

### Curriculum Vita

<b>NAME POSITION TITLE</b> Azhar, Esam Ibraheem		Professor of Medical Molecular Virology	
<b>CONTACT INFORMATION</b>			
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<b>EDUCATION/TRAINING</b>			
<b>INSTITUTION AND LOCATION</b>	<b>DEGREE</b>	<b>MM/YY</b>	<b>FIELD OF STUDY</b>
Sheffield University	Ph.D.	07/99	(Medical Molecular Virology)
Sheffield & Sheffield Hallam Universities	MSc	11/94	Pathological Sciences (Medical Virology)
King Abdulaziz University	BSc	07/87	Medical Technology
<b>Memberships/Fellowships</b>			
Royal College of Physicians Edinburgh (FRCPE)	Fellowship	11/2015	Microbiology
Saudi Commission for Health Specialties (SCHS)	Consultant	03/2015	Medical Molecular Virologist
Institute of Biomedical Sciences (FIBMS)	Fellowship	03/1995	Medical Virology

### **POSITIONS**

#### **Current Positions**

- Professor, Medical Molecular Virology, Department of Medical Technology, Faculty of Applied Medical Sciences, King Abdulaziz University, Jeddah, Saudi Arabia.
- Head of the Special Infectious Agents Unit, King Fahd Center for Medical Research, King Abdulaziz University, Jeddah, Saudi Arabia.

#### **Positions & Employment**

- 05/2003–Present** Head of the Special Infectious Agent Unit – Biosafety Level 3, King Fahd Medical Research Centre, King Abdulaziz University, Saudi Arabia.
- 03/2017-12/2017** Acting Director – King Fahd Medical Research Centre, King Abdulaziz University, Saudi Arabia.
- 03/2014-02/2018** Deputy Director of King Fahd Medical Research Center, King Abdulaziz University, Saudi Arabia.
- 01/2011–12/2012** Executive Director- Business & Knowledge Alliance, King Abdulaziz University, Saudi Arabia.
- 05/2009–01/2011** Deputy Executive Director- Business & Knowledge Alliance, King Abdulaziz University, Saudi Arabia.
- 10/2009–01/2011** Director of the Knowledge Park- Business & Knowledge Alliance, King Abdulaziz University, Saudi Arabia.
- 09/2007–09/2008** Director of the Houses of Expertise- Business & Knowledge Alliance, King Abdulaziz University, Saudi Arabia.
- 09/2006–09/2007** Member of the Houses of Expertise Executive Committee- Business & Knowledge Alliance, King Abdulaziz University, Saudi Arabia.

- 03/2006-01/2010** Vice-Dean for Post-Graduate Studies & Scientific Research – Faculty of Applied Medical Sciences King Abdulaziz University, Saudi Arabia.
- 04/2005–07/2006** Chairman of Medical Technology Department, Faculty of Applied Medical Sciences, King Abdulaziz University, Saudi Arabia.
- 10/2000–05/2012** Assistant Professor (Medical Molecular Virology, Medical Laboratory Technology Department, Saudi Arabia.
- 11/1999–08/2000** Trainee for MRCPPath part I in a Clinical Virology Lab, Different Public Health Laboratories, United Kingdom.
- 05/1992-09/1993** Demonstrator in Medical Virology, Medical Technology Program, Faculty of Medicine & Applied Health Sciences, King Abdulaziz University, Saudi Arabia.
- 04/1989-05/1992** Clinical Immunology Laboratory Technologist, King Abdulaziz University, Saudi Arabia.
- 12/1987-04/1989** Medical Laboratory Technologist (Blood Bank, Clinical Chemistry, Haematology and Immunology Laboratories), Al-Noor Specialist Hospital Saudi Arabia.
- 09/1986-06/1987** Medical Technology Laboratory Trainee, King Abdulaziz University Hospital Saudi Arabia

