

From spine to eye: The benefits of multidisciplinary research

What have spinal and vision research got in common? More than you'd think.

Funded by Fight for Sight, Dr Richard Eva came to vision from spinal cord research and is now co-lead on a project related to glaucoma.

Dr Eva, a lecturer at King's College London, has a lab that works on complimentary vision and spinal cord projects. It demonstrates the power of interdisciplinary research, which is something Fight for Sight aims to promote with a new doctoral training programme (launching April 2025).

This unique scheme will see students mentored by two co-supervisors from different institutions, and ideally different disciplines. Fight for Sight's Nina Bryant spoke to Dr Eva about his research.

Dr Eva, could you tell us a bit about your journey into academia and where you started in scientific research?

When I looked for a PhD, I took a position doing cell biology research at the University of Bristol. The PhD was related to the brain which was the area that I wanted to work in, but it was a completely different language, mostly being cell biology. And then I just fell in love with understanding what's going on inside individual cells.

What then led you to focus on spinal research?

After that PhD, I was determined to look for a postdoc applying the cell biology skills to anything to do with understanding how the brain works or trying to find treatments for brain-related diseases. I wasn't particularly focused on spinal cord injury at the time, but I came across a position at Cambridge in a spinal cord injury research group.

And what was your first step into vision research?

At the time that I was working in spinal cord injury, I felt like I was mostly a cell biologist whilst other people in the group were applying the research to the spinal cord. I discovered new ways of stimulating regeneration, and I wanted to find out if these would work in other injury or disease models. I was fortunate that we had a visiting academic in Cambridge who had experimental skills for investigating optic nerve regeneration and was looking to gain experience from the work going on in our lab. So, I said yes, please can I work with you?! And that was the first step.

Tell us about the Fight for Sight Project Grant with Professor Keith Martin.

We made this discovery that was published in 2020 that a molecule, called Protrudin, can stimulate regeneration in the optic nerve, and it looked like it might be a bit neuroprotective [protecting cells from damage or degeneration] as well. Which was cool and exciting for several reasons.

One of which is that we investigated it using a gene therapy approach, so it suggests that with more work, there could be a potential treatment



as a gene therapy. But the other exciting thing for me is that we don't completely understand how it works.

So, a large part of the current project [with Fight for Sight] is to investigate how protective and regenerative [Protrudin] could be and also to try and understand why it's being protective and can we make it even better? One aspect is understanding how to prevent essential cells from dying from the stresses that occur in things like glaucoma.

Could that have different possible applications, not necessarily just glaucoma?

We also have funding from spinal cord research charities to try and test those related treatments in the spinal cord as well.

We're always looking at ways of applying what we're doing for spinal cord or for traumatic brain injury. And there are other researchers at King's who are doing back of the retina work, so we're starting collaborations to see if we can apply things more broadly in the eye as well. So, I would say [it could be applied to] spinal cord, traumatic brain injury and possibly other parts of the eye as well as the optic nerve and retinal cells.

You've now got your own lab set up at King's which works on both spinal cord and vision regeneration and protection. How important do you think cross-discipline collaboration is for the future of vision research?

I think it's really, really important. I know some really good labs who've done some amazing research in the eye and spinal cord, so we're not the only people that are doing it. There are some scientists who I really respect who are doing amazing work in spinal cord and in vision research.

And you say you think of yourself more as a cell biologist. Do you think that describing people as vision or spinal cord researchers can limit that ability to transfer knowledge?

I think so, yeah. You need to be as aware of the possibilities as broadly as possible, and what your applications can be. Because following a career in science and academia is really, really tough and making the step from post doc to Principal Investigator, to getting your own funding and getting your own lab is tricky. So [my advice is] to be as open as possible. The more options there are, the more possibility that you'll succeed in getting the funding.

I've been quite fortunate with the funding for the past few years that both spinal cord charities and vision charities, like Fight for Sight, have supported the work that we're doing.

And what do you think charities like Fight for Sight can do to enable that collaboration?

One of the things you're doing is the new grant that you announced, which I think is fantastic to try and pollinate cross-collaboration. So, the funding and making people aware of the funding and opportunities I think is brilliant.

Are there any disciplines that you think we need more expertise on in the field of vision research?

The advanced technology section is a big grey area at the moment because it's so exciting and rapidly changing, and there are some exciting gene therapies already in use for some eye diseases, but there is so much potential for new treatments, like other gene therapies, or with things like cell therapies and biomaterials. [For example] if there was something you could inject in the eye that would slowly release a protective or supportive molecule – that type of research.

Thank you, Dr Eva, for your time and for speaking with us.

INTERVIEWED BY



Nina Bryant,

As Research Communications Lead at Fight for Sight, Nina loves turning complex science into engaging stories. Finding the sweet spot where science meets creativity, Nina is dedicated to demonstrating the exciting potential of early-stage research funded by Fight for Sight.



Fight for Sight funds the brilliant minds and bright ideas, putting change in sight for everyone impacted by vision loss.

For more information on Fight for Sight and its doctoral training programme(s), visit:
<https://www.fightforsight.org.uk/apply-for-funding/research-funding/current-funding-opportunities/>