

## Miss Saaeha Rauz PhD, FRCOphth

Clinical Senior Lecturer/ Consultant Ophthalmologist

School of Immunity and Infection

### Contact details

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### About

Saaeha Rauz is a Senior Clinical Lecturer in the Academic Unit of Ophthalmology, School of Immunity and Infection, University of Birmingham and a Consultant Ophthalmologist at the Birmingham and Midland Eye Centre, one of the largest dedicated eye units in Europe.

She provides a supra-regional referral clinical service specialising in (i) ocular surface diseases where the majority of patients have immune-mediated aetiology necessitating either local or systemic immunosuppression and (ii) severe infections of the eye; providing care for one of the largest cohort of patients in the country. Her specific interest is conjunctival scarring disorders such as mucous membrane pemphigoid and Stevens-Johnson Syndrome / Toxic Epidermal Necrolysis together with secondary causes of dry eye including Sjögren's Syndromes.

This patient base underpins her research activities within the University's College of Medical and Dental Sciences newly established Centre for Translational Inflammation Research.

### Qualifications

- PhD Medicine 2002
- Fellow of the Royal College of Ophthalmologists 1995
- MB BS (Lond) 1990

### Teaching

- [Medicine and Surgery MBChB \(/undergraduate/courses/med/medicine.aspx\)](#)
- [Medical Science BMedSc \(/undergraduate/courses/med/medical-sci.aspx\)](#)

### Postgraduate supervision

There is a specific interest in supervising doctoral research students in the following areas:

- Immune-mediated ocular surface diseases
- Ocular infections
- Ocular surface inflammation and dry eye
- Autocrine regulation of corticosteroids and hormones in the eye and related structures

If you are interesting in studying any of these subject areas please contact Miss Rauz on the contact details above

### Research

#### RESEARCH THEMES

Inflammatory eye disease, ocular infections, ocular surface disease, limbal epithelial stem cells, hormonal metabolism in the eye, innate immune responses.

#### RESEARCH ACTIVITY

##### Immune-Mediated Ocular Surface Diseases

The ocular surface is a highly specialised mucosa consisting of three distinct areas: the conjunctiva, corneo-scleral limbus and cornea. These together with adnexal structures (eyelids, lashes and lacrimal system) form an integrated functional unit that is essential for optical clarity and vision. Ocular surface diseases are a group of disorders, of diverse pathogenesis, in which disease results from the failure of mechanisms responsible for maintaining a healthy ocular surface. These can be classified into diseases that are primarily the result of abnormalities of the ocular surface (primary e.g. nutritional, iatrogenic, trauma, immunological etc) or in which disease is secondary to abnormalities of the ocular adnexa (lid and tear film disorders, orbital and neurological diseases). Patients with immune-mediated diseases include conditions such as atopic keratoconjunctivitis, blepharokeratoconjunctivitis; graft-versus-host disease, sclerokeratitis which is frequently associated with autoimmune conditions such as Wegener's granulomatosis or rheumatoid arthritis, Stevens-Johnson syndrome/Toxic epidermal necrolysis, Sjögren's syndrome and non-Sjögren's syndrome dry eye. Inflammation and scarring of the ocular mucosal surfaces provide particular challenges; the most commonly encountered being mucous membrane

pemphigoid. Although rare (Incidence 1 in 1,000,000), damage to the ocular surface during inflammation leads to conjunctival shrinkage, ulceration, limbal epithelial stem cell failure and eventually total keratinisation with subsequent loss of sight.

Progression of disease frequently occurs without manifest inflammation which makes monitoring disease problematic. A key principal is to tease apart activity of disease from damage caused by disease. To facilitate this in a clinical setting, the group have developed a computer-designed custom made "Fornix Depth Measurer" (FDM - a small ruler designed to gauge scarring around the eye) which is currently being used to determine normal periocular anthropological measurements in different ethnic groups and to monitor progression of ocular disease in a detailed phenotyping longitudinal study. Through optimising molecular/cellular analytical techniques the group hope to identify surrogate markers for activity and damage by examining samples taken from the surface of the eye in health and disease. Ongoing studies in this area could provide novel data on how best to diagnose ocular mucosal scarring diseases, their prognosis, and how to go about treating these blinding conditions.

### Endogenous Hormonal Regulation and the Eye

Natural hormones such as glucocorticoids and vitamin D are pivotal to the regulation of the inflammatory mechanisms of the ocular microenvironment. There is a specific interest in the expression of a bidirectional isozyme, 11 $\beta$ -hydroxysteroid dehydrogenase (11 $\beta$ -HSD1) that inter-converts active cortisol and inactive cortisone. Over the last two decades, 11 $\beta$ -HSD1 has emerged as a critical determinant of glucocorticoid function in tissues such as the liver, adipose and bone. Interest in the isozyme has escalated primarily because of its putative role in diseases such as human obesity, insulin resistance and osteoporosis, and also its role in the regulation of immune-cell function and inflammation. The eye represents an important corticosteroid target tissue and Miss Rauz's studies have been the first to implicate 11 $\beta$ -HSD1 in the pathogenesis of blinding diseases of such as glaucoma, thyroid-associated ophthalmopathy and idiopathic intracranial hypertension. Ongoing studies are focussing on innate immune responses of the ocular surface and how these may interact with commensal and pathogenic micro-organisms.

