporosis can be prevented. Therefore, increasing awareness among doctors, will be effective in preventing this epidemic. Appropriate assessment and evaluation consider as initial important step in management of osteoporosis.

Scientific Oral Presentation Abstracts

Post Bariatric Surgery Metabolic Complication

Dr. Sumayah Aljenedil

Consultant Chemical Pathologist Clinical Lipidologist
King Faisal Specialist Hospital and Research Centre - Riyadh

Bariatric surgery is used for over weight management. It is very effective option to treat obesity, diabetes, high blood pressure, sleep apnea and high cholesterol, however it has some subsequent complications. Beside the procedure-related complications, it has the potential to cause a variety of metabolic, hormonal and nutritional sequelae. These complications are mainly caused by anatomical changes induced by the surgery. Malabsorption complications is very common post bariatric surgery. It involves, vitamins mineral and trace element deficiencies. A noticeably metabolic consequence post bariatric surgery is reactive hypoglycaemia. Dietitian counselling, and follow up with appropriate vitamins and mineral supplements is essential to prevent nutritional and metabolic complications after bariatric surgery

Scientific Oral Presentation Abstracts

Insulin Resistance Conundrum

Mr. Rayyan Al-Sulaimani

King Abdullah Medical City- Holy Capital (KAMC), KSA.

In 1931, Professor Wilhelm Falta introduced insulin resistance and its relationship to diabetes mellitus type 2 (DM2). Now, much attention has been given to resolve primary causes of chronic diseases including insulin resistance. This presentation will focus on how high consumption of carbohydrates that leads to chronic hyperglycemia and hyperinsulinemia, a major contributor to this chronic process, can be controlled to prevent ore even reverse insulin resistance. Such management can therefor reduce the risk of insulin resistance related metabolic disorders such as DM2, obesity, hypertension, cardiovascular disorders, metabolic syndrome, and polycystic ovary syndrome amongst few. We suggest that public awareness programs to follow low or restricted carbohydrate diet and healthy lifestyle is a key to combat insulin resistance and correct a bleak future.

Scientific Oral Presentation Abstracts

Water Fasting Therapy

Dr. Ahmed Alayouby

Consultant OBGYN
Al Yamama Hospital, Riyadh

During fasting, the drastic change in metabolism that follows glycogen depletion is primarily dependent on the metabolism of triglyceride stores in adipose tissue. Triglycerides are separated into free fatty acids and glycerol that the liver converts into ketone bodies and glucose, respectively. Ketone bodies made from free fatty acids through the process of ketogenesis are then converted into acetyl-CoA at the site of the tissues requiring energy. In addition to adipose catabolism, protein catabolism in various tissues including muscle takes place during fasting through the process of gluconeogenesis. More importantly, the chronic inflammatory process in the body is interrupted and the process of autophagy is maximized. During water fasting, the body is spared from alimentation; ingestion, digestion, absorption, and transportation, allowing a so called 'internal maintenance' to occur. Although, the effects of fasting have been thoroughly studied in healthy adult individuals, data concerning certain groups with chronic illnesses are still lacking and close medical supervision is still essential.

Scientific Oral Presentation Abstracts

T2DM reversal evidence based

Dr. Ammar Tonkal
Senior Internal Medicine Resident
KFAFH, -Jeddah,

According to 2017 International Diabetes Federation statistics, there are approximately 425 million people with diabetes worldwide. Type 2 diabetes (T2D) has long been identified as an incurable chronic disease based on traditional means of treatment. We will discuss the concept of diabetes reversal and the current evidence that T2D reversal is achievable using bariatric surgery, low-calorie diets, or carbohydrate restriction. Despite the growing evidence that reversal is possible, achieving reversal is not commonly encouraged by our healthcare system. In fact, reversal is not a goal in diabetes guidelines. Given the state of evidence for T2D reversal, healthcare providers need to be educated on reversal options so they can actively engage in counseling patients who may desire this approach to their disease.

Scientific Oral Presentation Abstracts

Type Two Diabetes Reversal and How To Sustain (Case Series)

Dr. Abdulhadi Bima

Chemical Pathology Consultant,Clinical Biochemistry Laboratory
King Abdul-Aziz University Hospital

Diabetes Mellitus (DM) is a growing global health concern expected to affect more than 552 million people by 2030. The Middle East is anticipated to be among the highest affected regions in the world due to changes in lifestyle, urbanization, and recent economic development. Low carb diet is a popular approach to weight loss and have been getting more recognition as a therapeutic approach to combat diabetes and its complications. After careful evaluation to the patient history and dietary habits, the patient is placed on a specified ketogenic diet and is closely monitored over 4 to 6 weeks. Dramatic control of hyperglycemia and hypertension has been associated with patients following low carb diets. Here, we will present clinical cases managed with low carb diet approach and its positive laboratories outcome and clinical prognosis. Indeed, lifestyle adaptation of low carb diet has been gaining much evidence-based support and can easily be implemented to drastically alter the progression of many chronic diabetes related illnesses.

Scientific Oral Presentation Abstracts

Contemporary Practice in Serum Protein Electrophoresis

Dr. Christopher McCudden

Clinical Biochemist, Division of Biochemistry, The Ottawa Hospital
Associate Professor & Vice Chair, Department of Pathology & Laboratory Medicine, University of Ottawa
Medical/Scientific Director of Information Services & Information Technology & Deputy Chief Medical/Scientific Officer,
Eastern Ontario Regional Laboratory Association – Canada

This presentation will begin with a background on the disease continuum of plasma cell dyscrasias, from Monoclonal Gammopathy of Underdetermined Significance (MGUS) through International Myeloma Working Group definitions of multiple myeloma. The second part of the talk with focus on providing an overview of the key Clinical Chemistry diagnostic, prognostic, and monitoring tests, describing serum protein electrophoresis, urine protein electrophoresis, serum free light chains, and immunofixation. A brief overview of the technology used to generate results will follow with contrasts between capillary and gel-based methods. In the third part of the talk, there will be a an overview of the recently published College of American Pathologists Guideline on Laboratory Detection and Initial Diagnosis of Monoclonal Gammopathies. The CAP guideline provides specific recommendations that 1) Clinical care providers should order both SPEP and sFLC for the initial detection of M protein in all patients with suspected MG; 2) Laboratorians should confirm an SPEP abnormality suspicious for a presence of a M protein with additional testing by sIFE or alternative method with similar sensitivity; 3) Laboratorians and/or clinical care providers should follow up an abnormal sFLC ratio for the presence of a M protein with an sIFE or alternative method with similar sensitivity; 4) Clinical care providers should order SPEP, sFLC, sIFE, and uIFE for the initial detection of M protein in all patients with suspected AL amyloidosis; 5) Clinical care providers should NOT order HLC for initial detection of M protein in patients with suspected MG; 6) Clinical care providers should NOT use total/intact light chains for the quantitation of M proteins in patients with suspected myeloma; 7) In patients with intact M proteins outside the gamma region by SPEP, laboratories should use total immunoglobulin (IgA, IgG, or IgM) for the quantitation of the M proteins; quantitation of a band in the beta-region by SPEP can be performed if the M protein is distinguished from background normal protein bands; 8) Laboratorians should report both quantitative levels of free K and free L and the rFLC when the sFLC assay is performed; 9) Clinical care providers may use rFLC, IgM isotype, M protein >1.5 g/dL, and immunoparesis as risk factors for progression to MM or a B-cell lymphoproliferative disorder. A brief summary of testing recommendations will conclude the talk.

Scientific Oral Presentation Abstracts

Protein Electrophoresis: Recommendations for Standardize Reporting with Case Studies

Dr. Ronald A. Booth, FCACB

Clinical Biochemist, EORLA & The Ottawa Hospital. Associate Professor,
Department of Pathology and Laboratory Medicine, University of Ottawa.
The University of Ottawa, The Ottawa Hospital and Eastern Ontario Regional Laboratory Association (EORLA) - Canada

The Canadian Society of Clinical Chemists Multiple Gammopathy Working Group recently published a comprehensive set of candidates reporting recommendations for protein electrophoresis. The recommendations cover various topics including nomenclature, technologies, quantitation of monoclonal immunoglobulins and immunotyping. They also provide guidance on the clinical importance of certain aspects of the laboratory report. This lecture will focus on the need for standardization of nomenclature, quantitation and reporting. Case examples will be used to illustrate how best to achieve standardized analysis and reporting and how best to support accurate diagnosis and follow-up of multiple myeloma patients.

Scientific Oral Presentation Abstracts

Effective Governance of POCT Services

Mr. Tony Cambridge

Lead Biomedical Scientist Pathology Management
University Hospitals NHS Trust - UK

A safe and quality point of care service cannot be established or maintained without an effective governance structure able to respond to the challenges presented by this area of diagnostics. This presentation will illustrate how good governance can be established, how to engage stakeholders, and where the responsibilities and ownership should be defined. Attendees will be guided on which elements of the service to measure to assess effectiveness and performance.

Scientific Oral Presentation Abstracts

HOW TO TROUBLE SHOOT INACCURATE POINT-OF-CARE TEST RESULTS

Dr. Adil Khan

Medical Director of POCT and Clinical Chemistry & Associate Professor of Pathology
Department of Pathology & Laboratory Medicine, Temple University Lewis Katz School of Medicine, Philadelphia, PA. USA

The ease of performing a laboratory test near to the patient, at the point-of-care, has resulted in the integration of point-of-care tests into healthcare treatment algorithms and play a vital role in the management of patients. Therefore, being able to validate the integrity of test results is essential for patient safety. However, like any laboratory test, these tests are susceptible to errors at the pre-analytical, analytical and post-analytical stages of the testing process. It is important to be able to correctly validate point-of-care test methods to minimize errors, in addition to identifying error entry points because of the serious consequence to patient management of inaccurate laboratory tests.

Scientific Oral Presentation Abstracts

Development of Provincial POCT Framework for the Installation of Blood Gas Analyzers within the Canadian Province of Newfoundland and Labrador

Dr. Vinita Thakur

Division Chief/Clinical Biochemist & POCT Scientific Lead
Memorial University, Health Science Center
Eastern Health Authority – Canada

Background: Point of care testing is an integral part of Laboratory Medicine. In today's challenging time, the world is struggling with a global outbreak of COVID-19 infection caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). A robust province-wide blood gas analysis network is developed to provide immediate patient care. This project is based on a Lean process.

Material: The point of Care division at St. Clare's Mercy hospital (SCMH) is in the city of St John's. This division is functioning as the referral center for Point of Care testing (POCT) for the Province of Newfoundland and Labrador, Canada. This province has four regional health care authorities: Eastern Health, Western Health, Central Health, and Labrador Grenfell Health. Thirty-Three identical Radiometer blood gas analyzers which include ABL 90 flex plus and 90 flex analyzers, as back up, were installed at various Lab and POCT sites in the province. These new units were replacement for old blood gas analyzers from NOVA Phox, Radiometer ABL 800 & 90 and Siemen's Rapid devices. The analyzers were received at different phases at the primary site (SCMH) for implementation.

Methods: Verification of these devices was done in two phases: primary and secondary phases. Verification protocol was prepared. Two reference instruments were verified against existing ABL 800 blood gas analyzers during the primary phase. Primary verification for other units was done against reference instruments at the primary reference site and secondary verification was done at permanent sites of installation. Each instrument was assigned a unique provincial identification number (PEUIN). Equipment accession list, Equipment transfer policy, Pre move checklist, Standard Operative Procedures and other controlled documents were developed as per Good Laboratory Practices (GLP). Primary verification completed at the primary site consisted of method comparison and 1st linearity study. Verified instruments were then installed at permanent sites. Operational training was provided to users at these sites. Secondary verification was processed by trained users at secondary sites which included second linearity, and between day precision using external quality control and internal onboard quality control samples. Verification data was evaluated for acceptance of verification. Errors, if occurred, were corrected immediately by repeating the experiment. Instruments were interconnected with Radiometer Aqure middleware to monitor internal quality control and troubleshooting of errors. Conclusion: Standardization and harmonization of processes by installation of identical blood gas analyzers across the province helped in developing a Lean framework. When processes are aligned and good lab practices are applied; ease and efficiency of people increases, cost is reduced, and time is saved. We plan to implement similar Lean models for further POCT installations in the province.

Scientific Oral Presentation Abstracts

The Evolving Role of Optimum Diabetes Care in Form of Low-Carbohydrate Diet Focused Education, Flash Glucose Monitoring System in Pre-Diabetes Individuals (LCD-FGM)

Mr. Ayman Al Hayek

Head of Diabetes Education and Insulin Pump Unit
Department of Endocrinology and Diabetes, Diabetes Treatment Center,
Prince Sultan Military Medical City

Background: From last few years, the prevalence of diabetes mellitus (DM), in Saudi Arabia, is growing at a frightening rate. Overall, one-fourth of the adult population is affected by DM, which is further predicted to rise to more than double by the year 2030, however, T2D is preventable. It was recently reported that a low-carbohydrate diet (LCD) is useful for achieving weight loss and glycemic control in patients suffering from DM, but there is limited information about the effects of the LCD on disease prevention among prediabetes individuals in Saudi Arabia. In the present study, we hypothesized that the implementation of a LCD education with Flash Glucose Monitoring (FGM) system is a novel strategy to prevent T2D.

Objective: The present study aims to investigate the participant's acceptability of a focused diabetes education utilizing low-carbohydrate diet education and (FGM) use and among participants with prediabetes to drive dietary behavior change as a preventable strategy for T2D development.

Methods: A 6 –months prospective study was conducted at a major tertiary hospital in Riyadh, Saudi Arabia. A total of Fifteen participants with prediabetes: (HbA1c 5.7% - 6.4%) and a body mass index >30 kg/m2 were included. The focused LCD education intervention and assessments took place during 3 one-on-one counseling sessions with the educator visits in addition to Two phone interview sessions at 3 weeks and 6 months after the intervention. At baseline visit, FGM sensors were fixed by a diabetes educator, and participants asked to complete a food intake (FI) and the Food Cravings Questionnaire–Trait (FCQ–T) for 10 days. In second visit, the FCQ–T and FI log along with the Ambulatory Glucose Profiles (AGP) downloaded results were reviewed and the LCD education was provided, including learning about carbohydrates and personalized feedback. A second FGM sensor, with the ability to perform scanning scan for AGP glucose trends, was placed, and the participants recorded their FI and food cravings as they attempted to reduce their total carbohydrate intake (<100 g/day). In the 3rd visit, study participants reviewed their AGP glucometric data and log data. The primary endpoints was to assess participant`s acceptability to follow a focused diabetes education utilizing LCD and FGM use, while The secondary outcomes included % of time spent in hyperglycemia (> 180 mg/dL), weight, and HbA1c change.

Results: Participants perceived clear improvements across all questions relating to the combined focused LCD education acceptability (91%). As the intervention did a weight reduction of 0.63 (P=.02) and a reduction of HbA1c levels by 0.78% (P<.001) since enrollment. Though statistically non-significant, the % of time spent in hyperglycemia and mean daily glucose levels decreased slightly during the study period.

Conclusion: Implementation of optimum diabetes care that combining LCD focused education and FGM use was found feasible and acceptable in individuals with prediabetes which may ultimately prevent or delay T2D development.

