



# RAEF ALBUGAMI, MSc, Ph.D

## Consultant Clinical Scientist

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## Summary

As a Ph.D. holder in bone marrow transplant immunology/immunotherapy, I'm keen to move the stem cell processing laboratories in Saudi Arabia toward the broader concept that is cellular therapeutic. Through intensive experimental, clinical research and collaboration with both Saudi and international experts, my simple aim is that all patients eligible for cell therapy treatment in Saudi Arabia should have the chance to be provided with a high-quality and safe product.

## Academic Qualifications

- 2005** Bachelor's degree in medical laboratory sciences  
Collage of Applied Medical Sciences  
King Saud University  
Riyadh, KSA
- 2011** Master degree in laboratory medicine with a major in  
Transfusion and Transplantation science  
RMIT University  
Melbourne, Australia
- 2020** Ph.D in Transplant Immunology and  
Immunotherapy  
Institute of biomedical research  
College of medical & dental science  
University of Birmingham  
Birmingham, UK

## Work experience

- July 2006 – Feb 2009**  
Medical Technologist, Department of Blood Bank  
KFMC
- Sep 2011 – March 2012**  
Participate in establishing the stem cell  
processing laboratory  
KFMC
- Apr 2011 – Nov 2012**  
Training course on haematopoietic cell processing  
Paul O'Gorman Laboratory of Cellular  
Therapeutics, Royal Free Hospital,  
London, UK
- March 2013 – Dec. 2014**  
Chief Supervisor Technologist &  
Stem cell processing laboratory supervisor
- Dec. 2014 – Feb 2016**  
Head of Phlebotomy, Specimen  
Processing, point-of-care testing sections &  
stem cell processing laboratory supervisor
- July 2020 – To date**  
Head of Flowcytometry and Cellular  
Therapy Processing Laboratory  
(CTPL)

## Job responsibilities (Dec. 2014 – Feb. 2016)

- Daily management and administrative operations of sample receiving and processing, Phlebotomy, and Point of Care Testing Sections.
- Ensuring that key performance indicators (KPI's) are met in all the sections.
- Maintained the highest professional and technical standards within the sections all the time.
- I was member of the KFMC bone marrow transplantation committee.
- I was member of the Pathology and Clinical Laboratory Medicine Utilization Committee.
- I was member of the Supervisory Committee of Phlebotomy Program.
- I was member of KFMC task force responsible to set up KFMC biobank.
- I was responsible for following up and coordinating tasks between all the stakeholders of the project of establishing a stem cell processing laboratory ;
  - Choosing the appropriate stem cell processing software with KFMC IT department
  - Evaluating and choosing the appropriate medical instruments with KFMC biomedical engineering, purchasing, logistics departments
  - Put the specifications and follow up the implementation required to build a clean rooms that met the JACIE and AABB with regard to air quality and cleanness in order to produce a high quality stem cell products.
  - I build up a well defined documentation system in compliance with JACIE and AABB standards including; quality management plan, policies, SOPs and forms.

## Clinical Laboratory technical Skills

### BLOOD BANK

- ABO grouping Rh typing by gel card technique. (Gel station automated system)
- Cross matching technique by gel card and immediate spin.
- Elution techniques.
- Lui-freeze technique.
- Washing RBC unit technique.
- Platelets filtration and pooling.
- PRBC filtration.
- Antibody identification and interpretation of results.
- Plasma preparation for therapeutic plasma exchange.
- Separation of blood components: platelet concentration, plasma and cryoprecipitate.
- Trained well to use blood bank information system (med info).
- Cryoprecipitate preparation.

### Haematopoietic stem cell processing

Successfully completed a 16 weeks intensive course of practical and theoretical training in haematopoietic cell processing in the Paul O’Gorman Laboratory of Cellular Therapeutics, Royal Free Hospital, London, UK.

The training programme covered the following aspects:

➤ **Good Manufacturing Practice (GMP) awareness**

The RFH LCT operates in compliance with EU & PICT GMP standards and JACIE standards. All staff and visitors must undergo a 2 day training programme to obtain a permit to enter the facility. This includes teaching the theory of GMP, the rationale behind GMP, the regulatory environment enforcing GMP and the practical aspects of GMP compliance including document control, gowning and laboratory entry procedures.

➤ **Aseptic technique**

A practical training session in a grade A cell processing environment teaching aseptic technique and leading to a practical test to EUPh standards which certifies aseptic competence and is a requirement for all staff operating in the GMP unit.

➤ **Laboratory environmental monitoring**

Practical training in how to comply with Eu & PICT standards for GMP EM monitoring

➤ Product acceptance, labelling and control of cross contamination – practical

➤ Apheresis product QC assessment

➤ Practical and theory training in cell counting, CD34 and cell subset enumeration, cell viability assays and colony forming unit assays

➤ Autologous peripheral blood stem cell production

➤ Practical training in apheresis processing, cryopreservation, QC testing

➤ Allogeneic peripheral blood stem cell production

➤ Practical training in apheresis processing, erythrocyte removal, T cell enumeration, QC testing

➤ Allogeneic bone marrow processing

➤ Practical training in mononuclear cell isolation, erythrocyte removal, QC testing

➤ Allogeneic therapeutic T cell processing

➤ Practical training in CD3 enumeration, dose calculation, dose-specific cryopreservation

➤ Release, thawing and infusion of cryogenically preserved transplant products

➤ Practical training in the lab and at the patient's bedside

➤ Mesenchymal stem cell isolation and expansion – non-routine

➤ Practical training in MSC isolation from bone marrow, ex-vivo culture and expansion, QC testing and formal release as a medicine

➤ Therapeutic-grade cell sorting by CliniMacs – non-routine

➤ Practical and theory training in immunomagnetic sorting of cell subsets for therapeutic product manufacture (e.g. CD34+ stem cells, anti-viral T cells, CD8 depleted TC-T)

➤ Regulation of cell therapies A theory course on the EU and FDA regulations covering cell therapy manufacture and use.