### Severe Sight-threatening Ocular Infections

Infections are a leading cause of preventable worldwide blindness where infections of the cornea, comprises by far the largest group of disorders. In 2002, the World Health Organisation highlighted that 10 million people were blind or visually impaired from corneal infection. Sanitation and hygiene are paramount, and in the developing world contaminated water is a major risk (trachoma, river blindness), whereas in the developed world, contact lens wear is the most significant contributory factor. Endophthalmitis is a group of infections affecting vitreous cavity and constitutes the most feared complication following cataract surgery – the most commonly performed surgical procedure to restore eyesight. Although rare, 1:1000 cases, post-operative endophthalmitis can result in complete loss of vision.

Current research is exploring the balance between inflammatory cell recruitment into the eye for sequestering and eradicating pathogenic organisms, whilst the recruitment and inflammatory cell migration into the optically clear ocular tissue in itself, threatens sight-loss. Regulation of these inflammatory pathways is necessary to limit damage and maintain optical clarity. Many different molecules may be involved and the group is investigating the role of glucocorticoids and its interactions with toll-like receptors and other pathogen recognition molecules. Vitamin D has recently been shown to have a potent anti-inflammatory effect, and regulation of endogenous production in the eye is the basis of our ongoing work in relation to extraocular and intraocular infection.

## Other activities

### National

- Associate Editor for 'Eye' (Nature Publishing Group)
- National Institute of Health Research Clinical Research Network for Ophthalmology - BBC Joint-Representative
- President of the Medical Contact Lens and Ocular Surface Association (UK)
- Member of the Medical Council of the British Sjögren's Syndrome Association

### Royal College of Ophthalmologists Committees

- Member of the Academic Group
- Member of the Continuing Professional Development sub-committee
- Member of the FRCOphth Part 1 Examinations sub-committee

### Regional

- Priority Area Joint Lead for the Birmingham and Black Country Clinical Local Research Network for Ophthalmology
- Member of the Regional Speciality Advisory Appointments Committee
- Member of the Birmingham Eye Foundation
- Member and Academic Tutor for the West Midlands Deanery School of Ophthalmology Training Committee
- Chairperson for the West Midlands Deanery Postgraduate Educational Training Programme for Ophthalmology Steering Group

### Trust

- Designated Individual for the Human Tissue Act Licence 2004 (Licensing BMEC Tissue Bank)
- Member of the Sandwell and West Birmingham Hospitals Organ Donation Committee
- Clinical Lead for the Corneal and External Eye Diseases Service and Specialty Group

## Publications

Wallace GR, Liu L, Walker EA, Kissane S, Khan I, Murray PI, **Rauz S**. (2011). Gene Expression and miR Profiles of Human Corneal Fibroblasts in Response to Dexamethasone. **Invest Ophthalmol Vis Sci**. [Epub ahead of print]

Williams G, Denniston A, Elamanchi S, **Rauz S**. (2011) Rheumatoid corneal melt: autoimmunity or infection? **JRSM Short Rep**. 4;2(1):1.

Denniston AK, Kottoor SH, Khan I, Oswal K, Williams GP, Abbott J, Wallace GR, Salmon M, **Rauz S**, Murray PI, Curnow SJ. (2011). Endogenous cortisol and TGF-beta in human aqueous humor contribute to ocular immune privilege by regulating dendritic cell function. **J Immunol**;186(1):305-11.

Williams GP, Saw VP, Saeed T, Evans ST, Cottrell P, Curnow SJ, Nightingale P, **Rauz S**. (2011) Validation of a fornix depth measurer: a putative tool for the assessment of progressive cicatrizing conjunctivitis. **Br J Ophthalmol**, 95(6):842-7.

Ng WF, Bowman SJ, Griffiths B; UKPSSR study group. (2011) United Kingdom Primary Sjögren's Syndrome Registry--a united effort to tackle an orphan rheumatic disease. **Rheumatology (Oxford)**. 2011 Jan;50(1):32-9

Sinclair AJ, Walker EA, Burdon MA, van Beek AP, Kema IP, Hughes BA, Murray PI, Nightingale PG, Stewart PM, **Rauz S (joint senior)**, Tomlinson JW. (2010). Cerebrospinal fluid corticosteroid levels and cortisol metabolism in patients with idiopathic intracranial hypertension: a link between 11beta-HSD1 and intracranial pressure regulation? **J Clin Endocrinol Metab.**, 95(12):5348-56.

Ahearne M, Wilson SL, Liu KK, **Rauz S**, El Haj AJ, Yang Y. (2010) Influence of cell and collagen concentration on the cell-matrix mechanical relationship in a corneal