## **RESEARCH EXPERINCE**

After completing my PhD from Sheffield University in 2000, I returned to my home country to pursue an important academic career. In educational roles I served as Chairman of the Medical Laboratory Technology Department and Vice Dean for Postgraduate studies & scientific research in the Faculty of Applied Medical Sciences, King Abdulaziz university. After an outbreak of Rift Valley Fever in the Southern region of Saudi Arabia I act as a founder for the establishment of the Special Infectious Agents Unit (SIAU) which contains a full range of facilities including Biosafety Level 3 which allows us to ambulate and culture risk group 3 viruses in Saudi Arabia & gulf states for the first time. Since May 2003, I lead the Special Infectious Agents Unit and our international collaboration extended to implement a standard protocols in the infectious agents diagnostics procedure through different mode of collaboration including exchange of expertise, joint research program and more recently a technology transfer agreements with number of International institute sharing same interests. Furthermore, we have been engaged in number of mass gathering research related to Hajj & Umrah plus number of national services under the collaboration with the Ministry of Health (MOH) through which, we utilize our Mobile biosafety level 3 Lab to enhance the diagnostics of MERS CoV in the Holly sites during Hajj since 2014. I served as a Deputy Director of the King Fahd Medical Research Center through it I start empowering many young Saudis to take-up the challenges of scientific research. In 2016, I have been awarded A Fellowship of the Royal College of Physicians of Edinburgh based on my contribution to the infectious agent's research and services through a nomination by two international distinguished Professors. In our SIAU and with a powerful team we have an excellent basic science, molecular and clinical translational research portfolio on commonly encountered pathogens, and a special interest in emerging and re-emerging viral infections of humans, particularly viral hemorrhagic fevers, Rift valley fever, and the Middle East Respiratory Syndrome Coronavirus with an extensive experience of conduct and supervision of research with over 190 peer reviewed publications.

My research on Microbial aspects of infectious diseases internationally recognized as it pose a threat to global health security (due to several millions pilgrims coming to Saudi Arabia from 182 countries). My recent studies of the MSER-CoV outbreak and screening of blood donors, slaughter

houses, and nosocomial outbreaks were of international attention and published in high impact journals. My research has made valuable contributions through *in-vivo* and *in-virto* animal and human studies and to the identification, isolation, molecular characterization, viral kinetics, translation and diagnosis of several human viral pathogens which are a threat to global health security due to millions of pilgrims visiting Saudi Arabia every year from 182 countries: with particular areas of interests in: Alkhurma Viral Hemorrhagic Fever, Dengue Hemorrhagic Fever Viruses; Rift Valley Fever Virus and more recently the new global infectious diseases threat, the Middle East Respiratory Syndrome Coronavirus (MERS-CoV).

My work was highlighted internationally when one of my MERS CoV study provide definitive evidence of the zoonotic transmission of MERS-CoV from camels to humans (manuscript published in New England Journal of Medicine, Azhar E *et al.*, 2014).

I am highly involved in COVID 19 research involving several aspects; I) *In-vitro* evaluation of the antiviral activity of natural products, medicinal plants, and repurposing drugs against SARS-CoV-2. II) Generation and evaluations of numbers of inactivated vaccines using conventional and novel methods with potential protection against SARS-CoV-2. III) Establishment and development of number of diagnostics detection techniques for SARS-CoV-2 (serological and molecular techniques).

I am extremely motivated in pursuing cutting-edge research for the advancement of science related to infectious agents.

## PUBLICATIONS

### Peer-reviewed Publications

Full List of publications can be found at:

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Azhar, Esam Ibraheem Ahmed

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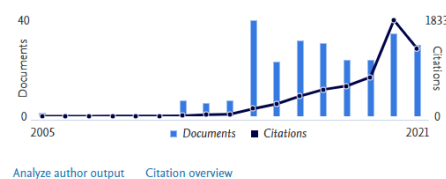
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Eggerthella Lenta; Gram's Stain; Bacteroides  
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1. Salwa I Hindawi, Sherif A El-Kafrawy, Ahmed M Hassan, Maha A. Badawi, Maiman M. Bayoumi, Ahmad A. Almalki, Hosam M. Zowawi, Ahmed M Tolah, Thamir A Alandijany, Qossay Abunada, MarcusPicard-Maureau, Ghazi A Damanhour, Esam I Azhar. Efficient inactivation of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) in human