Scientific Oral Presentation Abstracts

Point-of-Care Testing Quality and Accreditation

Prof. Dalal Nemenqani

Professor & Consultant of Pathology &
Dean of the College Medicine Taif University

Worldwide, one of the fastest growing aspects of clinical laboratory testing is point of care testing (POCT), estimated to increasing at least 10-12% per year overall and upwards to 30% per year in some testing areas. In contrast, Central laboratory testing has grown approximately 6-7% annually.

POCT is defined by the College of American Pathologists as tests designed to be used at or near the site where the patient is located, that do not require permanent dedicated space, and that are performed outside the physical facilities of the clinical laboratories. It has many advantages and many challenges.

There are many challenges associated with POCT, mainly related to quality assurance. POCT is performed by clinical staff rather than laboratory trained individuals which can lead to errors resulting from a lack of understanding of the importance of quality control and quality assurance practices. Such issues mandate executing a structured, well established, and comprehensive POCT program that covers all phases of testing, pre analytic, analytic and post analytic. It should include policies and procedures that address the definition of POCT, assignment of the responsibility of managing the POCT to the laboratory,the Process of acquiring POCT devices/methods ,training and competency testing requirements , maintenance, quality control, and quality management of the POCT devices/methods and appointment of a qualified individual as POCT coordinator.

The program should address and cover all POCT Accreditation requirements with special emphasis on documentation.

POCT, when used and performed by standards , is a powerful tools toward providing efficient and safe patient care.

Scientific Oral Presentation Abstracts

POCT Current Practices and Future Perspective: The Egyptian Experience

Prof. Rania Al Sharkawy

Prof. of Chemical Pathology
Medical Research Institute, Alexandria University – Egypt

As a developing country with vast human resources and a rapidly growing economy, reforming Egypt's health care sector is a top priority for the national social development agenda. The dimensions of the Egyptian health reform program embraced the WHO Strategy to prevent the non-communicable illness. Several initiatives were launched in this regard at no cost to all Egyptians, including but not limited to the 100 million Seha , National Breast Cancer Screening Programme and the National Hepatitis Campaign. All these initiatives were depending mainly on the POCT as the main diagnostic tool. Point-of-care testing (POCT) is defined as, 'testing that is performed near or at the site of a patient with the result leading to possible change in the care of the patient and is performed in a variety of clinical settings. Point-of-care technologies can help to improve access to healthcare. Implementation of POCT in hospitals and clinics can also shorten the 'therapeutic turn-around time' when compared with conventional laboratory testing. POCT does not replace the medical laboratory but extends it, with a key oversight role and mindful of the accreditation standard and evidence based guidelines adherence. The Egyptian experience adopted several POCT guidelines that ensures sustainable POCT quality management system for reliable and accurate health outcomes

Workshops Oral Presentation Abstracts

Considerations When Looking at QC for Multiple Instruments

Mr. Ayman Enayah

Field Application Specialist
Bio-Rad Laboratories

Historically, QC means, and ranges are based on the performance of an individual analyzer. The lab measures the same QC material on separate days and calculates estimates of the mean and standard deviation (SD). When laboratories have multiple analyzers, each analyzer's mean and SD are individually established. Differences (biases) between analyzers' means lead to increased patient result variation. Some labs try to mitigate this by implementing a mean and SD across analyzers, but at this time, there is not a lot of literature nor consensus how to use this strategy.

This presentation will provide some practical examples how using a quality control data management software can provide tools to compare and analyze the different analyzers in the lab, or even between different laboratories. What are the most common practices to monitor the differences between analyzers in the laboratory? Which tools can we use to analyze and review the data?

Workshops Oral Presentation Abstracts

Pre-analytical Errors and Quality Indicators

Dr. Vladimir Sashkov

Interim EMA Head of Medical Affairs
Becton Dickinson, Dubai

Quality assurance in lab medicine. Main sources of pre-analytical variables and pre-analytical errors include:

- Patient Identification and labelling
- Sample container type and quality of blood collection devices
- Order of draw
- Phlebotomy procedure and difficult vein access
- Tourniquet time
- Clenching & squeeze balls
- Specimen mixing
- Sample centrifugation
- Transportation of samples

Specimen rejection and main reason of it: haemolysis, sample volume fibrin presence ect. Sample storage and stability. Processing and handling of blood specimens. Sample collection from IV lines. Main solutions for prevention of pre-analytical errors – quality control and continuous education.

Workshops Oral Presentation Abstracts

How to Automate Sample Workflow Today & Tomorrow

Mr. Ahmad Abbas

Workflow & Informatics (WITS) Manager MEA
Beckman Coulter MEA – United Arab Emirates

You want a laboratory that keeps pace with the changing reality of healthcare, a laboratory where your technologists are first responders in the patient care pathway. You are seeking ways to cope with well-publicized labor shortages, increasing workloads and demands for delivering high-quality test results faster. Last but not the least, you're looking for ways to reduce the cost of testing.

So, what drives you? Building a high-performance laboratory renowned for its quality, with an engaged team, minimal rote tasks, and fast, reliable turnaround times.

Laboratories are highly focused on enhancing patient care by driving faster turnaround time (TAT), delivering quality results and improving laboratory operations. The DxA 5000 helps laboratories meet these challenges through a collection of patented innovations that deliver rapid and consistent turnaround time, provide a new level of comprehensive preanalytical sample-quality detection, and reduce the number of manual processing steps to significantly improve laboratory efficiency.

The DxA 5000 total laboratory automation system drives this vision into reality: Proprietary intelligence drives rapid and consistent turnaround times for all samples; the industry's most comprehensive pre-analytical sample inspection drives errors out of your workflow; and minimized manual-processing requirements drive increased productivity and engagement.

At a time when up to 75% of lab errors occur pre-analytically,1 all laboratories could benefit from comprehensive workflow automation. That's why we developed the DxA 5000 Fit, an automation system that offers a fundamentally improved approach to laboratory workflow by making intelligent automation accessible to labs of virtually any size.

Intelligent automation previously exclusive to larger laboratories is now within your reach. The DxA 5000 Fit is designed for laboratories with space constraints, yet its scalable design allows it to easily expand to accommodate growing workloads.

The DxA 5000 Fit is an automation system comprising an integrated input/output module—which can be combined with a centrifuge—connected to up to four of the following Beckman Coulter Clinical Chemistry/Immunoassay instruments: Dxl 600, Dxl 800; DxC 700 AU; AU 5800.

Workshops Oral Presentation Abstracts

Forensic Toxicology and MS applications

Mr. Shailesh Damale

Deputy Manager; Application support
Shimadzu Middle East and Africa, Dubai

In recent years, various drug poisons can be easily obtained through different sources. Various incidences of traffic accidents occur frequently due to the taking of stimulant drugs and dangerous drugs, and psychotropics. Inappropriate use of such drugs for consumption and poisoning cases using such medicines like slipping pills has become a big social problem.

Regarding dangerous drugs, the Ministry of Health over the globe has identified the list of the drugs and enforced the Act on Securing Quality, Efficacy and Safety of Pharmaceuticals, Medical Equipment.

Analytical instruments such as LC / MS, GC / MS, etc. are mainly used for analysis of dangerous drugs and drug poisons. The LC / MS / MS drug poison database has over 7,000 phytotoxin spectra registered. Based on two kinds of HPLC separation conditions (ODS method, Biphenyl method), synchronous survey scan (Including MRM simultaneous analysis method for screening measurement of drugs of abuse, medicine for neuropsychiatry, drugs etc. Shimadzu provides a compound list creation tool for creating methods with product ion sampling conditions. It also contains a data sheet containing the monoisotopic mass, chemical formula, CAS number, etc. of the registered compound, making it easy to search for drug poisons that you want to measure.

It is a solution that supports a wide range of drug toxicological analysis such as efficient profiling of drug poisons, screening of designated drugs and highly sensitive quantitative analysis. It helps to expand LC / MS to clinical forensic fields.

Workshops Oral Presentation Abstracts

"Most recent innovations in clinical diagnostics for the Analysis of 48 Amino Acid Analysis in Serum, Plasma and Urine via LC-MS – Solutions for the Clinical laboratory."

Dr. Frank Kühlwein

Head, International Sales
Chromsystems GMBH

Efficacy and clinical utility of Amino Acid Analysis (AAA) rely on the specific, sensitive, and reproducible measurement of Aminoacids in matrices like serum/plasma and urine are challenges in the daily routine lab. Liquid chromatography coupled with mass spectrometry (LC-MS) has emerged as an attractive alternative to classical, time-consuming LC methods coupled with derivatisation. Currently, >40 of Amino Acids are analyzed daily in the clinical setting by still using conservative techniques. Webinar is highlighting the need for faster ready-to-use solutions. Higher throughput, SFDA compliance, better result reproducibility and sample traceability are further features.

In this presentation, Dr. Frank Kühlwein, Head of International Sales at Chromsystems GmbH, Munich, will explain the relevance of clinical LC-MS and related Dx kits in the medical practice, the process for quantification AAs through LC-MS and the advantages of facilitating this process. In the last part of the webinar Dr. Frank will present the range of commercial solutions that Chromsystems can provide to customer working in NBS field.

Workshops Oral Presentation Abstracts

FLCs, SAA and Protis Software

Dr. Lenard Muller

Global Marketing Manager of Plasma Protein at Siemens Healthineers

Nephelometric plasma protein testing offers a sensitive technology for a variety of disease states including cardiovascular risk assessment, kidney diseases or neurological disorders.

Free light chain (FLC) testing has become an important element in diagnosis and monitoring of multiple myeloma. Other innovative assays offer new insights: Serum amyloid A (SAA) is being investigated in more and more studies for progression of COVID-19, or beta-trace protein (BTP) is used an easy and reliable marker for residual kidney function in dialysis patients.

Workshops Oral Presentation Abstracts

Determining Novel Biomarkers for Sickle Cell Disease and other Hereditary Hemolytic Anemia's Using the Lorrca Instrument.

Dr. Richard van Wijk
University Medical Center Utrecht, Utrecht, The Netherlands

The ability of red blood cells (RBCs) to transport gases, their lifespan as well as their rheological properties invariably depend on the cell's deformability, hydration, and membrane stability. These features can be quantitatively measured by the Laser Optical Rotational Red Cell Analyser (Lorrca). Especially the Osmoscan mode of the Lorrca instrument is currently used in clinical laboratories for the diagnosis of various rare anemias. Recently, the Lorrca was equipped with the Oxygenscan. This new module is especially designed to be used in sickle cell disease (SCD). In SCD, sickle hemoglobin (HbS) polymerizes upon deoxygenation, resulting in sickling of RBCs. These sickled RBCs have strongly reduced deformability, leading to vaso-occlusive crises and chronic hemolytic anemia. To date, there are no reliable laboratory parameters or assays capable of predicting disease severity or monitoring treatment effects. In this presentation we will report on a number of clinically relevant novel biomarkers for SCD and other hereditary hemolytic anemias that are produced by the Lorrca instrument in a highly reproducible manner.

Workshops Oral Presentation Abstracts

Clinical Utility of Prostate Health Index

Dr. Steven Ness

Director
Medical & Scientific Affairs

Prostate Health Index (*phi*) is an FDA-approved, CE marked blood test analysis to be used as an aid in distinguishing prostate cancer from benign prostatic conditions.

phi is a proprietary calculation developed by Beckman Coulter Inc. that uses a combination of three blood tests to produce a "phi score." This phi score provides more information about what elevated PSA levels might mean and the probability of finding prostate cancer on biopsy.

The prostate is a gland of the male reproductive system. In adults, it is about the size of a walnut, and weighs between 7 and 16 grams. The prostate is in the pelvis. It sits below the urinary bladder and surrounds the urethra. The prostrate secretes fluid which becomes part of semen.

Prostate specific antigen, also called PSA, is a protein made by cells in the prostate gland. PSA is secreted by both normal cells and cancer cells. PSA is mostly found in semen, but a small amount is also found in blood.

Prostate cancer screening with a Prostate Specific Antigen test, or PSA test, is standard of care and widely performed. The Beckman Coulter *phi* test has the following key features. The *phi* test was FDA approved in 2012 for use as an aid in distinguishing prostate cancer from benign prostatic conditions in men aged 50 and older who have a normal digital rectal exam and a PSA level greater than 4 and less than 10. *phi* is not diagnostic as a prostate biopsy is required for the diagnosis of prostate cancer. The reason *phi* is indicated for men 50 and older, with a normal DRE and a PSA level greater than 4 and less than 10 is that in this PSA range the specificity of the PSA test is poor which results in a large number of false positive PSA tests. False positive PSA tests result in a greater number of unnecessary prostate biopsies. Prostate Health Index uses a calculation based on PSA, free PSA and an isoform of free PSA called p2PSA.

Prostate Health Index is widely published. In the prospective multicenter study published in *Journal of Urology* 2015; 193:1163-69 it was demonstrated that *phi* increases the specificity for prostate cancer by reducing false positive results resulting in a 30% reduction of unnecessary biopsies.

Workshops Oral Presentation Abstracts

Protein Induced by Vitamin K Absence or Antagonist II (PVKA II): Biomarkers for Hepatic Cellular Carcinoma (HCC)

Mr. Rani Besisou

Medical Affairs Manager
Roche Diagnostics – Riyadh, Saudi Arabia

- HCC is the most frequent form of liver cancer (approx. 90% of all liver cancer cases)
- It is a global disease burden and most prevalent in APAC and sub-Saharan Africa
- HCC incidence increases in developed countries due to the increased incidence of risk factors in these countries
- Risk factors in APAC are mostly Hepatitis B & C and Aflatoxin
- Risk factor in developed countries mostly ALD and NASH
- NASH is connected to obesity and obesity number are growing
- PIVKA-II is **P**rotein **I**nduced by **V**itamin **K** **A**bsence or **A**ntagonist **II**
- PIVKA-II is mentioned in three guidelines. These three guidelines apply to regions where currently 72% of HCC cases arise from.
- PIVKA-II is recommended by the Japan guideline
- PIVKA-II Is mentioned in the China guideline together with AFP
- PIVKA-II is described in the APASL guideline as specific marker for HCC but not directly recommended
- AASLD Guideline cites the following:

"In addition, it would be important to determine whether other serum biomarkers in addition to AFP complement US, such as des-gamma carboxy prothrombin, AFP L3, and other novel serum tests. "

Workshops Oral Presentation Abstracts

Adopting a New TBI 'Traumatic Brain Injury' Test in the Emergency Department

Dr. Paul Jarvis

Director of Global Medical Affairs, Abbott
Consultant, Emergency Medicine Calderdale & Huddersfield NHS Foundation Trust, UK

Background: Head injury is a common reason for presentation to the Emergency Department worldwide with an estimated 69 million patients sustaining a Traumatic Brain Injury (TBI) each year. Mild TBI is often difficult to diagnose, and the diagnostic yield from Head CT in this patient group is low. Glial fibrillary acidic protein (GFAP) and ubiquitin carboxyl-terminal hydrolase L1 (UCH-L1) are two neuro-biomarkers which may aid in the evaluation of traumatic brain injury (TBI).

