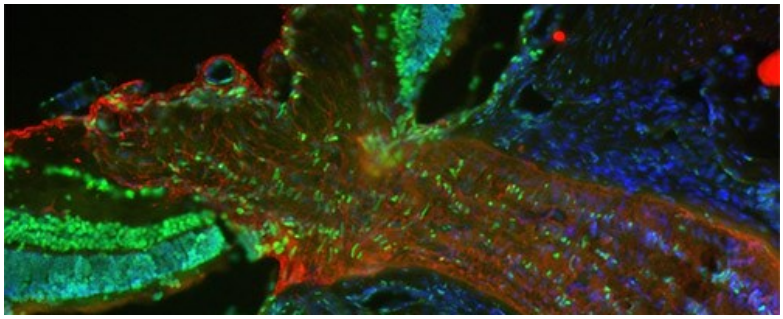
University of Birmingham

Ocular Injury Research Group



Group leader: Dr Zubair Ahmed (/staff/profiles/cem/neubio/Ahmed-Zubair.aspx)

Overview

Many delicate ocular structures are injured by trauma and disease. The Ocular Injury Research Group aims to fast track the translation of discoveries from the University of Birmingham research laboratories to improve outcomes for all patients with ocular damage.

The Ocular Injury group carries out translational research linked with the activity of the **NIHR Surgical Reconstruction and Microbiology Research Centre (Trauma Research) (http://www.srmrc.nihr.ac.uk/)** . We study the early response to damage in the eye. Our lab uses *in vivo* and *in vitro* models that have been developed to mimic the pathophysiological changes seen after ocular trauma. We have particular interest in, the identification of new genes involved in central nervous system (CNS) axon regeneration, the development of neuroprotective, neuroregenerative and anti-fibrotic drug strategies. Our research focuses on novel technologies to detect early signatures of damage before this becomes irreversible or to identify patients at risk of poor visual outcomes, thus allowing the development of targeted intervention and personalised treatments.

Our research group

Our ophthalmologists, psychiatrists, psychologists, neurologists, neuroscientists and bioengineers work together to develop a multi-disciplinary approach to research into ocular injury. We are *pioneering advances in our understanding of the cellular and molecular events that underlie ocular injury to deliver excellence in innovation for the better treatments* to deliver excellence in innovation for the better treatments.

Of special interest to the group is research that advances our understanding of the mechanisms responsible for retinal damage and the loss of retinal neurons during disease progression. Linked to this is the development of novel neuroprotective and neuroregenerative drugs that will help preserve and restore the vision of patients with retinal damage.

We also have a particular interest in developing a better understanding of the cause of scarring in the cornea, retina and optic nerve that can develop after injury and in disease and how new multi-modal drugs may better treat damaged eyes.

Because the retina is a part of the brain that can be easily accessed for study in situ, isolated and cultured, it represents an excellent model system for studying how central nervous system neurons respond to injury and to novel therapies.

Open all sections

Current projects

- Rescuing retinal ganglion cells from death by survival signaling – Wellcome Trust funded project led by Dr Zubair Ahmed
- Developing new drugs that enhance the regeneration of retinal ganglion cell axons – MRC funded project led by Professor Ann Logan
- Evaluating the therapeutic potential of dental pulp stem cells for retinal repair – BBSRC funded project led by Dr Wendy Leadbeater
- Rescuing injured photoreceptors with neuroprotective drugs – MOD funded project led by Professor Robert Scott
- Evaluating novel anti-fibrotic drugs that reduce scarring in the cornea, in the retina damaged by proliferative retinopathy and in the optic nerve after optic neuropathy – NIHR funded project led by Professor Ann Logan
- The pro-regenerative effects of dental pulp stem cells on the injured CNS - BBSRC funded project led by Dr Wendy Leadbeater and Dr Ben Scheven

Recent publications

- Mead B, Logan A, Berry M, Leadbeater W and Scheven BA (2013) **Intravitreally transplanted dental pulp cells promote neuroprotection and axon regeneration of retinal ganglion cells after optic nerve injury (http://www.ncbi.nlm.nih.gov/pubmed/?term=Intravitreally+transplanted+dental+pulp+cells+promote+neuroprotection+and+axon+regeneration+of+retinal+ganglion+cells+after+optic+nerve+injury)** . *Invest Ophthal Vis Sci* 54(12):7544-56
- Morgan-Warren PJ, Berry M, Ahmed Z, Scott RA and Logan A (2013) **Exploiting mTOR signalling: a novel translatable treatment for traumatic optic neuropathy? (http://www.ncbi.nlm.nih.gov/pubmed/?term=Exploiting+mTOR+signalling%3A+a+novel+translatable+treatment+for+traumatic+optic+neuropathy)** *Invest Ophthalmol Vis Sci* 54(10):6903-16
- Blanch RJ, Ahmed Z, Sik A, Snead DR, Good PA, O'Neill J, Berry M, Scott RA and Logan A (2012) **Neuroretinal cell death in a murine model of closed globe injury: pathological and functional characterization (http://www.ncbi.nlm.nih.gov/pubmed/?term=Neuroretinal+cell+death+in+a+murine+model+of+closed+globe+injury%3A+pathological+and+functional+characterization)** . *Invest Ophthal Vis Sci* 53(11):7220-6
- Vigneswara V, Berry M, Logan A and Ahmed Z (2012) **Pharmacological inhibition of caspase-2 protects axotomised retinal ganglion cells from apoptosis in adult rats (http://www.ncbi.nlm.nih.gov/pubmed/?term=Pharmacological+inhibition+of+caspase-2+protects+axotomised+retinal+ganglion+cells+from+apoptosis+in+adult+rats)** . *PLoS One* 7(12):e53473
- Ahmed Z, Kalinski H, Berry M, Almasieh M, Ashush H, Slager N, Brafman A, Spivak I, Prasad N, Mett I, Shalom E, Alpert E, Di Polo A, Feinstein E, Logan A (2011) **Ocular neuroprotection by siRNA targeting caspase-2 (http://www.ncbi.nlm.nih.gov/pubmed/?term=Ocular+neuroprotection+by+siRNA+targeting+caspase-2)** . *Cell Death Dis* 2:e173

Staff

Principal Investigators

Professor Ann Logan (/staff/profiles/cem/neubio/Logan-Ann.aspx) - School of Clinical and Experimental Medicine
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Dr Zubair Ahmed (/staff/profiles/cem/neubio/Ahmed-Zubair.aspx) - School of Clinical and Experimental Medicine

Internal Collaborators

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Dr Ben Scheven (/staff/profiles/dentistry/scheven-ben.aspx) - School of Dentistry

Honorary Staff
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Professor Martin Berry - School of Clinical and Experimental Medicine
Dr Richard Blanch - School of Clinical and Experimental Medicine

Postdoctoral Researchers
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Lisa Hill

PhD Students
Ben Mead
Dr Peter Morgan-Warren