- apheresis platelet concentrates with amotosalen and ultraviolet A light. *Transfusion clinique et biologique* 2021; S1246-7820(21)00119-1 <https://doi.org/10.1016/j.tracli.2021.08.005>
2. Abeer N. Alshukairi, Sherif A. El-Kafrawy, Ashraf Dada, Muhammad Yasir, Amani H. Yamani, Mohammed F. Saeedi, Ahmed Aljohaney, Naif I. AlJohani, Husam A. Bahauddeen, Intikhab Alam, Takashi Gojobori, Aleksandar Radovanovic, Thamir A. Alandijany, Norah A. Othman, Tagreed L. Alsubhi, Ahmed M. Hassan, Ahmed M. Tolah, Jaffar A. Al-Tawfiq, Alimuddin Zumla, Esam I. Azhar. Re-infection with a different SARS-CoV-2 clade and prolonged viral shedding in a hematopoietic stem cell transplantation patient. *International Journal of Infectious Diseases*. 2021; (110), 267-271 <https://doi.org/10.1016/j.ijid.2021.07.036>
  3. Hoang Thong Kieu, Noémie Garrigou, Amael Fadlane, Ludivine Brechard, Nicholas Armstrong, Philippe Decloquement, Muhammad Yasir, Esam Ibraheem Azhar, Saad B. Al-Masaudi, Jean-Christophe Lagier, Maryam Tidjani Alou, Didier Raoult. *Clostridium culturomicium* sp. nov. and *Clostridium jeddahitimonense* sp. nov., novel members of the *Clostridium* genus isolated from the stool of an obese Saudi Arabian. *Current Microbiology* 2021; 78:3586–3595. [doi.org/10.1007/s00284-021-02616-4](https://doi.org/10.1007/s00284-021-02616-4).
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  5. Yasir, M., A.K. Qureshi, and E.I. Azhar, 16S amplicon sequencing of microbial communities in enriched and non-enriched sediments of non-volcanic hot spring with temperature gradients. *Peer J*, 2021. 9.
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  7. Sohrab, S.S., T.A. Madani, S.A.E. Kafrawy, H.M. Al-Bar, A.M.A. elzein, S.A.A. Farraj, N.A. Uthman, A.M.S. Hassan, L.H. Bajrai, and E.I. Azhar, Full-genome sequencing and analysis of DENV-3 serotype isolated from Yemen. *Journal of Infection and Public Health*, 2021. 14(6): p. 803-810.
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  9. Sohrab, S.S., S. Aly El-Kafrawy, Z. Mirza, A.M. Hassan, F. Alsaqaf, and E.I. Azhar, In silico prediction and experimental validation of siRNAs targeting ORF1ab of MERS-CoV in Vero cell line. *Saudi Journal of Biological Sciences*, 2021. 28(2): p. 1348-1355.
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- Clostridium* genus isolated from the stool of an obese Saudi Arabian. *Current Microbiology*, 2021.
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  21. Bibi, F. and E.I. Azhar, Analysis of bacterial communities in sponges and coral inhabiting Red Sea, using barcoded 454 pyrosequencing. *Saudi Journal of Biological Sciences*, 2021. 28(1): p. 847-854.
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- inactivates severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in human plasma. *Vox Sanguinis*, 2021. 116(6): p. 673-681.
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  26. Alshukairi, A.N., A.M. Tolah, A. Dada, J.A. Al-Tawfiq, R.S. Almagharbi, M.F. Saeedi, M.A. Al-Hamzi, S.A. El-Kafrawy, H.A. Bahauden, A. El-Saed, M.A. Al-Mozaini, I. Khalid, L.K. Hefni, A.M. Hassan, T.A. Alandijany, L.H. Bajrai, D.T. Bayumi, G.E. Albishi, S.I. Althawadi, N.A. Zabani, S. Perlman, and E.I. Azhar, Test-based de-isolation in COVID-19 immunocompromised patients: Cycle threshold value versus SARS-CoV-2 viral culture. *International Journal of Infectious Diseases*, 2021. 108: p. 112-115.
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### **Book Chapters & Published Conference Proceedings**