Objective: To determine the accuracy of a new, rapid blood test combining measurements of both GFAP and UCH-L1 for predicting acute traumatic intracranial injury on head CT scan.

Methods: Analysis of banked venous plasma samples from subjects completing the Prospective Clinical Evaluation of Biomarkers of Traumatic Brain Injury (ALERT-TBI) trial, enrolled 2012-2014 at 22 investigational sites in the United States and Europe. All subjects were ≥18 years old, presented to an emergency department (ED) with a nonpenetrating head injury and Glasgow Coma Scale score 13-15 (mild TBI), underwent head CT scanning as part of their clinical care, and had blood sampling within 12 h of injury. Plasma concentrations of GFAP and UCH-L1 were measured using i-STAT Alinity and TBI plasma cartridge and compared to acute traumatic lesions on head CT scan.

Results: 1901 patients had a GCS 13-15 (mTBI), for which the rapid test was intended. Among these subjects, the rapid test had a sensitivity of 0.958 (95% confidence interval [CI] = 0.906 to 0.982), specificity of 0.404 (95% CI = 0.382 to 0.427), negative predictive value of 0.993 (95% CI = 0.985 to 0.997), and positive predictive value of 0.098 (95% CI = 0.082 to 0.116) for acute traumatic lesions on CT.

Conclusions: The test had high sensitivity for the prediction of traumatic lesions on CT scan. The high accuracy of this test may facilitate clinical adoption of neuro-biomarker testing as an aid to head CT decision making in EDs.

Workshops Oral Presentation Abstracts

Covid-19 (SARS-CoV-2) Rapid Antigen Testing During the Covid-19 Pandemic

Dr. Nedim Albayrak
Head of Medical Affairs
Integrated Diagnostic Solution, Eastern Europe, Middle East & Africa
Becton Dickinson & company

There are important differences between PCR and antigen tests. PCR is very sophisticated tests that need to be performed in a clinical laboratory by highly trained technologists. For the PCR test, the specimen is collected from the patient and is sent to the clinical laboratory where the testing is performed and then the results are sent back to the physician who is taking care of the patient. In contrast, the antigen test can be done immediately when the specimen is collected. These are point-of-care tests where the specimen is collected from the patient, appropriately trained laboratory personnel and healthcare providers can run this simple test and the test results are available in about 15 minutes.

The molecular tests are designed to take a single piece of genetic information and amplify. In contrast, with the antigen test there's no amplification of that target. In other words, you measure only what's already there in the virus. In this case, there's about a thousand copies of the antigen that we're trying to measure, and you would expect that it's not going to be as sensitive as measuring a million copies of the genetic information in the molecular test. What we want to be able to do with a diagnostic test is to check whether a patient has an infection - and both the PCR and antigen tests can do that. Secondly, we look if the patient can spread that infection to other individuals and in this case, the antigen test turns out to be a better test because it gives a positive result during the time when the patient is shedding the virus that's infectious for other individuals. The difference between the antigen test and the molecular test is that the antigen test, although it's less sensitive, it is particularly sensitive during the time when the patient is shedding infectious virus.

In conclusion It is very important that as we look at antigen tests, we have to remember that there's a number of tests that have been developed and that not all tests are really the same or equal. There are some tests that work better than others, and so I think for any country or region that's looking to adopt antigen tests, it's very important to look at their performance. It is important to look critically at the available tests and select the best tests to satisfy the needs of the region that will use them.

Workshops Oral Presentation Abstracts

Role of POCT in Acute Care Diagnostics

Dr. Valentina Pigazzo

Clinical Specialist Acute Care Diagnostics
Werfen EEMEIA

The acute care setting requires timely, decisive actions based on accurate diagnostic assessment. Point of care testing devices can support the clinical decision making to expedite the time to treatment, enhance patient care and experience, while assuring quality test results and reducing cost of care. As part of the POC portfolio, the intelligent Blood Gas analyzer with an allin-one, multi-use cartridge offers quality test results with advanced simplicity.

The real-time quality assurance mitigates the potential risks that can affect the results when testing blood gas samples from patients in critical conditions: pre-analytical variables, abnormal sensor response during the measurement process that may be caused by micro-clots, microbubbles, interferences and CO-Oximetry absorbance error. Remote oversight of the blood gas testing service is enhanced by the connectivity solution and automated functionality for management of systems, operators and sample data.

The portfolio also includes Rotational Thromboelastometry, antiplatelet therapy monitoring and activated clotting time testing. Implementation of a Patient Blood Management programme embedded with POC hemostasis testing have been demonstrated to improve patient care to guide the treatment of coagulopathies and to minimize inappropriate blood transfusions, while reducing complications, mortality and LOS during and post-intervention in major surgery and traumatic bleeding. Furthermore, the individual response to antiplatelet and anticoagulant therapy varies, causing a potential hyper-response associated with an increased risk of bleeding or a hypo-response associated with an increased thrombotic risk. Understanding the patient's unique response to antiplatelet therapy and measuring the activated clotting time to guide heparin administration is essential for effective medical decision-making.

The acute care diagnostics portfolio ensures patient safety at every point of patient care, from the lab to the POC, helping and supporting the clinician's offering quality, simplicity and efficiency while reducing cost of care.

Workshops Oral Presentation Abstracts

The Importance of Accurate Glucose Measurement in Clinically Ill Patient

Dr. Dennis Begos
Medical Director, Medical Scientific Affairs
Nova Biomedical – USA

This presentation will review the technique of blood glucose monitoring using point-of-care technology (POCT). The importance of accurate glucose monitoring and glucose control in COVID-19 patients and critically ill patients will also be discussed. Particular attention will be paid to common factors which can cause interference with accurate blood glucose measurements, with ascorbic acid (vitamin C) and hematocrit being major interfering agents. Adverse events from inaccurate glucose results will be reviewed.

Poster Presentation Abstracts

Abstract #: 1

The Need for Having HbA1c Testing Analyzers at The Point of Care in Clinical Area: does it Make a difference?

Ayman A. Al Hayek. Abdulghani H. Al-Saeed. Weal M. Alzahrani. Mohamed A. Al Dawish.

Department of Endocrinology and Diabetes, Diabetes Treatment Center, Prince Sultan Military Medical City, Riyadh, Saudi Arabia

Background: Poor glycemic control is a serious challenge in successful diabetes management. Given the low adherence and compliance with HbA1c testing frequency and the corresponding delay in the appropriate medication adjustment, point-of-care testing (POCT) for HbA1c provides an opportunity for better control of diabetes and higher patient satisfaction. The data with this regard are limited in Saudi Arabia. Therefore, we aimed to assess the level of patient satisfaction associated with the POCT service implementation for HbA1c and evaluate the differences between the number of requested and conducted HbA1c tests before and after POCT implementation and its effect on glycemic control in Saudi clinical practice.

Methods: We conducted a single-center descriptive cohort study in Riyadh, Saudi Arabia. This study had two phases: the retrospective phase (January 2017 to December 2017) and the prospective phase (January 2018 to December 2018). Patient satisfaction was assessed using the patient satisfaction questionnaire short form (PSQ-18) and on-site HbA1c point-of-care testing (HbA1c-POCT) satisfaction questionnaire.

Results: This study included 75 patients with diabetes (37% type 1 ,63% type 2) with a mean age of 44.35 (± 17.97) years. The adherence to physician recommendations for HbA1c testing frequency increased from 24% to 85% (before and after POCT implementation, respectively). High levels of satisfaction across seven dimensions of PSQ-18 (77–88%) were reported towards the provided healthcare service after POCT implementation. Furthermore, a high level of agreement on the statements of the on-site HbA1c-POCT satisfaction questionnaire was also observed. Finally, the mean HbA1c level has significantly improved after POCT implementation compared to the traditionalHbA1c laboratory testing before POCT implementation [8.34 ± 0.67 and 8.06 ± 0.62, respectively, $p<0.001$).

Conclusion: HbA1c testing at POCT improved adherence to recommendations for HbA1c testing frequency for better glycemic control and higher patient satisfaction. POCT reduces turnaround time, improves glycemic control, and facilitates the decision-making process. HbA1c measurement with POC devices is recommended to be implemented in diabetes treatment centers. All of the described benefits of POCT come together to make HbA1c testing the most common procedure for diabetes management at the point of care.

Poster Presentation Abstracts

Abstract #: 2

EVALUATING THE USE OF NON-HIGH-DENSITY LIPOPROTEIN CHOLESTEROL AS A SUPERIOR BIOMARKER FOR CARDIOVASCULAR RISK PREDICTION: A RETROSPECTIVE-COHORT STUDY

Dina Nuwaylati[1], Hoda Gad[2] and Zuhier Awan[2]

[1]Clinical Biochemistry Department, Faculty of Medicine, Jeddah University, Jeddah, KSA. [2]Clinical Biochemistry Department, Faculty of Medicine, King Abdulaziz University, Jeddah, KSA

Background: The prognosis of CAD is LDL-C-dependent, although it only reflects the atherogenicity of one lipoprotein subtype and not the remaining residual risk in other lipoproteins. These residuals can be addressed through non-HDL-C, as it reflects all atherogenic lipoproteins. Our aim was to validate the application of non-HDL-C as a better biomarker for CAD risk prediction.

Methods: The data of 800 multiethnic subjects, 546 being Saudis, were collected retrospectively from medical records at KAUH between 2009 and 2016. Their baseline lipid profiles were obtained, and they were followed-up for CAD occurrence. Non-HDL-C was compared to other lipid biomarkers for its ability to predict the outcome. A sub-analysis was performed among Saudis.

Results: 106 (13.2%) cardiovascular outcomes occurred after a median follow-up period of 25 years. An ROC curve for non-HDL-C showed the highest sensitivity for predicting CAD (AUC of 0.806, 95% CI 0.767 – 0.846 in multiethnic populations; AUC of 0.861, 95%CI 0.809 – 0.913; in Saudis), P<0.001. With an LDL-C cutoff of 3.87 mmol/L and a non-HDL-C of 4.52 mmol/L, the PPV was 16.8% for LDL-C in the multiethnic population and 10.4% in Saudis, compared to 18.7% and 12.2% for non-HDL-C in both populations, respectively. Spearman's correlation showed a stronger association of non-HDL-C with TRL-C only among Saudis with CAD; r_s=0.647 vs. r_s=0.525 among those without CAD, P<0.001. Non-HDL-C strongly correlated with LDL-C among both populations; r_s= 0.893 and 0.926, P<0.001. Furthermore, high non-HDL-C was concordant with higher CAD incidence than LDL-C. Finally, a multiple linear regression model predicted non-HDL-C to be 1.1 mmol/L (95% CI, 1.04 to 1.15) higher than LDL-C among Saudis.

Conclusion: Non-HDL-C is a better predictor for CAD risk compared to other lipid biomarkers and it should be given more emphases in clinical practice.

Poster Presentation Abstracts

Abstract #: 3

A comparative study for measuring serum ferritin levels with three different laboratory methods: Enzyme-linked immunosorbent assay (ELISA) versus Cobas e411 and Cobas Integra 400

Lotfi S. Bin Dahman[1*], Lool S. Al-Mashgri[2], Saleh M. Bin kolaib[3], Fatima M. Alhadhrmi[3]

[1]Department of Medical Biochemistry, College of Medicine and Health Sciences, Hadhramout University, [2]Center of Dermatology and Cosmetic, Hadhramout Modern Hospital, [3]Department of Medical Laboratory Sciences, College of Medicine and Health Sciences, Hadhramout University, Mukalla, Yemen.

Abstract: Different laboratory methods are used to quantify serum ferritin levels as a marker of iron status in the general population. The study aimed to compare serum ferritin levels using enzyme-linked immunosorbent assay (ELISA) versus electrochemiluminescence (ECLIA) and immunoturbidimetric methods and whether they can be used interchangeably.

Methods: A comparative cross-sectional study enrolled one hundred and six Yemeni patients among 33 males and 73 females aged 18-55 years. The study was conducted at the Hadhramout Modern Hospital in Mukalla, Yemen, from 1st January to 30th March 2021. Serum ferritin levels were measured using three different laboratory methods: enzyme-linked immunosorbent assay (ELISA), electrochemiluminescence (Cobas e411), and immunoturbidimetric (Cobas Integra 400). For method comparison, paired-sample T-test was used. For the consistency between the methods, they were analyzed with regression and Pearson correlation. For determining accuracy, Receiver Operating Curve (ROC) was used. At the same time, bias error between the methods was determined through Bland Altman Plot analysis.

Results: Our results didn't show any significant statistical difference between ELISA and Cobas e411 (P=0.967). While significantly higher values from Cobas Integra 400 results than ELISA (P<0.001) and Cobas e411 (P<0.001). However, a strong correlation between ELISA with Cobas e411 (r=0.987, P<0.001) and Cobas Integra 400 (r=0.989, P<0.001) was observed. Furthermore, using the ROC curve at a 95% confidence interval, ELISA showed a significant agreement with the Cobas e411 (89.4%) and Cobas Integra 400 (89.4%). For determining accuracy, Cobas e411 and Integra 400 results showed higher sensitivity and specificity (P<0.001). Additionally, using Bland Altman Plot, significantly negative bias values were observed between ELISA and Cobas Integra 400 (P<0.001). Also, negative bias values for Cobas e411 with Cobas 400 Plus were observed (P<0.001).

Conclusion: Serum ferritin levels were measured by Cobas e411, and Cobas Integra 400 methods are strongly associated with ELISA results with higher sensitivity and specificity. However, further investigations with larger samples are required for better accuracy and precision results.

Poster Presentation Abstracts

Abstract #: 4

Evaluation of (V-PRO) blood collection tubes for routine chemistry and hormones technical aspect and clinical significance of differences.

Adnan Belali, Abdullah S. Alqahtani, Zaed A. Asiri, Alla AlMoulad, Waleed Alharbi, Zahir H. Alshehry

Biochemistry Section, King Fahad Medical City, Riyadh, KSA

Background: The blood collection tube has a considerable impact on the sample's stability and reliability for laboratory analysis. The tube validation and verification procedure are some of the most significant quality control techniques that may assist determine whether a tube is safe to use in the laboratory or not.

Aim & Objective: The purpose of this evaluation is to compare the tubes from two prospective; the clinical and analytical qualifications for chemistry and immunoassay tests using Abbott Architect (c16000 and i2000SR, Abbott, USA), this include blood collection tubes of lithium heparin (LH, Green top tubes), Serum Separator Tubes (SST, Yellow top tubes), sodium fluoride (Gray top Tubes) provided by Advance Medical Co (V-PRO) and Becton, Dickinson (BD).

Materials and methods: Blood samples were collected in two different tubes (V-PRO and BD) by phlebotomist from 20 volunteers. Assays with different testing methodologies were selected for technical comparison (i.e. Ion-Specific Electrode, Immunoassay, Spectrophotometry). Plasma and serum samples (n=60) using tubes from V-PRO and BD total (n=120) analyzed for Albumin, Glucose, Alkaline Phosphatase, Calcium, Aspartate Aminotransferase, Sodium, Total protein(TP), Chloride, Bicarbonate (CO2), Creatinine, Phosphorus, Urea, Vitamin D, Thyroxin(FT4), Thyroid-Stimulating Hormone(TSH). The correlation was determined for accuracy and (mean ± SD) were compared using a student t-test. Clinical significance of deference's was judged by the biases from tubes by comparing them with the current desirable allowable bias based on biological variation.

