bmieker called neurofilament light chain (NFL).

Measuring these proteins accurately is not an easy process, because damaged neurofilaments tend to clump together in blood and CSF in the same way that they do so in dying motor neurons, so Dr Malaspina and his team have spent several years refining and optimising the technique. He showed that samples from MND cases from both the Oxford and London collections could be discriminated from non-MND controls, with a sensitivity and specificity of over 95% for CSF samples.

Dr Tumer said: “Neurofilaments are the building blocks of each and every nerve and are thought to accumulate in the spinal fluid (crossing over into the blood too) as nerves degenerate across a range of conditions. We have found them to be raised in people living with MND.”

‘Even though this finding in itself is not unique to MND, importantly the level seems to reflect an individual’s speed of disease progression. What my group has been able to show (as part of BioMOx) is that this level can be directly linked to the damage we see in the motor tracts using the MRI scanner. It confirms that neurofilaments are objectively linked to the disease process in MND, and is a strong candidate for a workable biomarker that we might even be able to measure using only a blood test.’

Induced pluripotent stem cells and MND

Dr Kevin Eggan started a session on induced pluripotent stem cells (iPSCs), explaining that patients with MND have more electrically active neurons than people who are healthy. This can be shown using things like transcranial magnetic stimulation.

He wanted to investigate why motor neurons are more excitable, and he used iPSCs from two patients with a specific type of the SOD1 inherited form of MND.

When measuring the electrical activity of motor neurons from iPSCs, he found the same thing that he saw in people – that the SOD1-MND motor neurons have more activity compared to activity in healthy motor neurons.

Dr Eggan was using a new technique with an adapted pore within the motor neurons that is sensitive to blue light – when blue light is shone on the motor neurons the channels open and they become electrically active, what's more is that in his system, the presence of electrical activity causes a tag on another part of the nerve cell to glow red. Through this work he showed that the potassium brake on electrical activity doesn’t work so well in the SOD1 form of MND.

Therapy for SOD1 MND

With all the talk of new gene discoveries in recent years, the final day of the symposium returned to the original discovery in 1993 that mutations in the SOD1 gene were responsible for around a fifth of inherited MND cases and 2-3% of all cases of the disease.

Although much of our understanding of MND in the past two decades comes from SOD1 laboratory models of the disease, we still don’t know exactly how SOD1 kills motor neurons. But that hasn’t stopped several groups from working on a number of innovative ways of protecting motor neurons from SOD1 toxicity. Although focused on a relatively rare form of MND, some of the strategies being followed could potentially also be applicable to other forms of the disease.

Dr Lorelei Stoica from Massachusetts Medical School, explained that they are switching off the SOD1 gene by reducing the gene activity in the spinal cord of SOD1 mice by over a third, leading to a 50% increase in survival. However, some animals did show side effects that need to be explained before this approach can be considered for the clinic.

Dr Grad (University of British Columbia) has identified a part of the SOD1 protein structure that appears to be crucial for the propagation to occur. Using computers, he has started to design more ‘drug-like’ compounds for testing, based on a molecule called uridine, which he has found is able to reduce SOD1 propagation in lab studies. This is early stage work, but has the advantage that it does not necessarily rely on the drugs getting inside cells, although they still need to be designed to get from the blood into the central nervous system.

Overall the three day event covered some fantastic science, as well as some innovative developments in case practice. Next year the symposium will be held in Orlando in just under a year’s time, and who knows what will be discussed then!

Read detailed reports via the MND Association’s MND Research blog and our peer-to-peer blog ReCCoB

PREVIEW SMi present their 15th Annual conference on... Pain Therapeutics


Reviewing current opportunities in the effective and safe management of pain at SMi’s Pain Therapeutics conference.

SMi’s Pain Therapeutics conference returns to London on the 18th & 19th May 2015 with a two day intensive agenda highlighting the latest developments in pain therapeutics and offering attendees a unique platform to engage with KOLs and esteemed academia to learn the challenges and successes in the field of pain management.

With the increasing demand for new research techniques and a range of drugs to combat chronic pain syndromes, this conference will highlight key factors including personalised medicine for pain, biomarkers and CGRP receptor antagonists for migraine treatment. Attendees will learn about Grunenthal’s latest screening approach for neuropathic pain and pain models and hear timely case studies from Merck and Afferent Pharmaceuticals along with latest updates on developments in targeting nerve growth factors and advances in the treatment of pain from leading, pharma, biotech and academic experts from the industry. The conference will also feature an interactive panel discussion on reviewing validity of animal models for chronic pain.

Keynote Speakers

Expert panel of speakers will include Dr Gregor Bahrenberg, Associate Scientific Director from Grunenthal, who will speak on Vesicular Glutamate Transporters (VGLUTs) as targets for neuropathic pain. Professor Alexander Oksche, Executive Director of Pharmacological Intelligence from Mundipharma will speak on day one, highlighting recent developments in opioids.

The conference will also feature a spotlight session on Nerve Growth (NGF) updates; Mark T Brown, MD, Executive Director, Tanezumab Clinical Program Leader for Osteoarthritis and Cancer Pain Studies, from Pfizer will speak on Update on Tanezumab, a monoclonal antibody inhibitor of nerve growth factor.

Interactive workshops

Delegates can also choose between two half day workshops, both held on 20th May 2015 in London: workshop A is on: In vitro techniques and models for pain drug development: “Clinical trial in a dish” in association with Imperial College London and workshop B is on: Healthcare Innovation - A patient centred approach, in association with Insight Consultancy.

Visit www.pain-therapeutics.co.uk for more information or contact Magdalena Georgieva on telephone +44 (0)20 7827 6148 Email mgeorgieva@smi-online.co.uk

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