## Research laboratory technical skills

➤ Developed a good ability to define and explore research questions and convert them into a well designed studies with clear protocols.

➤ Developed a good ability of statistical thinking, data interpretation and graphs making using GraphPad prism software.

➤ I am holding a licence to carry out regulated procedures on living mice granted from the Animals in Science Regulation Unit Home Office Science, United Kingdom.

The licence include;

A. Minor/minimally invasive procedures not requiring sedation, analgesia or general anaesthesia

B. Minor/minimally invasive procedures involving sedation, analgesia or brief general anaesthesia. Plus surgical procedures conducted under brief non-recovery general anaesthesia

C. Surgical procedures involving general anaesthesia. Plus administration and maintenance of balanced or prolonged general anaesthesia

- Full understanding of theoretical and technical aspects of flow cytometry technology including; cells preparation, staining, operating Becton Dickinson (BD) Fortessa 20X flow cytometer, and data analysis using both BD FACSDiva and FlowJo softwares.
- *In-vitro* T cell depletion from bone marrow cells using magnetic beads for bone marrow transplant purpose.
- Dissecting mouse Fetal liver and making cell suspension for fetal liver transplant purpose.
- Inducing graft-versus-host disease (GVHD) in an animal model using purified allogeneic donor T cells.
- Follow up on GVHD induced animals for disease progression and clinical signs.
- Performing gene expression evaluation by real-time quantitative PCR using thermal cycler (Marshall scientific; PTC-225 Gradient Thermal Cycler) for complementary DNA synthesis and Applied Biosystems 7900HT sequence detection system (Applied Bioscience) for PCR reactions.
- Performing animal small intestine tissue freezing and cutting using cryostat microtome (Bright Instruments) followed by fluorescent antibodies staining for confocal microscopy imaging using Zeiss LSM 780 as well as analysing images using ZEN (black edition) software.

## Master degree Project

Participated in a stem cell therapy project at Monash Immunology and Stem Cell Laboratories (MISCL), Melbourne, Australia (February 2009 - August 2011). The research title was "Haematopoietic Stem Cell Transplantation in a Mouse Model of Multiple Sclerosis"

The overall aim was to use enhanced green fluorescent protein (eGFP)-expressing HSCs and precursors in a preliminary proof of principle experiment for engraftment in the spinal cord at the lesion site in an experimental autoimmune encephalomyelitis (EAE) - an animal model of MS.

These preliminary experiments are critical for the future therapeutic delivery using genetically modified HSCs transduced to overexpress a fusion protein between the Nogo receptor ectodomain NgR(310) and the Fc portion of a mouse immunoglobulin (ie NgR(310)-Fc). This strategy has been devised to specifically target axonal degeneration as a consequence of EAE disease progression.

## Ph.D degree Project

The Ph.D project was focused on the potential use of newly discovered innate lymphoid cells (ILCs) particularly, ILC3s as a therapeutic potential to restore mucosal immunity homeostasis following lethal irradiation and bone marrow transplant. In the gastrointestinal tract (GI) tract, Innate lymphoid cells group 3 (ILC3s) are the major producer of IL-22 which plays a critical role in maintaining mucosal homeostasis and tissue repair. The ability of IL-22-producing ILC3s to reconstitute and perform their normal function following BMT has not yet been fully addressed.

Here, we found that IL-22 producing ILC3s, as well as other ILC subsets, remained severely depleted in small and large intestines following BMT. Donor strain and MHC mismatch were the two main factors that dictated the extent of ILC recovery.

These data suggest that an investigation of ILC repopulation of the gut as well as other non-lymphoid tissues may reveal a link between IL-22 producing ILC3 numbers in the gut and the severity of GVHD/susceptibility to gut infections. Furthermore, such ILC3s may be manipulated in order to expand them *in situ* or elicit improved function which may attenuate gut GVHD pathology whilst leaving the graft versus tumour effect intact.

## Events participations

- Oral presentation during the 2017 British Society of Immunology (BSI) Congress in Brighton, UK. I won the second place prize for the best presentation for my presentation on 'Innate lymphoid cells reconstitution post lethal irradiation and allogeneic bone marrow transplantation'
- Poster during the 2017 Immunology and Immunotherapy Away Day, University of Birmingham, UK.
- Oral presentation during the 2018 Post-graduate Research Festival, University of Birmingham, UK.
- Oral presentation during the 2018 5<sup>th</sup> European Congress of Immunology, Amsterdam, Netherlands .
- Oral presentation & poster during the 2019 3 Minute Thesis Competition, University of Birmingham, UK.
- Poster during the 2019 the BSI west-midlands symposium "From fundamental immunology to immunotherapy", Birmingham, UK.
- Chaired the Bright Spark session during the 2019 BSI Congress in Liverpool. UK

## National and International organisation membership

- Member of the Saudi Immunohaematology group
- Member of the British Society of Immunology
- Member of the British Transfusion Society
- Member of the International Society of Cell & Gene Therapy (ISCT)
- Member of the American Association of Blood Bank (AABB)
- Member of the American Association of Tissue Banks (AATB)
- Member of the Society for Immunotherapy of Cancer (SITC).
- Membre of the Association for Change Management Professionals® (ACMP)