Results: The average bias of Vitamin D and TSH using SST tubes between (V-PRO) and (BD) were (-1.38% (*p*= 0.877) and -2.93% (*p*= 0.938), respectively,). Furthermore, average bias of TP and CO2 using LH tubes between (V-PRO) and (BD) were the lowest = (0.20% (*p*= 0.958) and 3.44% (*p*= 0.315), respectively). The comparison study (V-PRO vs. BD) showed the optimal correlation for Urea ($\mathbf{R^2}$=0.998) and correlation coefficients (r) = (0.999), while CO2 showed the least correlation ($\mathbf{R^2}$ =0.711) and (r) = (0.842) in LH tubes. And TSH showed the optimal correlation ($\mathbf{R^2}$ = 0.996) and (r) = 0.998, while FT4 showed the least ($\mathbf{R^2}$ = 0.928) and (r) = (0.963) in SST tubes. Finally, sodium fluoride between (V-PRO) and (BD) were ((-1.95%), $\mathbf{R^2}$ = (0.994) and (r) = 0.989) for bias, comparison and correlation coefficient respectively.

Conclusion: Data obtained in study showed that V-PRO tubes are comparable with (BD) and that the use of V-PRO tubes for routine chemistry and immunoassays show minimal effect on the results accuracy.

Poster Presentation Abstracts

Abstract #: 5

Nitric Oxide Levels in Association with Lipid Profile in Endothelial Dysfunction among Type 2 Diabetic Patients

Hamza A. Algomizy [1], Abdelmarouf H. Mohieldein[2]

[1] Biochemistry Laboratory, King Saud Hospital, Unaizah, KSA, [2] Medical Laboratories Department, College Of Applied Medical Sciences, Qassim University, Al Qassim Region, KSA

Background & Aim: Individuals with type 2 diabetes have the chance to develop coronary artery disease (CAD) four-folds more than healthy individuals. CAD in early-stage diabetic patients is often asymptomatic and slow in progression, this imperative situation of silence and asymptomatic incidence requires evidence and screening procedures to verify myocardial ischemia onset in diabetic patients with high susceptibility to develop CAD. This study aimed to (1) estimate the level of NO in association with lipid profile, (2) figure out lipid profile indexes and atherogenic index of plasma (AIP), (3) find the correlation between levels of NO and selected independent variables in type 2 diabetic patients with CAD compared to diabetic patients without any complications and to healthy donors.

Methods: A case-control study in which a total of 103 people have participated, included 50 diabetic patients with diagnosed CAD (group 1; case), 30 diabetic patients without documented CAD or other diabetes complications (group 2; control 1), and 23 healthy controls where they are neither diabetic nor CAD (group 3; control 2). Biochemical parameters were determined as per standard procedures, while Plasma NO was determined quantitatively by measuring its products nitrite and nitrate. Data analyzed using SPSS; descriptive statistics used for demographic and clinical variables. Comparison of variables between groups performed with an unpaired T-test. Pearson correlation was used to examine the relationship between plasma nitric oxide level and selected independent variables. Significance was considered when a P- value was less than 0.05

Results: Data analysis revealed that the diabetic patients with diagnosed CAD (The cases) showed significantly high levels of plasma nitric oxide compared to diabetics without complications (P=0.013) or healthy subjects (P=0.011). NO was positively correlated to FBS and HbA1c but negatively correlated to TC.

Conclusions: Chronic hyperglycemia is possibly accountable for the induction of the endothelial cell for NO overproduction, which may be considered as a key mediator for the incidence of diabetes-related endothelial dysfunction and vascular complications progression.

Poster Presentation Abstracts

Abstract #: 6

THE ASSESSMENT OF LIVER FUNCTION TESTS AND FERTILITY HORMONES IN ATHLETES USING ANABOLIC ANDROGENIC STEROIDS

Shatha. Jambi[1], Anwar. Borai[1], Haitham. Khalil[1], Torki Alzughaibi[2], Ahmed Mirza[2].

[1] College of Applied Medical Sciences, King Saud bin Abdulaziz University for Health Sciences, King Abdullah international Medical Research Center, Jeddah, Saudi Arabia. [2] College of Applied Medical Sciences at King Abdulaziz University, Jeddah, Saudi Arabia,

Background: A growing number of athletes are using synthetic anabolic-androgenic steroids (AAS), comprised of testosterone and other derivatives, to enhance athletic performance and muscle mass. Over the years, numerous reports elucidated the side effects brought on by the illegal use of unprescribed AAS such as liver disorders including infertility and intrahepatic cholestasis, hepatitis adenoma and hepatocellular carcinoma. Consequently, AAS's recreational use has become a case of concern for the general public's health worldwide and should be brought to more serious attention in in particular Saudi Arabia. As of yet, AAS's effect on the hepatic and reproductive systems in Saudi athletes has never been studied. Here, we examined liver function and sex hormone parameters of AAS-users as compared to non-users.

Methods: Fasting blood samples were collected from 16 athletes, 10 AAS-users (cases) and 6 non-users (controls) to measure liver function parameter; ALT, AST, GGT, LDH, ALP, CK, total protein, albumin, and bilirubin. In addition to this, fertility hormones including LH, FSH, total testosterone, estradiol, and prolactin were added. A self-reported questionnaire was used to identify the type of AAS used, the dosage, and the length of the course prior to sample collection.

Results: The results show a statistically significant increase in ALT (P<0.001), AST (P<0.001), CK (P<0.05), and a significant decrease (P<0.05) in albumin (P<0.001) and total bilirubin levels (P<0.01) in AAS-users. However, Total Testosterone increased significantly among AAS (P<0.05), following with a significant decrease in LH (P<0.01) and FSH (P<0.001) levels. While serum prolactin and estradiol levels were significantly increased (P<0.05).

Conclusion: Recreational AAS use outside the therapeutic frame induces biochemical unfavored changes and increases chances of liver damage and infertility with chronic use in Saudi athletes.

Poster Presentation Abstracts

Abstract #: 7

Comparison between biochemical profiles of type 2 diabetic patients with and without NAFL.

Alaa Almowallad[1], Suhad Bahijri[1], Ghada. Ajabnoor[1], Amani. Alhozali[2], Khalid Al-Shali[3], Mymona Ahmed[4], Anwar Borai[5].

[1] Department of Clinical biochemistry and [2] Department of Endocrinology king Abdulaziz university, and [3] Department of biochemistry, KAMC, Jeddah, KSA

Background: The prevalence of Non-alcoholic fatty liver disease (NAFLD) in the Kingdom of Saudi Arabia was reported to be very high in Saudi patients with type 2 diabetes (T2DM). Liver enzymes were reported to be useful markers for diagnosis of NAFLD. However, results from various studies were inconclusive. Thus, better diagnostic serum biomarkers are strongly required. Our aim was to explore the possible use of highly sensitive C-reactive protein (hs-CRP), free fatty acids (FFAs), measures of insulin resistance, and some routinely measured biochemical parameters as markers of NAFLD in T2DM Saudi patients

Materials and Methods: Type 2 diabetic patients with and without NAFLD were recruited from the diabetic clinics in King Abdulaziz University Hospital. Routinely performed analysis of glucose, HbA_1c, total cholesterol, HDL-Cholesterol (HDL-c), Triglycerides, Aspartate aminotransferase (AST), Alanine aminotransferase (ALT), γ-glutamyl transferase (γ-GT), Alkaline Phosphatase (ALP), total bilirubin were carried out. In addition, insulin, hs-CRP, and FFAs were measured. HOMA- IR and LDL-cholesterol (LDL-c) were calculated using known equations. Differences between the two groups were tested using appropriate statistical methods.

Results: A total of 50 (35 men, and 15 women) T2DM patients diagnosed with NAFLD (mean age ± SD 57.45±10.68 years), and 44 (28 men, and 16 women) without (mean age ± SD 58.02±10.36 years) were enrolled in this study. There was no difference between the two groups in gender distribution (P= 0.33). Compared to patients without NAFLD, patients with NAFLD had significantly higher mean duration of diabetes (11.16±7.1 vs. 14.4±8.32 years, P= 0.04), BMI (29.25±4.56 vs. 34.02±5.36, P< 0.001), Waist Circumference (WC) (99.7±12.5 vs. 112.7±12.2 cm, P< 0.001).

Conclusion: In this study, all estimated biochemical parameters showing significant difference in the mean of the two groups showed great overlap in ranges and cannot be suggested to be used singly as markers of NAFLD. However, very highly elevated values of triglycerides, FFA, AST, γ GT, and HOMA-IR were only found in NAFLD disease. A bigger study is needed to find the best combination and calculate cut-off values for diagnosis.

Poster Presentation Abstracts

Abstract #: 8

EVALUATION OF APOPTOSIS INDUCTION BY ACTIVE HEXOSE CORRELATED COMPOUND (AHCC)

Arwa Mohammed Alkhuzaee, Gada Ajabnoor, Aliaa Alamoudi

Clinical biochemistry department, Faculty of Medicine, King Abdulaziz University, Jeddah, KSA

Background: Active Hexose Correlated Compound (AHCC) is a natural nutrient supplement derived from basidiomycete mushroom culture. It showed recently in different studies an immunomodulatory and anticancer effects on different types of cancer including breast cancer and colon cancer**.** The molecular activity of the AHCC is presumed in the acylated alpha-1,4 glucan. However, the exact molecular anticancer effect still under study. **Objective:** In this study we aimed to study the molecular cell death mechanism (apoptosis) induction of AHCC treatment alone or in combination with chemotherapy Gemcitabine (GCB) on breast cancer cells MCF-7 and colon carcinoma cell line HCT-116.

Methods: Cell culture of breast carcinoma cell line MCF-7 and colon carcinoma cell line HCT-116. MTT assay was used to assess cell viability and cell proliferation effect of the AHCC. The cell death mechanism induced by AHCC was analyzed using Annexin V-FITC Apoptosis Detection Kit (Abcam). Cell cycle distribution was evaluated by RNAase A and propidium iodide (PI). Gene expression analysis was carried out using real time qPCR technique to assess panel of apoptotic genes expression levels.

Results: The AHCC exerted cytotoxic activity with a calculated IC_{50} of MCF-7 cells was 7± 2 mg/ml and for HCT-116 cell was 7.3±1.3 mg/ml. the IC_{50} of GCB treatment for MCF-7 and HCT-116 were 39.89±2.3, 17.37±2.7 µM respectively. In the Annexin experiment analysis the AHCC treatment induced significant apoptosis at 48 h in MCF-7 and HCT-116 cells, thus for late apoptosis results observed mean of 17.4±2.96, 15.3 ± 0.25 respectively, for GCB treatment in MCF-7 and HCT-116 cells observed mean of 18.6± 1.7 and 36.8 ±4.4 respectively. The combination treatment of AHCC with GCB produced mean for MCF-7 cells 24.17 ±1.46 and for HCT-116 cell mean 46.5 ±0.7 compared to untreated control cells for MCF-7 and HCT-115 cells mean were 6,17±0.6 and 10.15±1.6 respectively. The cell cycle analysis for AHCC effect in the S phase distribution at 24 h in treated MCF-7 and treated HCT-116 cells showed 32.6% and 41.7% respectively compared to control cells or untreated cells MCF-7 shows 18.4% and HCT-116 showed 14.6%. However. The AHCC effect on G0/G1 phase distribution at 24 h in MCF-7 and HCT-116 were (6% and 1.8%) respectively, compared to control MCF-7 and HCT-166 cells were cells 51.3%, 56.6% respectively. Genes were selected to represent the data of AHCC treated cells, in MCF-7 cell caspase-8 was upregulated which is proapoptotic factor in apoptosis pathway. BCL2 gene is an anti-apoptotic factor showed downregulation. In HCT-116 cells treated with AHCC the CYCS and DIABLO genes were upregulated which were considered as pro-apoptotic mediators. The anti-apoptotic NFKB2 gene expression level showed to be downregulated in AHCC treated HCT-116 cells.

Conclusion: Collectively, finding observed that AHCC possess a potential apoptosis induction mechanism. The activation of pro-apoptotic genes in breast and colon cancer cells suggest a level of extrinsic apoptosis pathway activation. However, the exact mechanism still requires further investigation.

Poster Presentation Abstracts

Abstract #: 9

α-Glucosidase inhibitory activity and toxicological evaluation of 25% ethanolic extract of Gynura Procumbens: its antidiabetic potential

Khaled Algariri [1], M Zaini Asmawi [2], Amirin Sadikun[2]

[1] Department of Medical Laboratories, College of Applied Medical Sciences – Qassim University- Kingdom of Saudi Arabia KSA. [2] School of Pharmaceutical Sciences, Universiti Sains Malaysia, Pulau Pinang, Malaysia.

Background: Type 2 diabetes mellitus (T2DM) is an endocrine disease, which accounts for 9% of deaths worldwide. The aim of oral therapy is to reach normoglycemia to prevent later complications. Among glucose-lowering medications, α-glucosidase inhibitors delay the absorption of ingested carbohydrates, reducing the postprandial glucose. α-Glucosidase inhibitors such as Acarbose have been used for the management of T2DM for a long time. The natural α-glucosidase inhibitors from alternative medicine have become an attractive therapeutic approach for treating T2DM due to their low toxicity. Thus, this study was undertaken to evaluate the potential inhibition activity and toxicological activity of 25% ethanol and its fractions extracts of Gynura Procumbens (G.Procumbens). The extracts were further subjected to phytochemical studies.

Method: The25% ethanol and its fractions (butanol & aqueous) extracts ware obtained from extraction of G.procumbens fresh leaves by soxhlet method . Then, investigated the effect of the 25% ethanol extract and its fraction on α- glucosidase and α- amylase enzymes by administration (500 mg/Kg and 1g/Kg) doses of starch and sucrose in the normal and Streptozotocin (STZ)-induced diabetic rats. Streptozotocin (STZ)-induced diabetic rats and the Organization for Economic Cooperation and Development (OECD) guidelines 425 were used in the toxicity studies. Phytochemical screening, total phenolic, and flavanoid contents were examined.

Results: In the in vivo, α-glucosidase inhibition experiment, the doses of 25% ethanolic extract and its fractions reduced the blood-glucose levels and decreased the peak blood glucose (PBG) and area under curve (AUC) after starch administration in normal rats , while only doses of both ethanolic extract and n-butanol fractions exhibited a significant reduction (P< 0.05) in PBG, AUC and blood-glucose levels after sucrose loading in normal rats . On the other hand, 25% ethanolic (1g/kg) extract and the dose of both n-butanol fractions showed significant reduction (P< 0.05) of the blood-glucose levels, PBG and AUC concentrations after sucrose loading in diabetic rats. Thus, both doses of n-butanol fraction suppressed the blood-glucose levels from increasing as high as the level seen for the control group. This suppression effect was observed at 30 and 60 minutes after starch administration in normal rats, whereas in diabetic rats the suppression effect was observed after 90 and 120 minutes. The degree of prevention of a rise in the blood glucose levels by the n-butanol fraction was close to the results observed when acarbose was used. The extracts did not produce any oral, acute or subchronic toxicity in both female and male rats. In addition, n-butanol extract contains the highest phenolic and flavonoids contents (19.34 µg/ml and 51.34 µg/ml).