#### Book Chapters

- 1- Saleh, I., Alwan, N., Barbour, E., Azhar E., Harakeh, S., (2012) *Listeria infections: Epidemiology, pathogenesis and treatment*, *Listeria Infections: Epidemiology, Pathogenesis and Treatment*, pp. 155-166.
- 2- Azhar E.I., Lanini S., Ippolito G., Zumla A. (2016) *The Middle East Respiratory Syndrome Coronavirus – A Continuing Risk to Global Health Security*(4). In: Rezza G., Ippolito G. (eds) *Emerging and Reemerging Viral Infections. Advances in Experimental Medicine and Biology*, vol 972. Springer, Cham

### **Poster Presentations**

1. Degnah A, Hassan A, Al-amri S, Hindawi S, Azhar E, Hashem A. Serological investigation of MERS CoV in human between 2011-2016, Jeddah, Saudi Arabia. *Gulf Congress of Clinical Microbiology & Infectious Diseases*. Dubai, United Arab Emirates, November 7-10, 2018
2. Alraddadi Y, Hashem A, Azhar E, Tolah A. Circulation of non-MERS CoV in Imported Camels in Saudi Arabia. *Gulf Congress of Clinical Microbiology & Infectious Diseases*. Dubai, United Arab Emirates, November 7-10, 2018

3. Al-Ghamdi A, Al-amri S, Tolah A, Azhar E, Hashem A. Circulation of Influenza A Viruses in Dromedary Camels in Saudi Arabia. Gulf Congress of Clinical Microbiology & Infectious Diseases. Dubai, United Arab Emirates, November 7-10, 2018
4. Al-Amri S, Al-subhi T, Azhar E, Hashem A. Development and validation of different indirect ELISAs for MERS-CoV serological testing. Gulf Congress of Clinical Microbiology & Infectious Diseases. Dubai, United Arab Emirates, November 7-10, 2018
5. Anwar M Hashem, Ahmed M Hassan, Salwa I Hindawi, Sherif A El-Kafrawy, Qossay Abunada, Marcus Picard-Maureau, Ghazi A Damanhour, Esam I Azhar. Complete Inactivation of MERS Coronavirus in Human Apheresis Platelets with Amotosalen and Ultraviolet A Light Treatment. AABB Annual Meeting 2017. Boston, USA, October 13-16, 2018
6. Eitezaz A. Zaki, Mai M. El-Daly, Ahmed Abdulhaq, Tagreed L. Al-Subhi, Mohammad Alhazmi, Majid A. Darraj, Esam I. Azhar. Genotype and antiretroviral drug resistance of human immunodeficiency virus-1 in Jazan, Saudi Arabia. 12th Annual Conference of Saudi Society of Medical Microbiology Infectious Diseases. Jeddah, Saudi Arabia, February 20-22, 2018
7. Nada F Alwathinani, Saad B Almsaudi, Sherif A El-Kafrawy, Mohamed Yasir, Taghreed Alsubhi, Osama Al-Wafi, Abdulhafeez Turkistani, Esam I Azhar. Molecular detection of Respiratory Pathogens Among Healthcare Workers during Hajj Season. 12th Annual Conference of Saudi Society of Medical Microbiology & Infectious Diseases. Jeddah, Saudi Arabia, February 20-22,
8. Abdullah M Subahi, Muhammad Yasir, Muhammad Waseem Shah, Maha Alawi, Anees A. Sindi, Asif Ahmad Jiman-Fatani, Esam Ibraheem Azhar. Antimicrobial susceptibility analysis of bacterial community in the hospital environment. 11th Annual Conference of Saudi Society of Medical Microbiology and Infectious Diseases, Jeddah, Saudi Arabia. February 7, 2017
9. Muhammad Waseem Shah, Muhammad Yasir, Esam I. Azhar, Muhammad Farman Asif A. Jiman-Fatani, Saad Al-Masoodi, Antimicrobial susceptibility and molecular characterization of *Acinetobacter baumannii* isolates in health care facility of Saudi Arabia. 11th Annual Conference of Saudi Society of Medical Microbiology and Infectious Diseases, Jeddah, Saudi Arabia, February 7, 2017
10. Fehmida BIBI, M Yasir, S.A Alvi, A.A.K AL-Ghamdi, M.I Naseer, E.I Azhar. Isolation, diversity and high antagonistic potential of mangroves associated bacteria and Actinobacteria from Saudi Arabia. 67th Annual Conference of the Canadian Society of Microbiologists, University of Waterloo, Waterloo, Ontario, Canada. June 20–23, 2017
11. Hindawi SI, Hashem AM, Damanhour GA, El-Kafrawy SA, Hassan AM, Azhar EI. Efficient Inactivation of MERS Coronavirus in Human Plasma with Amotosalen and UVA Light. AABB Annual Meeting 2017. San Diego, USA, October 7-10, 2017
12. Sherif A. El-Kafrawy, Ghazi A. Jamjoom, Mai M. El-Daly, Hisham O. Akbar, Hind B. Fallatah, Yousif A. Qari, Esam I Azhar. Deep Sequencing Analysis of HBV in Chronic HBV patients from Saudi Arabia. 12th World Congress on Virology, Baltimore, USA. 16-17 October 2017
13. F. Bibi, M. I. Nasser, S. Akhtar, M. Yasir, A. A. Jiman-Fatani, A. Sawan, E. I. Azhar. Gene expression analysis of Gastric cancer Patients from Saudi Arabian Population. 12th Meeting of the European Human Genetics Societies; Barcelona, Spain. May 21-24, 2016
14. Aymn T Abbas, Muhammad Yasir, Imran Khan, Esam I Azhar, Elie K Barbour and Taha Kumosani. Assessment of antibiotic resistance-dissemination from MDR E. coli to rat's microbiota by Matrix Assisted Laser Desorption Ionization Time of Flight Mass Spectrophotometry (MALDI TOF-MS). 2nd International Conference and Exhibition on Pharmacology and Ethnopharmacology. Chicago, USA, May 2 - 4, 2016
15. Imran Khan, Muhammad Yasir, Esam I Azhar, Sameera Al Al-Basri, Eli Barbour, Taha Kumosani. Metagenomics profile of gut microbiota during pregnancy in Saudi population. Second