Conclusion: n-Butanol fraction possesses the highest corrective effect on postprandial hyperglycemia after administration of starch and sucrose in the normal and diabetic rats by inhibition of the α-glucosidase and α-amylase activities. This potential inhibition effect may be due to the presence of phenolics and flavonoids active constituents. G.procumbens extracts can be considered devoid of any toxic risk and have a no-observed-adverse-effect-level (NOAEL)., G.procumbens leaves extract can be considered as a potential candidate for the management of T2DM.

Poster Presentation Abstracts

Abstract #: 10

Impact Of MCH On HB A1c In End Stage Renal Disease

Sattam Lafy Alanazi and Sultan Alouffi

Department of Medical Laboratory Sciences, College of Applied Medical Sciences, University of Hail, Saudi Arabia

Background: Patients with End stage renal disease (ESRD) have greater risk of cardiovascular disease, diabetes mellitus and hematological abnormalities than the general population. Glycated hemoglobin (HbA_{1c}) has been well established as an index of long-term blood glucose concentrations and as a measure of the risk for development of microvascular complications in diabetes. Erythrocyte life span varies significantly to cause clinically relevant differences in Hb A_{1c} in ESRD. A few studies have reported the nature of correlation between Hb A1c and mean corpuscular hemoglobin (MCH). The aim of this study is to investigate hematological alterations especially that might be associated with altered Hb A1c in diabetic ESRD patients undergoing hemodialysis or peritoneal dialysis.

Methods: 54 patients with ESRD on maintenance hemodialysis and peritoneal dialysis were recruited on this study. The enrolled patients were categorized into 4 groups: (i) 14 patients (age: 55.2 ± 19.5 years) on maintenance hemodialysis without diabetes (HD ND), (ii) 7 patients (age: 40.6 ± 16.8 years), on maintenance peritoneal without diabetes (PD ND) (iii) 22 patients (age: 62.3 ± 11.9 years) on maintenance hemodialysis with diabetes (HD D) and (iv) 12 patients (age: 37.3 ± 21.2 years) on maintenance peritoneal with diabetes (PD D). Biochemical analysis of major analytes and major hematological parameters were measured on Dimension EXL 200 and automated (SYSMX.KX-21n) hematology analyzer respectively . For comparison between groups, ANOVA was used followed by post hoc testing with Bonferroni correction. Paired Student test was used to determine the significance between the pre and post dialysis data means.

Results: The hematological indices most closely correlated with MCH in all studied groups. There was a significant positive correlation between MCH and MCV (r =0.6236, P = 0.0303) , (r =0.9546, P = 0.0008) , (r =0.6303, P = 0.0017) and (r =0.901, P = 0.000) in PD D , PD ND , HD D and HD ND respectively. Among studied hematological parameters, the results showed significant difference in only platelets. However, multiple comparison analysis showed a significant increase in PD D versus HD ND and HD D groups. There was a highly significant correlation between HbA1c and FBG (r = 0.802, P =0.0006) for PD ND group. Although, there was no significant difference in lipid profile (TC, HDL-C, LDL-C and TGs) between all groups, the levels of TGs and HbA1c were significantly positive correlated in HD D group.

Conclusion: Our data showed a numerous hematologic manifestation of renal disease ranging from morphologic changes of red blood cells to coagulation abnormalities affecting hemostasis. Optimal patient care is facilitated by an understanding of these associated complications and their appropriate management. Overall, these data reflect the need for further investigation of the contribution of dialysis in patients with ESRD in presence of diabetes.

Poster Presentation Abstracts

Abstract #: 11

Hematocrit Interference on Measuring Blood Glucose by POCT Devices

Abdulrahman Al Anazi [1,2], Christopher Bueno[1,2], Rehaf Alabdaly [1,2], Francisco Santos III[1,2] , Noel Nicolas[1,2], Najla Alhussain [1,2], Anoud Alharbi [1,2], Ali Alhamad [1,2], Fahad Aljread [1,2], Sami Mahmood [1,2], Abdullah Bahis [1,2], Ikram Alhassan [1,2], Sawsan Haider [1,2], Ivy Alquisalas [1,2], Waleed Tamimi [1,2,3].

[1] Department of Pathology & Laboratory Medicine, King Abdulaziz Medical City, National Guard, [2]King Abdullah International Research Center, and [3]College of Medicine, King Saud Bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia.

Background: Monitoring of blood glucose levels is important for managing and maintaining normalized blood glucose concentrations in hospitalized patients. Point of Care (POC) glucose meters are ideally suited for providing a quick turnaround in results at hospitals. Many of these POCT meters have migrated into use in hospitals without full validation of their use in this setting and concern has been raised about their accuracy especially with interference substances. The aim of this evaluation study was to assess the general analytical performance of two POC glucose meters (Nova Biomedical StatStrip and existing hospital meter- Meter 'A') compared to the main hospital reference laboratory system, to confirm the specificity and accuracy of all the meters when challenged with substances known to cause interferences in current market hospital meters.

Methods: In this study, testing involved measuring glucose on whole blood samples at three different haematocrit (Hct) levels (low, normal and high) over three different glucose concentrations (low, high and very high). Each level was repeated 4 times. The two glucometers used were from Nova Biomedical (StatStrip) and Meter 'A' (mutant Glucose dehydrogenase Enz) which is the hospital existing meter. Both glucometers were compared with the main analyzer in the hospital laboratory from Abbott (Allinity ci). The protocol used for this evaluation study was based on independently developed CLSI (NCCLS) protocols.

Results: Overall, across all Hct and glucose levels, the average StatStrip percent-error (deviation from results from normal versus abnormal Hct levels), the meter showed a 3.4% accuracy error comparing results with and without abnormal Hct levels. In addition, the meter showed only a 8.0% accuracy error versus the reference method overall. Overall, across all Hct and glucose levels, the average Meter 'A' percent-error (deviation from results from normal versus abnormal Hct levels), the meter showed a 6.4% deviation; showing no Hct interference effect using the StatStrip. While the overall accuracy error did not show any major interference effect with the StatStrip. Meter 'A' did show an 23% accuracy error at high Hct readings for low glucose range.

Conclusion: The Nova StatStrip meter did not show any significant accuracy errors or interference effects due to hematocrit level. Meter 'A' did exhibit a small interference effect at high Hct levels for Low Glucose levels.

Poster Presentation Abstracts

Abstract #: 12

Frequency of Serum Free Light Chain Abnormalities in Patients with High Levels of Serum Paraproteinemia Electrophoresis

Najla Besharah, Ahmed Al Saffar, Nada Al zahrani, Saad AL Awad

Central Military Laboratory & Blood Bank, Prince Sultan Military Medical City, Riyadh, KSA

BACKGROUND: Concentration of serum free light chain (sFLC) has been promoted as an assay in the screening and evaluation of monoclonal gammopathic manifestations in addition to serum protein electrophoresis (SPEP) and immunofixation (IFE). The majority of patients with intact immunoglobulin multiple myeloma (MM) present abnormal serum free light chain ratio. However, about 5% percent of patients may present high concentration of M-component with normal sFLC ratio.

OBJECTIVE: To assess the frequency of normal and abnormal sFLC ratio in samples with high level of M-protein detectable by capillary serum electrophoresis from hospital laboratory.

METHODS: Retrospective analysis (January 2019 – September 2021) of all samples which had SPEP and sFCL ordered in conjunction were analyzed. SPEP was analyzed by capillary electrophoresis method (Sebia, France) and sFLC by immunoturbidimetric method (The Binding Site, UK). Abnormal sFLC ratio was considered when outside the reference range (0.26 – 1.65) and a high level of M-component was considered when serum concentration superior to 3g/dL.

RESULTS: A total SPEPs (5592 samples) were ordered and (2000 samples) had sFLC ordered in conjunction, of these samples 118 had abnormal SPEP, 23 of the 118 samples had quantifiable M – component in SPEP superior to 30 g/L (50.5 ± 20.4).of these samples 20 had abnormal sFLC ratio (43.23 ± 50.5) when Kappa involvement and (3.26 ± 25.1)when Lambda involvement and 3 samples had a normal sFLC ratio (0.83 ± 0.76). Patient with normal sFLC 1 had identifiable IgG Kappa, one with Lambda free light chain and one with IgG Lambda.

CONCLUSION: Our results support literature findings of low frequency normal sFLC ratio in patients with high levels of paraproteinemia, which are likely to have an intact immunoglobulin MM diagnosis.

Poster Presentation Abstracts

Abstract #: 13

Laboratory Analysis Results for Predicting Severity and Mortality in Hospitalized Covid-19 Patients

Hossein M. Elbadawy[1], Amin Khattab[2], Aisha Alhaddad[1], Fahad Dakilallah Aljohani[2], Ziab Alahmadey[2], Yaser Alahmadi[2], Heba M. Eltahir[1], Hanaa Wanas[1]

[1] College of Pharmacy, Taibah University, Al Madinah Al Munawarah, KSA, and [2]Laboratory Department, Ohud hospital Madinah, Al Madinah Al Munawarah, KSA

Background: Coronavirus Disease 2019, COVID-19, has reached all the corners of the world and was declared by the WHO as a global pandemic and public health emergency of international concern on the 31st of January 2020. Allocating quick and specific biomarkers to predict the disease severity upon admission to hospital became a crucial need. This study, therefore, aimed at exploring the relationship between laboratory results in COVID-19 patients admitted to hospital and the outcome in these patients.

Methods: Retrospective analysis was performed on the medical records of 310 COVID-19 positive patients admitted to Uhod hospital, the referral hospital in Madinah, Kingdom of Saudi Arabia, between the 13th of April and the 29th of July 2020. The association of laboratory results with the survival/mortality outcomes was studied.

Results: It was demonstrated that low hematocrit (Ht), lymphopenia, prolonged activated partial thromboplastin time (aPTT), high lactate dehydrogenase and creatine kinase (CK) are valuable prognostic indicators to predict the severity of the disease at early stages.

Conclusion: It is proposed to perform these tests on admission to hospital for moderate to severe COVID-19 patients to improve the management of those cases and reduce mortality.

Poster Presentation Abstracts

Abstract #: 14

Serum Cytokine Levels as Critical Parameters in Early Diagnosis of Disease Progression In Covid-19

Walaa Mohammedsaeed, Ziab Zakey Alahmadey[2]

[1] Department of Medical Laboratories Technology, Faculty of Applied Medical Sciences, Taibah University, Al Madinah Al Munawarah, KSA, and [2]Laboratory Department, Ohud hospital Madinah, Al Madinah Al Munawarah, KSA

Background: the severity of Coronavirus disease 2019 (COVID-19) has been proposed to be associated with cytokine dysregulation. A significant number of patients become serious and need intensive care in hospitals.

Method: the serum levels of cytokines interleukin (IL)-6, IL-10, and TNF (tumor necrosis factor) were estimated in 60 adult patients infected with SARS-CoV-2 along with 50 age-matched control adults.

Results: the mean age of the subjects was in the range 50-52 years and included equal number of males and females. The patients were further classified into severe (38 patients) and non-severe cases (22 patients). Enzyme-linked immunosorbent assay (ELISA) was used to estimate cytokine levels in serum samples. The mean serum levels of cytokines in the COVID-19 patients were significantly higher than those observed in the control group. IL-6 was excessively elevated in comparison to IL-10 and TNF. Comparative analysis of severe vs non-severe cases revealed only slight alterations in all the three cytokines; IL-6 being the most elevated in severe cases. The liver enzyme ALT was higher than AST in both severe and non-severe cases. The mean concentration of serum electrolytes (Na, K, Ca) did not vary much between the patients and healthy controls. Cytokine levels correlated positively and significantly with serum biomarkers in patients with COVID-19. **Conclusion:** current study suggests that early detection of cytokines especially IL-6 along with serum biomarkers can help in reducing disease prognosis and its severity in COVID-19 patients.

Poster Presentation Abstracts

Abstract #: 15

Prevalence of Celiac Disease and Reproductive Outcomes in the Saudi Population

Maram S. Alsefri[1], Ahmed Saleh[1], Abdullah Aljuryyan[2], Dania aljaroudi[3], Zaed Asiri[2], Peter Cahusac[3], Muhammad Amin[4], Weaam Babour[2]

[1] Faculty of Medicine, King Fahad Medical City Research Center, [2] Clinical Laboratory Medicine Administration, & [3] Reproductive Endocrinology and Infertility Medicine Department, King Fahad Medical City, Riyadh, Saudi Arabia, and [4] College of Medicine, Alfaisal University, Riyadh, Saudi Arabia.

Background: Celiac disease (CD) adversely affects fertility and other reproductive complications in females, Alongside fertility in males. Women with CD have a significantly higher prevalence of reproductive disorders, including amenorrhea, early menopause, menstrual cycle irregularity, reduced fertility, and recurrent spontaneous abortion (1). In contrast, males Semen analysis revealed marked abnormalities in sperm morphology (teratozoospermia), motility (asthenozoospermia), Androgen insensitivity syndrome (AIS), and reduced sexual activity (2). Our aim to determine the prevalence of infertility, miscarriage, and menstrual cycle disorders in a group of celiac disease (CD) patients.

Methods: A retrospective study performed by using pathology and clinical laboratory medicine administration records between January 2014 and February 2020 to identify patients with serum tissue transglutaminase IgA (tTGA) (>30 U/mL), and pathology lab reports for 216 CD patients. Thereafter, interviews were conducted with patients via mobile phone to collect further information.

Results: The prevalence of CD women with infertility was (29.8%) and (21.7%) among CD men. In addition, CD married women have other complications during the pregnancy, such as miscarriage (46.2%). Analysis showed that more than expected numbers of women and men were infertile, $p < .001$. CD women experienced more complications i.e., menstrual cycle disorder as oligomenorrhea 7.3%, and 25.9% had irregularity of menstrual cycle.

Conclusion: CD appears to be more prevalent in males and females with either explained or unexplained infertility. The symptoms of reproductive disorders should alert screening for CD, even in the absence of suggestive symptoms. These findings recommend increasing awareness about CD, to increase individual wellbeing and public health.

Poster Presentation Abstracts

Abstract #: 16

Diagnostic Comparison Between Cord Blood and Filter Paper for The Screening of Congenital Hypothyroidism

Seham Alameer[1], Eman Althobaiti[1], Saud Alshaikh[1], Meshari Turjoman[2], Feras Badriq[1], Abeer AlSofyani[1], Mohammed Mujalled[1], Anwar Borai[1]

[1] King Abdullah International Medical Research Center, King Saud bin Abdulaziz University for Health Sciences, King Abdulaziz Medical City, Ministry of National Guard Health Affairs, Jeddah, Saudi Arabia and [2] King Abdullah International Medical Research Center, King Saud bin Abdulaziz University for Health Sciences, Prince Mohammad ben Abdul-Aziz Hospital, Ministry of National Guard Health Affairs, Al-Madinah, Saudi Arabia

Background: Cord blood and heel prick TSH levels are essential in diagnosing and preventing the serious complications of congenital hypothyroidism which mainly include intellectual disability. The study aimed to compare between cord blood and heel prick TSH sensitivity and specificity in detecting congenital hypothyroidism (CH) among newborn screened babies.

Method: The study included 21,012 newborn screened babies for congenital hypothyroidism starting from September 2013 until March 2019. Both cord blood and heel-prick TSH were collected from each newborn. Heel-prick and cord blood TSH cut-off values of >21 µU/mL and >30 mIU/L respectively were considered positive.

Results: Out of the total screened newborns 12 were confirmed for having primary congenital hypothyroidism. 9 cases were positive for cord blood TSH (Sensitivity 75%, specificity 99.9%, and a recall rate of 0.004%) while 139 cases were positive for heel prick blood TSH (Sensitivity 100%, specificity 99.3%, and a recall rate of 0.60%).

Conclusion: For the screening of CH, heel-prick is considered a superior method, but cord blood remains a practical option due to its cost-effectiveness, immediate action, and lower recall rate. Therefore, whenever recall is difficult and/or early discharge is the practice, cord blood is an alternative method to heel-prick but not with cases of prematurity.

Poster Presentation Abstracts

Abstract #: 17

APOPTOSIS AND OXIDATIVE STRESS AS RELEVANT MECHANISMS OF ANTITUMOR ACTIVITY OF ZnO-NPs IN EXPERIMENTAL MODELS

[1] Hanem Rabah, Yehia El Mashad, [2] Samah K. Nasr Eldeen, [2] Wafaa Ibrahim [a]

[1] Department of Medical Biochemistry, Faculty of Medicine, Tanta University, Egypt and [2] Central laboratories, Egyptian Ministry of Health, Tanta, Egypt

Background: As with any other chemotherapy, methotrexate (MTX) is considered a common therapy against a variety of cancer types, nevertheless, its usage is requisite in elevated dosages thus leading to severe contrary actions. To boost its effect without increasing its side effects we checked the effect of Zink oxide (ZnO) nanoparticles (NPS) which are considered as a promising novel anticancer agent as well as methotrexate in mice bearing Solid Ehrlich Carcinoma (SEC).

Methods: In the present study, we investigated the possible mechanisms of apoptosis and DNA damage in the tumor cells which were induced by ZnO NPs on day 1 (early stage) and day 12 (late-stage) after tumor inoculation for three weeks.

Results: Treatment with ZnO NPs with or without MTX induced anti-tumor effects against SEC as revealed by a remarkable decrease in tumor size, upregulation of expression of apoptotic gene *Bax*, along with downregulation of anti-apoptotic gene *Bcl2* in tumor tissues. Additionally, ZnO NPs increase DNA fragmentation and oxidative stress in tumor cells.

Conclusion: Interestingly, based on the data, this study has provided insights into the possible mechanism of apoptosis caused by ZnO NPs which were administered with or without MTX.

Poster Presentation Abstracts

Abstract #: 18

A critical appraisal of four Automated Immunoassay Tests for the Measurement of 25-Hydroxyvitamin D

Amani Ayed Albelwi

Faculty of Biology, Medicine and Health, University of Manchester, UK.

Background: Vitamin D deficiency is one of the major health issues worldwide, therefore a reliable routine assay to assess vitamin D status in the circulation is required. Currently, total 25-Hydroxyvitamin D (25(OH)D), the sum of 25(OH)D2 and 25(OH)D3, is considered as the most accurate indicator for vitamin D status. However, patients on vitamin D therapy should be monitored by measuring 25(OH)D2 and 25(OH)D3 separately. The concentration of total 25(OH)D can be measured by various methods including liquid chromatography-tandem mass spectrometry (LC/MS-MS) and immunoassay.

Aims: To evaluate and compare the ability of measuring 25(OH)D by LC/MS-MS and immunoassay. Also, to critically assess the performance of four common automated immunoassays Elecsys, Centaur, iSYS, and Architect assays of measuring the total 25(OH)D, compared to LC/MS-MS analysis.

Method: An extended literature review, searching of various keywords in different databases for a period between 2015 and 2020.

Results: LC/MS-MS can measure 25(OH)D2 and 25(OH)D3 separately with a high level of analytical performance. Coefficient of variation (CV%) values of precision are <5.03%. The bias of accuracy ranges (0.3-2.7%) and the Lower limit of Quantification (LQ) is 6.25 nmol/L for each. However, automated immunoassays capture 25(OH)D2 and 25(OH)D3 and calculate the total without distinguishing between them, with %CV values of precision of 19.1 to 1.0%. The bias of accuracy ranges from 0.6 to 4.1%. The LQ values of automated immunoassays varies between 7.5 to 17.5 nmol/L of total 25(OH)D. Furthermore, the Architect and iSYS assays show good agreement with LC/MS-MS, while the Elecsys and Centaur assays show high biases against LC/MS-MS.

Conclusion: The LC/MS-MS method shows the most accurate performance for measuring 25(OH)D, with high level of sensitivity, although it has a limitation of separating some metabolites leading to over-estimation 25(OH)D level; some approaches can overcome that. Automated immunoassays perform a different agreement with LC/MS-MS causing a variety of classifying patients, therefore, clinicians should consider the utilized assay before making clinical decisions.

Poster Presentation Abstracts

Abstract #: 19

Identification Of Nkx2.5 Mutations in Congenital Heart Defects

Hamssa Mohammed Hawsawi, Adeel G Chaudhary and Ibtessam R Hussein

Faculty of Applied Medical Sciences, King Abdulziz University, Center of Excellence in Genomic Medicine Research, Jeddah, Saudi Arabia

Background: Congenital heart defects (CHDs) are the most common developmental anomaly. The incidence in newborns is approximately 1%. They are the leading cause of mortality among newborns. CHDs result from combined effects of genetic and environmental factors. Genetic factors have a significant role in cardiac development. Any change affects those genes is a primary cause of (CHD). The transcription factors TBX5, GATA4, NKX2.5 are major players. The homeodomain transcription factor NKX2.5 has a major significance among the cardiac genes. It is a transcription factor essential for normal cardiac development and in the determination of myocardial cell fate and the subsequent morphogenesis. This cardiac specific homeobox gene, is one of the earliest markers of cardiac mesoderm. NKX2.5 also plays a critical role in the postnatal development of the conduction system. Heart development and adult heart function can be altered by NKX2.5 mutations. The mutation in this gene is causing abnormal protein degradation via Ubiquitin-proteasome system and partial impaired transcription activity. The aim of the study was to identify mutations in NKX2.5 among patients with different heart defects.

Methods: The study included 46 congenital heart defects patients and 10 normal control subjects. Patients were referred from King Abdul-Aziz University Hospital) KAUH) , the Pediatric Cardiology Clinic to the Center of Excellence in Genomic Medicine Research (CEGMR). The patients were 23 males and 23 females. Their ages range from 9 days to 14 years. Most of the cases had more than one type of cardiac abnormalities. Two cases, one with Down syndrome and the other one with Edward syndrome were excluded from the study. DNA extraction, gel electrophoresis, Polymerase Chain Reaction PCR and DNA sequencing were done to all coding exons of NKX2.5 using automated sequencer.

Results: one mutation in NKX2.5gene was detected in two patients, (Arg25Cys) mutation. Also, five previously reported SNPs: rs:767243751, rs:2277923, rs:151314714, rs: 3729753 and rs:72554028 were identified.

Conclusion and Recommendations: The association between NKX2.5 mutations and CHD was observed in small percentage of patients in the Western region of Saudi Arabia. More analysis with a larger sample size is needed to understand the entire picture of CHDs and to establish the association between CHDs and the presence of mutations and SNPs.

Poster Presentation Abstracts

Abstract #: 20

STABILITY OF PARATHYROID HORMONE (PTH) IN-VITRO

Nora Al-Bagaei[1], Ali Al-Hamad[1], Amal Al-Sughair[1], Abeer Al-Enazi[1], Fares Al-Qahtani[1], Albandari Al-Mutairi[1], Fay Al-Khuredly[1], Dalal Al-Bogami[1], Haya Al-Dawsari[1], Rana Al-Yaeesh[1,] Waleed Tamimi[1, 2, 3]

[1]Department of Pathology & Laboratory Medicine, King Abdulaziz Medical City Riyadh, Saudi Arabia, [2]Department of Clinical Laboratory Sciences, College of Applied Medical Sciences, King Saud bin Abdulaziz University for Health Sciences (KSAU-HS), Riyadh, Kingdom of Saudi Arabia, and [3]King Abdullah International Medical Research Center (KAIMRC), Riyadh, Kingdom of Saudi Arabia.

Background: The half-life of parathyroid hormone (PTH) is very short in-vivo. The stability of PTH in-vitro in human blood has been also reported. However, no solid information of which blood collection tubes may be more suitable and stable to preserve PTH at different temperature conditions. In this study we have examined in serum and plasma blood collection tubes at different storage temperature for PTH measurements.

Methods: Blood samples from 20 patients were collected in parallel into EDTA plasma and SST gel separator tubes. Each plasma and serum samples were aliquoted into 4 tubes, the first aliquot was assayed directly after centrifugation to determine the "baseline" values. We later evaluated the change in PTH values when stored at (2-8 °C) after 24 hours and after 7 days, and then the stability of the 'frozen' PTH at (-20 °C) over one month. Comparison study was performed between the initial "baseline" values of Serum and Plasma PTH and the stored aliquoted samples of the same specimen type using the acceptable total allowable error (TEa) of 25%. Additionally, comparison between "baseline", 24 hours and one week of serum and plasma samples were conducted to determine the effect of the sample type to PTH results.

Results: All 20 PTH results were compared over a range of 2.45 to 15.73 pmol/L. Data shows that difference between Plasma and Serum PTH results at the Baseline, after 24 hours and 7 days at (2-8 °C) were within allowable error for 20 of 20 specimens (100%) with correlation coff (R) of 0.99, 0.98 and 0.97 respectively with p values of (0.65, 0.37, 0.51) respectively. PTH values in serum samples stored for 24 hours at 2-8 °C, 7 days at 2-8 °C and for one month at -20 °C were compared to the baseline of serum samples and all were within the acceptable limit of comparison with correlation Coeff (R) of 0.99 (p=0.63, 0.26, 0.27). Similarly, Plasma PTH values were stable after 24 hours at 2-8 °C, 7 days at 2-8 °C and for one month at -20 °C when comparing results to the initial samples with correlation Coeff (R) of 0.99 (p=0.98, 0.34, 0.98).

Conclusion: The study confirms that type of specimens used and specimens' stability have no effect on the false increased in PTH levels. Further study should be done to establish the laboratory normal range. However, results should be used in conjunction with other data, e.g., symptoms, results of other tests when Intact PTH results are inconsistent with clinical evidence.

Poster Presentation Abstracts

Abstract #: 21

Stability Study of Clinically Relevant Analytes in Pleural and Peritoneal Fluids

Amal Barnawi[1], Ali Al-Hamad[1], Nora Al-Bagaei[1], Rayan Al-Saedi[1], Majed Al-Shebani[1], Majedah Kadory[1], Mutasim Al-Knani[1], Sara Al-Dawas[1], Hassan S Alamri[2, 3], Maaged Alakiel[2, 3]

[1]Department of Pathology & Laboratory Medicine, King Abdulaziz Medical City Riyadh, Saudi Arabia, [2]Department of Clinical Laboratory Sciences, College of Applied Medical Sciences, King Saud bin Abdulaziz University for Health Sciences (KSAU-HS), Riyadh, Kingdom of Saudi Arabia, and [3]King Abdullah International Medical Research Center (KAIMRC), Riyadh, Kingdom of Saudi Arabia.

Background: Since analyses of pleural and peritoneal fluids are not characterized in the manufacturer's analytical performance specification and are not as common as serum, urine, and CSF, the aim of this study was to investigate the stability of 14 clinically relevant analytes in pleural and peritoneal fluids (ascetic) stored in variable storage temperatures with different time periods for the purpose of achieving proper storage condition needed prior to reanalysis and during evaluation of analytical method performance.

Methods: Baseline sodium, potassium, chloride, albumin, amylase, total bilirubin, calcium, creatinine, cholesterol, glucose, lactate dehydrogenase, total protein, triacyl-glycerides, and urea were measured using standard methods in samples from 12 pleural and 16 peritoneal fluids. Aliquots were stored for 6 hours at room temperature; for 24 and 72 hours at 2-8°C; and for 30 days at -80°C. At the end of each storage period, the analytes were measured again. Deviation in measurements between baseline and stored samples was calculated and compared to maximum permissible instability established for serum in our laboratory.

Results: Peritoneal fluid total bilirubin stored at 2-8°C for 72 hours and at -80°C for 30 days were significantly different from baseline measurements with deviations of (24.4% and 21.2%) while other analytes were stable with deviations of < 9.20%. Pleural fluid total bilirubin stored at 2-8°C for 72 hours and at -80°C for 30 days were significantly different from baseline measurements with deviations (45.5% and 34%). Peritoneal fluid lactate dehydrogenase stored at -80°C for 30 days showed also significant difference from baseline measurements with a deviation (21.6%), while other analytes were stable in peritoneal fluid with deviations of < 11.48%.

Conclusion: Our results demonstrated that sodium, potassium, chloride, albumin, amylase, calcium, creatinine, cholesterol, glucose, total protein, triacyl-glycerides, and urea in both pleural and peritoneal fluids are stable if stored for 6 hours at room temperature; for 24 and 72 hours at 2-8°C; or for 30 days at -80°C. However, a significant loss of stability could occur for pleural fluid LDH when samples are stored for 30 days at - 80°C, and for pleural and peritoneal fluid total bilirubin when stored for more than 24 h at 2-8 ℃.

Poster Presentation Abstracts

Abstract #: 22

Novel Familial Hypercholesterolemia Variant Identification in a Saudi Arabian Family.

Alhanuf Batran, Gehan Hejazy, and Zuheir Awan.

Clinical Biochemistry Department, Faculty of Medicine, King Abdulaziz University, Jeddah, KSA.

Background: Familial hypercholesterolemia (FH) is a potentially fatal hereditary condition associated with a high level of circulating LDL-C, which is considered a significant risk factor for premature atherosclerotic cardiovascular disease (ASCVD). FH is diagnosed usually as an autosomal dominant disease-induced primarily by mutations in the LDL receptor (*LDLR*), apolipoprotein B (*Apo B*), or proprotein convertase subtilisin/kexintype9 (*PCSK9*) genes. However, it can show in an irregular autosomal recessive pattern caused by low-density lipoprotein receptor adaptor protein 1 (*LDLRAP1*) gene. FH prevalence ranges by ethnicity, with more excellent rates between Franco-Canadians, Lebanese, Afrikaners, and Ashkenazi Jews. In Saudi Arabia, there is still no apparent frequency rate of FH due to poor genetic screening and local registries for FH. The aim of this current work is to uncover the genetic basis of significant clinical symptoms in FH Saudi individuals. It is a step to fill the missing records about the disease status in the Kingdom of Saudi Arabia.

Method: On a Saudi FH patient, clinical phenotyping and whole-exome sequencing (WES) were done. Sanger sequencing was used to determine the mechanism of inheritance of the *LDLR* mutation in the first-degree family members and ensure its rarity in 500 healthy population controls. Along with the utility of different bioinformatics methods to specify the pathogenicity degree of this mutation.

Results: WES exposed that FH patient inherited a novel heterozygous protein-truncating mutation (Arg744*) in the *LDLR* gene on exon 15 that was autosomal dominant. This nonsense variant is estimated to change the mRNA's minimum free energy, resulting in unstable RNA and affecting its folding and tertiary structure synthesis. According to the protein structure modeling, this loss of function (LOF) mutation destroys the crucial role of the LDLR protein domains that are critical to regenerating LDL receptors and promoting their role in the clearance of LDL-C.

Conclusion: This study highlights the effectiveness of the WES, Sanger sequencing, and computational analysis in identifying a novel pathogenic variant of FH, which will allow for better clinical diagnosis, screening, and management treatment for FH patients.

Poster Presentation Abstracts

Abstract #: 23

Introducing Laboratory Analysis for Vitamin B_1 and B_6 Using High Performance Liquid Chromatography at Prince Sultan Military Medical City

Saad A. Alkhaloufh, Fadwa Alharthi, and Salam Saadeddin.

Central Military Laboratory & Blood Bank, Prince Sultan Military Medical City, Riyadh, KSA.

Background: Analysis of Vitamin B1 and B6 is important to diagnose potential deficiency which often occurs in elderly people due to malnutrition, in severe alcoholism and in gastrointestinal compromise due to bypass surgery or disease. Since vitamin B1 and B6 analysis for diagnostic testing is recommended to be perform using chromatographic method, application required preacquisition evaluation of instrumentation, reference methods, reagent and analytical column with consideration of cost, feasibility, safety. Our goal was to implement a chromatographic method with minimum simple sample preparation and derivatization to identify the physiologically active forms of both Vitamin B1 [thiamine pyrophosphate, (TPP)] and Vitamin B6 [pyridoxal-5'-phosphate, (PLP)] in one run.

Method: High-performance liquid chromatography (HPLC) coupled with fluorescent detector is the most widely used method for Vitamin B1 & B6 quantitation. Utilizing an analytical column and reagents purchased from Chromsystem, we were able to quantify TPP and PLP levels in one gradient run. 200µl EDTA whole blood is required to obtain a result. Sample preparation is restricted to a single precipitation step and subsequent derivatization in a reaction vial. The derivatized sample is analyzed using fluorescence detection. In order to validate the assay; comparison study, analytical precision, linearity, sensitivity and carry-over study were assessed. Moreover, reference range verification study was evaluated.

Result: Precision study for low and high concentrations of vitamin B1 showed total CV% of 4.1 and 5.9 respectively. Method comparisons yield a correlation coefficient (r) = 0.975 and slope 0.932. The method was found linear over the AMR of 5.2 - 274.3 nmol/L. The lower limit of quantitation (LLoQ) was 5.2 nmol/L. Reference range of 78 - 143 nmol/L verified using 20 sample. Similarly, Vitamin B6 Precision study for low and high levels showed total CV% of 5.9 and 4.8 respectively. Method comparisons yield a correlation coefficient (r) = 0.989 and slope 0.979. The method was found linear over the AMR of 21.7 - 253.7 nmol/L with LLoQ of 21.7 nmol/L. Reference range from 51 to 183 nmol/L was verified using 20 sample. Carry-over for each analyte was less than 1%.

Conclusion: The described HPLC gives method reliable results and allows simultaneous determination of TPP and PLP in whole blood without intensive sample preparation or complex post-column derivatization.

Poster Presentation Abstracts

Abstract #: 24

The Effects of Drinking Zamzam Water on several Chemical Analytes in Apparently Healthy Adult Females

Rawan Al-Ghabban[1], Sawsan Abdullah[2], Hamed Khoja[3]

[1]Dept. Clinical Chemistry Laboratory, Saudi Board in Clinical Biochemistry, King Abdullah Medical City, Makkah, KSA, [2]Formerly, Dept. medical laboratory technology, Faculty of Applied Medical Science, King Abdulaziz University, Jeddah, KSA, and [3]Dept. medical laboratory technology, Faculty of Applied Medical Science, King Abdulaziz University, Jeddah, KSA

Background: Millions of Muslims from all over the world drink Zamzam water with grate hope of enormous benefits and improvement of their health and their life period. Our study aimed to assess the effects of drinking Zamzam on Renal Function Test; Creatinine, Blood Urea Nitrogen (BUN), Lipid profile; HDL-Cholesterol (HDL-CHOL), LDL-Cholesterol (LDL-CHOL), t-Cholesterol (t-CHOL) and Triglycerides (TG), Electrolytes; Sodium (Na), Potassium (k) and Chloride (Cl), Calcium (Ca), Magnesium (Mg), Phosphorus (Phos), Glucose, Cortisol, Thyroid Stimulating Hormone (TSH) in apparently healthy adult females.

Method: A total of 30 apparently healthy adult females, age range 20-25 years old participated in this study.two questionnaires; 1-pre drinking, 2-post drinking were given to each volunteer to fill.
Pre-drinking fasting blood samples were collected before the beginning of the study. 40 liters of Zamzam were given to each volunteer to be consumed over a period of 3 weeks at a rate of 2L/day with no other drinks. After 3 weeks, (post-drinking) fasting blood samples were collected. Blood samples were analyzed for Creatinine, BUN, HDL-CHOL, LDL-CHOL, t-CHOL, TG, Na, K, Cl, Ca, Mg, Phos, Glucose, Cortisol and TSH. The two results were compared using p value and average bias (p, %bias).

Result: Statistical and clinical significant result were obtained in the following analytes; Creatinine; decrease (n=17, p<.001, 45.00%) increase (n=11, p<.001, 33.05%), Na; decrease (n=14, p<.01, 44.37%) increase (n=11, p<.001, 30.57%), K; decrease (n=15, p<.001, 2.2%) increase (n=11, p<.001, 3.3%), Cl; decrease (n=17, p.005, 22.83%) increase (n=9, p.005, 20.98%), Ca decrease (n=14, p<.001, 1.08%) increase (n=12, p<.001, 1.09%), Mg; decrease (n=14, p<.01, 3.76%), Glucose; decrease (n=16, p<.001, 4.28%) increase (n=5, p<.01, 4.4%), cortisol; decrease (n=17, p<.001,684.9%) increase (n=9, p<.001, 1777.7%). Statistically but not clinically significant were obtained in the following analytes; BUN; decrease (n=19, p<.001, 1.8%) increase (n=9, p<.001, 33.70%), HDL-chol; decrease (n=16, p<.001,1.25%) increase (n=15, p<.001, .87%), LDL-chol; decrease (n=16, p<.001,1.81%) increase (n=13, p<.001, 1.82%), t-Chol; decrease (n=15, p<.001, 3.41%) increase (n=14, p<.001, 1.97%), TG; decrease (n=16, p<.001, 1%) increase (n=15, p<.001, .98%), Phos; decrease (n=18, p<.001, 1.63%) increase (n=9, p<.001, 1.31), TSH; decrease (n=17, p<.001, 3.72%) increase (n=13, p<.01, 4.88%). Allowable biases for each of the above analytes are as follow; Creatinine (3.96%), BUN; (5.57%), HDL-Chol (5.61%), LDL-Chol (5.46%), t-Chol (4.1%), TG (9.57%), Na (.23%), K (1.81%), Cl (4.1%), Ca (.82%), Mg (1.8%), Phos (3.38%), glucose (2.34%), cortisol (10.26%), TSH (7.8%).

Conclusion: In this study, which lasted for three weeks, Zamzam water was found to exert clinical and statistical effects on various body analyte. The full beneficial effect of Zamzam can be seen by applying similar studies on incurable diseases.

Poster Presentation Abstracts

Abstract #: 25

The Influence of Hematological Biomarkers in Type 2 Diabetes with Dry Eye Disease Patients: Case-Control Study

Amani Alhalwani [1], Shatha Jambi[1], Nada Taher[1], Abdullah Aseri[2], Ali Alghamdi[2], Abdulwahab Alshehri[3]

[1] King Saud bin Abdulaziz University for Health Sciences, Jeddah, Saudi Arabia, [2] King Abdulaziz University, Jeddah, Saudi Arabia, and [3] Almaarefa University, Riyadh, Saudi Arabia

Background: Several studies have found that serum biomarkers indicators are linked with the risk of dry eye disease in diabetes type 2 (DM2-DED). In this study, we used complete blood counts (CBC); neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), and the systemic immune-inflammation index (SII) levels to develop low-cost biomarkers to utilize as diagnostic and prognostic values in patients with DM2-DED.

Methods: Retrospective case-control study data was collected from the study groups:121 patients with diabetes type 2 with dry eye disease (DM2-DED), and control groups: 103 patients with diabetes type 2 (DM2) and 106 patients with dry eye disease (DED) between 2018 and 2020. Demographic and biomarkers variables were classified as categorical and continuous variables. CBC parameters, fasting, and random blood glucose level, and glycosylated hemoglobin HbA1c were collected. The biomarkers value was calculated as follows: NLR, PLR, and SII values.

Results: The mean age was 60.2±12.3 years in the study group; DM2-DED, 52.1±16.9 and 59.2±14.3 years in control groups; DED, and DM2, respectively. There was a statistically significant increase between the presence of DM2-DED compared by the DED control group via HbA1c, and fasting glucose ($p < 0.001$, and $p < 0.001$, respectively). The NLR value was higher in DM2 and DED ($p < 0.866$). However, the PLR value was significant for DED then DM2, and DM2-DED ($p < 0.007$). There was a positive correlation between SII vs. NLR (rho=0.900, $p < 0.001$) and SII vs. PLR (rho=0.646, $p < 0.001$) among all groups.

Conclusion: This study determined a higher PLR value in patients with DM2-DED which may be a remarkable marker to estimate the inflammatory severity of DED. SII value has a positive correlation with NLR among all groups. This study predicts a useful biomarker and the inflammatory status of DM2-DED.

Poster Presentation Abstracts

Abstract #: 26

Protective Effect of Fucoxanthin on Paracetamol-Induced Hepatotoxicity in Rats

Maimonah Koshak[1,2], Mohammad Elzubaier[1], Bassem Refaat[3], Shakir Idris[3], Mohammad Althubiti[1], Riyad Almaimani[1], Safaa Yehia Eid[1], Mahmoud Zaki El-Readi[1,4]

[1] Biochemistry Department, Faculty of Medicine, Umm Al-Qura University, Makkah, Saudi Arabia, [2] Laboratory Medicine Department, King Salman Armed Forces Hospital, Tabuk, Saudi Arabia, [3] Laboratory Medicine Department, Faculty of Applied Medical Sciences, Umm Al-Qura University, Makkah, Saudi Arabia, and [4] Biochemistry Department, Faculty of Pharmacy, Al-Azhar University, Assuit, Egypt

Backgrounds: Liver disease continues to be the leading cause of morbidity and mortality worldwide. Steatohepatitis, fibrous, and cirrhosis are all types of liver damage associated with liver disease, which is a multifactorial disease with complex pathophysiology. Liver injury can be prevented or reduced by using natural products, such as carotenoids. Fucoxanthin, an allenic carotenoid found in edible brown seaweeds, is a powerful antioxidant. A number of studies have demonstrated that fucoxanthin has anti-obesity, anti-tumor, anti-diabetic, antioxidant, anti-inflammatory, cardiovascular, and cerebrovascular properties. As a result, fucoxanthin has the potential to be used in the prevention and treatment of chronic diseases. Despite the fact that fucoxanthin has a wide range of medicinal and nutritional properties. In this study, the antioxidant fucoxanthin was examined for its potential protective effect against paracetamol-induced hepatic damage.

Methods: It was conducting this study to evaluate the hepatoprotective effects of Fucoxanthin against liver disease using an experimental rat model of acute liver injury as a model. The animals were classified into 7 groups (5 rats/group): normal health rat group (G1), paracetamol (PCA) treated group (G2), PCA-treated group, pretreated with 100 mg/kg of silymarin (G3), PCA-treated group, pretreated with 100 mg/kg of N-acetylcysteine (G4), PCA-treated group, pretreated with different doses of fucoxanthin 200 mg/kg (G5), 100 mg/kg (G6), and 50 mg/kg (G7). Due to a high dose of Paracetamol and current scientific evidence of biochemical analysis, this condition was carried on. There were two types of biomarkers tested in our study: 1) hepatic function markers: AST, ALT, ALP, Albumin, lactate dehydrogenase and bilirubin and 2) lipid profile: Cholesterol, LDL, TG, and HDL.

Results: Using a sub-lethal dose of paracetamol (2 mg/kg), we found that oral administration of the drug caused liver damage in rats, which was manifested by an increase in serum levels of transaminases (AST and ALT), alkaline phosphatase, lactate dehydrogenase, and bilirubin. Paracetamol caused an increase in liver function parameters in rats, which was prevented by pre-treatment with different doses of Fucoxanthin (200, 100, and 50 mg/kg). When comparing the groups treated with fucoxanthin to the groups treated with silymarin and N-acetylcysteine, as well as the groups treated with paracetamol, a significant improvement in liver functions and lipid profile was observed ($P<0.001$).

Conclusions: To summarize, these results demonstrate that Fucoxanthin has hepatoprotective activity, and the presence of this carotenoids in brown seaweeds may explain why this natural product has traditionally been used to treat liver disease.

Poster Presentation Abstracts

Abstract #: 27

Effects Of Hemolysis on Biochemistry Assays on Abbott Alinity Analyzer

Ali Al-Hamad[1], Nora Al-Bagaei[1], Alanood Al-Hussainan[1], Maram Al-Monaiser[1], Shaykhah Al-Mutairi[1], Huda Al-Mutairi[1], Mashael Al-Watban[1], Salma Al-Hamzah[1], May Bukary[1], Hassan S Alamri[2, 3], and Waleed Tamimi[1, 2, 3]

[1]Department of Pathology & Laboratory Medicine, King Abdulaziz Medical City Riyadh, Saudi Arabia, [2]Department of Clinical Laboratory Sciences, College of Applied Medical Sciences, King Saud bin Abdulaziz University for Health Sciences (KSAU-HS), Riyadh, Kingdom of Saudi Arabia, and [3]King Abdullah International Medical Research Center (KAIMRC), Riyadh, Kingdom of Saudi Arabia.

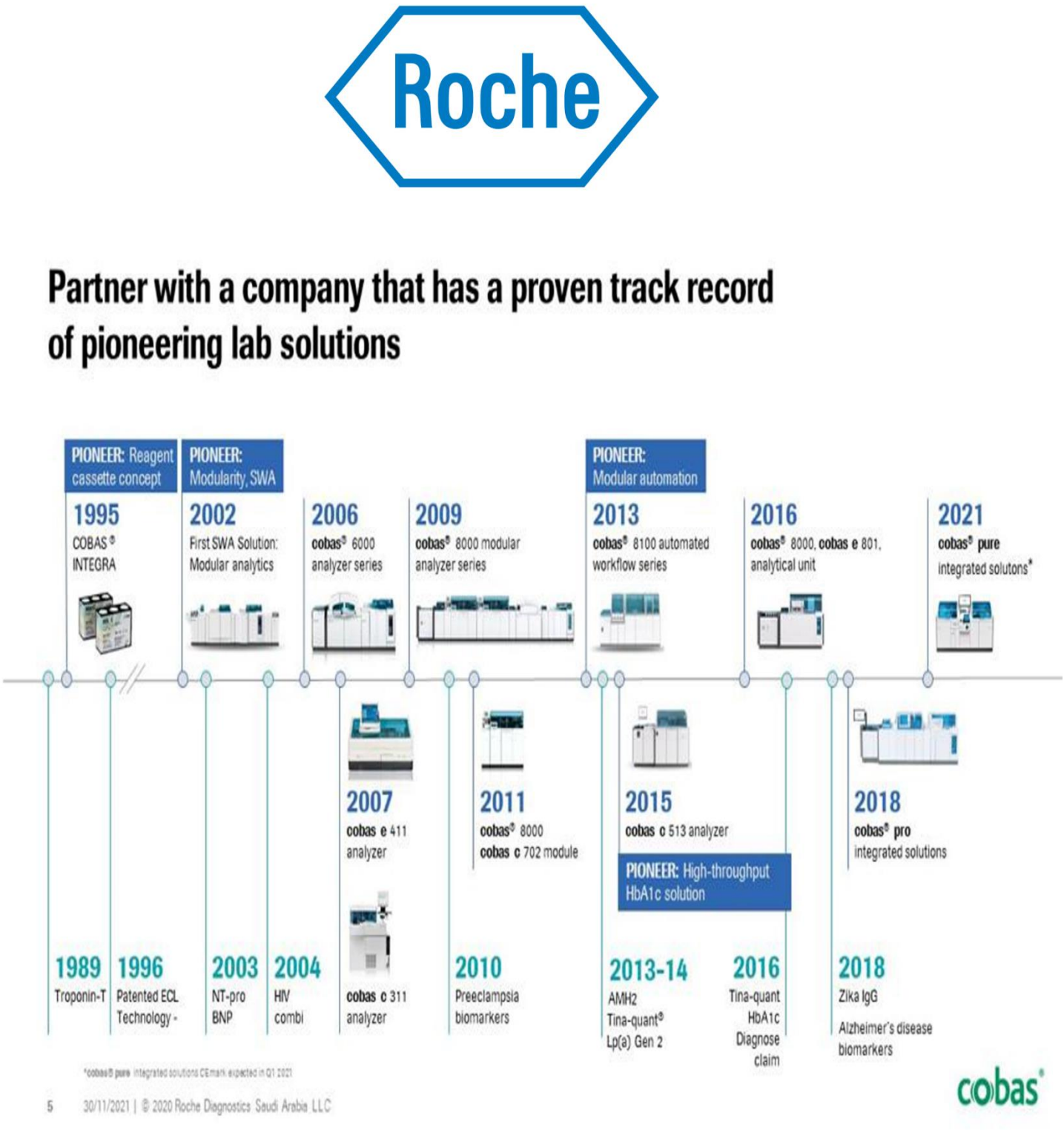
Background: In-vitro hemolysis is still the most prevalent reason for sample rejection and hence delay patient management. Hemolysis index (HI) can be measured to evaluate the degree of hemolysis on blood samples. Part of introduction of new analyzer in any lab is to verify or validate the interferences on serum indices. The purpose of this study was to observe the effects of hemolysis on 29 biochemistry assays on the new analyzer Alinity from Abbott Diagnostics and to establish the different cut-off levels of hemolysis affected routinely used biochemical parameters to avoid unnecessary rejections. EP Evaluator Software was used in accordance with CLSI guidelines EP07-A2 (Interference Testing in Clinical Chemistry) to evaluate the degree of haemolysis.

Methods: We collected two samples on Serum Separator Tubes (SST) from the same patient. The first one was centrifuged, and the supernatant was collected and used as (Low) concentration of interferent. The other sample was frozen thawed 3 times, centrifuged and supernatant was collected to be used as the (High) concentration of Hemolysis. Both samples should have the same measurand concentration. Four hemolysis levels were examined using the hemolysis index (HI) and hemoglobin concentration according to the manufacturer's specifications: (1+) =0.3–0.99 g/L, (2+) =1–1.99 g/L, (3+) =2–4.99 g/L and (4+) = >5 g/L. Total Allowable Error (TEa) was used as the acceptable criteria for assay interference to define what constitutes clinically significant difference. We performed the protocol for a "**Dose Response**" Experiment which was defined in CLSI: EP7 as low and High samples were mixed to create 5 interferent concentrations of 0%, 25%, 50%, 75%, 100%, three aliquots of each concentration were prepared, and three analytical runs were performed. Within each run, we analyzed one sample from each concentration. On the first run, the samples analyzed in ascending order, descending order on the second run, and ascending order on the third run. Any systematic drift effects are averaged out because of this.

Results: The interference of Hemoglobin up to 6.46 g/l was tested. The dose-response curves generated by the hemolysis interference evaluation for 7 assays that were significantly affected. Data shows increased in LDH, Total Protein and Folate (at H index of 1+), K, Iron (at H index of 2+) and AST (at H index of 3+) while Amylase decreased (at H index of 3+) causing clinically significant change. No interferences were detected at level of hemolysis, HI=(4+) for assays ALB, ALP, ALT, Bili D, Bili T, Crea, GGT, LDL, Mg, Phos, Trig, BUN. Interference bias could not be estimated by the Dose Response Protocol for CA, CHOL, CK, CL, CO2, Ferritin, Glu, HDL, NA, Uric, Slope were statistically equivalent to zero.

Conclusion: The presented results support the previous studies on the most Biochemistry assays that are affected by hemolysis. It also shows the validity of using of CLSI guidelines EP07-A2 on Ep Evaluator software as a useful tool to perform the interference study.

Sponsors

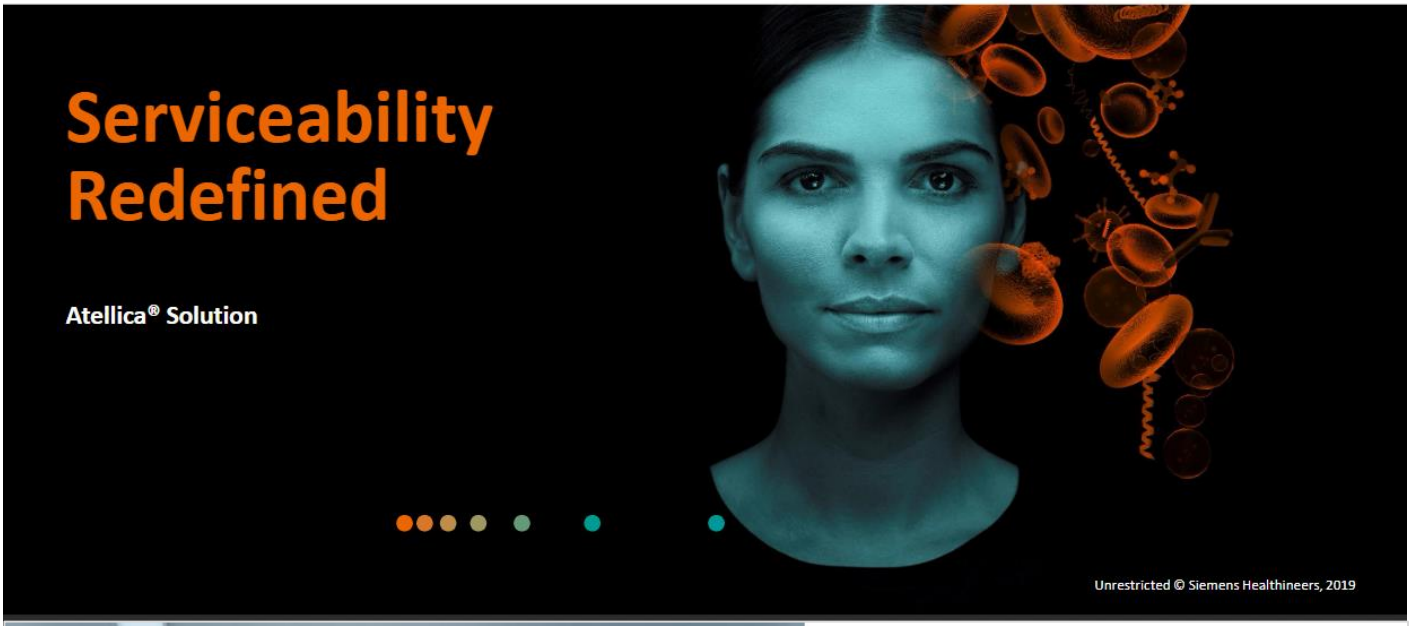

Roche
Partner with a company that has a proven track record of pioneering lab solutions
PIONEER: Reagent cassette concept
1995
COBAS® INTEGRA
PIONEER: Modularity, SWA
2002
First SWA Solution: Modular analytics
2006
cobas® 6000 analyzer series
2009
cobas® 8000 modular analyzer series
PIONEER: Modular automation
2013
cobas® 8100 automated workflow series
2016
cobas® 8000, cobas e 801, analytical unit
2021
cobas® pure integrated solutions*
1989
Troponin-T
1996
Patented ECL Technology
2003
NT-pro BNP
2004
HIV combi
2007
cobas e 411 analyzer
cobas c 311 analyzer
2010
Preeclampsia biomarkers
2011
cobas® 8000 cobas c 702 module
2013-14
AMH2 Tina-quant® Lp(a) Gen 2
2015
cobas c 513 analyzer
PIONEER: High-throughput HbA1c solution
2016
Tina-quant HbA1c Diagnose claim
2018
cobas® pro integrated solutions
2018
Zika IgG
Alzheimer's disease biomarkers
*cobas® pure integrated solutions CE-mark expected in Q1 2021
5
30/11/2021 | © 2020 Roche Diagnostics Saudi Arabia LLC
cobas®

Sponsors

Sponsors

Sponsors

SIEMENS Healthineers



Sponsors

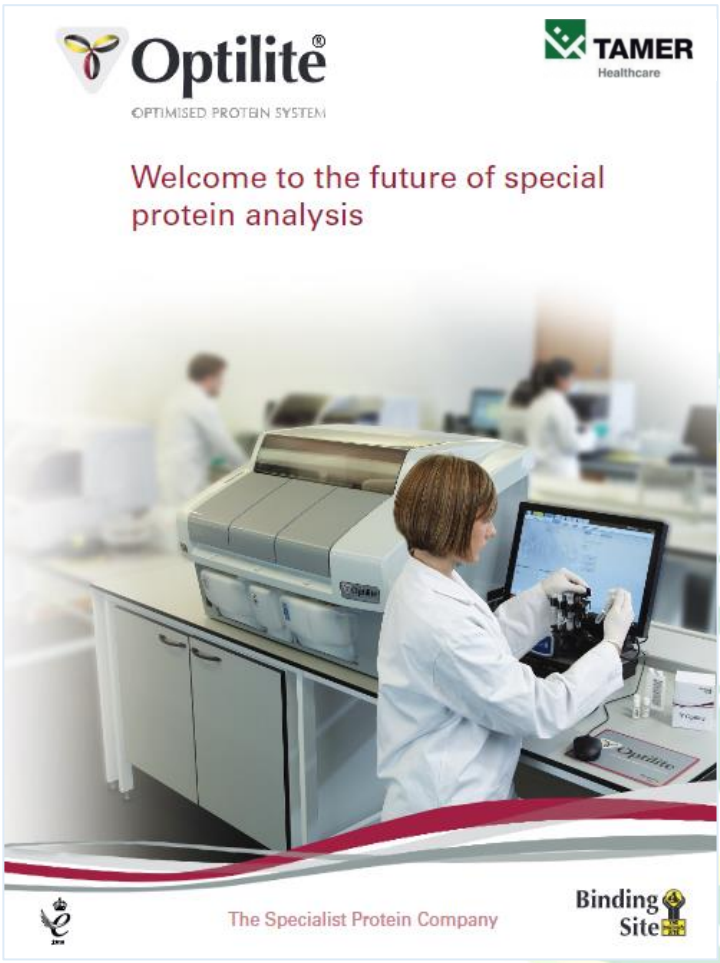
Sponsors

Sponsors


AnalyticaOne
for Integrated Scientific Solutions


sebia
The CAPILLARYS 3 OCTA is the most recent Sebia automated capillary electrophoresis system.
The CAPILLARYS 3 OCTA offers a broad assay menu in myeloma, diabetes, hemoglobinopathies and chronic alcohol abuse.
The CAPILLARYS 3 OCTA shares the same reagent and consumables as the other CAPILLARYS 3 instruments, allowing the lab to adopt the most relevant platforms, mixing CAPILLARYS 3 OCTA, TERA, TERA TLA and TERA MC configurations to match exactly the needs of their organization. This flexibility also allows the lab to evolve easily by scaling up the Sebia solution.
• Capillary electrophoresis instrument with 8 capillaries in parallel
• Instrument management via LCD touch screen
• Automatic or manual startup, shutdown & maintenance
• Automatic dilution segment management
• Automatic technique change using dedicated switch racks
ZAHRAWI
→ Assays on board & Throughput
• Hb A1c (venous blood) - 43 tests/h
• Serum Protein Electrophoresis (SPE) - 80 tests/h
• Urine Protein Electrophoresis (UPE) - 70 tests/h
• Serum Immunotyping - 10 tests/h
• Urine Immunotyping - 10 tests/h
• CDT/CDTIFCC - 50 tests/h
• Hemoglobin electrophoresis (adult whole blood) - 46 tests/h
For inquiries:
info.ksa@zahrawigroup.com
CAPILLARYS 3 OCTA
sebia
The new language of life

Sponsors


Optilite®
OPTIMISED PROTEIN SYSTEM
TAMER
Healthcare
Welcome to the future of special protein analysis
The Specialist Protein Company
Binding Site


[XEVO TQ-S MICRO]
SAMA MASA
REDEFINING COMPACT PERFORMANCE.
ROBUST SENSITIVITY BEYOND EXPECTATION.
DAR
TQ-S micro
GULF SCIENTIFIC CORPORATION
Serving the scientific community since 1990
Waters
THE SCIENCE OF WHAT'S POSSIBLE.

Sponsors

SPONSORS

DIAMOND SPONSOR

Roche

Snibe Diagnostic

Abbott

PLATINUM SPONSOR

SIEMENS Healthineers

GOLD SPONSOR

BECKMAN COULTER

SILVER SPONSOR

AnalyticaOne for Integrated Scientific Solutions

mindray

BD

عبدالله فؤاد ABDULLA FOUAD SINCE 1948 منذ

BRONZE SPONSOR

الرضوان Abdullah Bakr Redwan & Partners Co. شركة عبدالله بكر رضوان وشركاه

Binding Site THE BINDING SITE

TAMER Healthcare

DAR

SAMA MASA

aljeel Empowering Healthcare

sebia

ZAHRAWI

PARTNERS

الهيئة السعودية للتخصصات الصحية Saudi Commission for Health Specialties

LOW CARB SOCIETY

AFCB

ASCP

SPOCTA Point Of Care Testing Saudi Association

الجمعية السعودية لعلوم المختبرات الطبية

ifcc International Federation of Clinical Chemistry and Laboratory Medicine

7th Ann conference


30th Nov – 3rd Dec 2021