- International Genomic Medicine Conference in Saudi Arabia, King Abdulaziz University, Jeddah, Saudi Arabia. Nov 29-3 Dec, 2015
16. Muhammad W Sha, Muhammad Yasir, Esam I Azhar, Saad AL Masoodi, Metagenomic analysis of waste water microbiome from Saudi Arabia. Second International Genomic Medicine Conference in Saudi Arabia Nov.29-3 Dec. 2015, King Abdulaziz University, Jeddah Saudi Arabia
  17. Esam Azhar, Nadine Litzba, Pranav Patel, Petra Kreher, Moujahed Kao, Ghazi Jamjoom, Nasim A. Khan, Matthias Niedrig. ANALYSIS OF DENGUE VIRUS PATIENT SAMPLES FROM SAUDI ARABIA BETWEEN 2004 AND 2006. The Second International Conference on Dengue and Dengue Haemorrhagic Fever. Global Innovation to Fight Dengue, Phuket, Thailand, 15-17 October 2008.

## **Students Supervised**

### **MSc Students**

- |                    |   |
|--------------------|---|
| <b>2005 – 2007</b> | Amal Abdullah Baqatadah, Thesis Title "Molecular Epidemiology of Hepatitis C Virus among Hemodialysis Population in two regions of Saudi Arabia" Department of Microbiology, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia.                              |
| <b>2006 - 2008</b> | Leena H. Bajrai, Thesis Title "Establishment of molecular genotyping methods for Hepatitis B Viruses" Department of Biochemistry, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia.  |
| <b>2008– 2010</b>  | Moroj M. Ba-Akdah, Department of Biochemistry, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Establishment and Characterization of a-Amylase from the Fungus <i>Trichoderma harzianum</i> "  |
| <b>2010 - 2012</b> | Norah A. Alkaiedi, Department of Biochemistry, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Hospital based surveillance of the burden of rotaviruses gastroenteritis among children aged 5 years in Saudi Arabia"                         |
| <b>2011 - 2013</b> | Norah A. Uthman, Department of Biochemistry, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Diversity of Swine Flu A (H 1 N1) Isolated from Human in Makkah Region"   |
| <b>2011 – 2014</b> | Raied A. Badierah, Department of Biology, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Seroepidemiological Study of Dengue Fever among Students Attending Medical Administration of King Abdulaziz University"                            |
| <b>2014 - 2015</b> | Ahmed Toalah, Department of medical Laboratory Technology, Faculty of Applied Health Sciences, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Phenotypic Analysis of Drug Susceptibility of Influenza Viruses Circulating in Jeddah, Saudi Arabia in 2013-2014" |
| <b>2014 - 2015</b> | Tagreed Alsubhi, Department of Biochemistry, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Development of Immunoblot Assay for Dengue Virus Serotyping"  |
| <b>2016 - 2018</b> | Nada Al-Wethenani, Department of Biology, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Molecular  |

- Detection of Respiratory Pathogens among Healthcare Worker during Hajj Season"
- 2016 - 2018** Etezaz Zaki, Department of medical Laboratory Technology, Faculty of Applied Health Sciences, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Genotype and antiretroviral drug resistance of human immunodeficiency virus 1 in Jazan, Saudi Arabia"
- 2016 - 2018** Abdullah M. Subahi, Department of Medical Laboratory Technology, Faculty of Applied Health Sciences, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Antimicrobial susceptibility analysis of bacterial community in the hospital environment"
- 2016 - 2018** Mohamed Al-Ahmari, Department of Medical Laboratory Technology, Faculty of Applied Health Sciences, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Prevalence of micro RNA (miRNA) in chronic Hepatitis C virus Cases in king Abdul-Aziz university hospital in Jeddah city"
- 2017 - 2019** Afnan Degnah, Department of Medical Laboratory Technology, Faculty of Applied Health Sciences, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Seroprevalence of Middle East respiratory syndrome (MERS)-CoV in healthy Saudi blood donors"
- 2017 - 2019** Abdulaziz Alghamdi, Department of Medical Laboratory Technology, Faculty of Applied Health Sciences, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Circulation of Influenza A Viruses in Dromedary Camels in Saudi Arabia"
- 2018 - 2020** Moneerah Al-Saeed, Department of medical Laboratory Technology, Faculty of Applied Health Sciences, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Clinical characteristics and severity of influenza infections by virus type, subtype, and lineage during 2017 – 2018"
- 2018 - 2021** Mohammed Marouf, Department of Medical Laboratory Technology, Faculty of Applied Health Sciences, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Molecular screening and detection of flaviviruses in blood samples collected from patient with undiagnosed acute viral febrile illnesses"
- 2018 - 2021** Rawan Mosalam, Department of medical Laboratory Technology, Faculty of Applied Health Sciences, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Pattern of Viral Respiratory Infections in Jeddah between 2016 -2019"
- 2018 - 2021** Bedour Alhazmi, Department of medical Laboratory Technology, Faculty of Applied Health Sciences, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Genetic Diversity of Dengue Viruses in Jeddah, Saudi Arabia"

### **PhD Students**

- 2012 – 2014** Emran Khan, PhD student, Department of Biochemistry, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Analysis of Gut

- Microbiota Composition, Resistance and Antibiotics-induced changes During Pregnancy"
- 2012 - 2014** Mohamed Zia Mohamed Shabeer, PhD student, Department of Biochemistry, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Genetic Variability in the Pre S and S gene of HBV in patients with chronic liver disease in Saudi Arabia"
- 2016 – 2019** Farman Jannat Mir, PhD student, Department of Biology, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Molecular characterization of antimicrobial resistance of Enterococcus spp. isolated from local community and hospital patients"
- 2017 - 2019** Ahmed Tolah, PhD student, Department of Biochemistry, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Genetic Diversity of MERS-CoV in Camels Imported to Saudi Arabia"
- 2017 - 2020** Suha Farraj Abdulaal, PhD student, Department of Biochemistry, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Identification of Infectious agents in Cases of infections with Unknown Etiologies in Saudi Arabia" Department of Biochemistry, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia.
- 2017 - 2021** Hessa Awad Alsherif, PhD student, Department of Biochemistry, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. Thesis Title "Molecular Identification and Genetic Diversity of Respiratory Viruses Isolated from Patients attending King Abdulaziz University Hospital" Department of Biochemistry, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia.