

BRAIN STEM DEATH: FROM HEART TRANSPLANTS TO THERAPEUTIC PAIN RESEARCH – EXPANDING THE ROLE OF DONATED TISSUES.

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Chronic pain is a grossly debilitating condition whose estimated incidence is 19-43%. The repeated failure of promising chronic pain pharmaceuticals during early phase clinic trials evidences the failure of traditional drug discovery pipelines, presents a therapeutic challenge, and undermines the ethics of animal experimentation. There is a pressing utilitarian and 3Rs need to improve translational research by introducing human neurons to *in vitro* target identification and when testing molecules of interest.

DRGnet Scotland, funded by NC3Rs, established ethical protocols and permissions to retrieve human primary sensory neurons from organ transplant donors, in collaboration with NHS Blood & Transplant (Scotland). With donor family authorisation, dorsal root ganglia are retrieved following solid organ retrieval for therapeutic transplant. Cells are prepared for *in vitro* pain research. Neuronal phenotype has been confirmed by University groups, and utility within drug discovery pipelines by industry partners active in chronic pain.

Ethical permission to access organ donors was granted by the West of Scotland Research Ethics Service (Research Ethics Committee ref:13/WS/0089; NHS GGC Integrated Research Application System ID: 129533), and University boards. Legal regulation is by the Human Tissue (Scotland) Act 2006; the required authorisation, not consent, is obtained from a hierarchy of ‘nearest relations’ by Specialist Nurses (Organ Donation).

Tissue is removed for research purpose only. Open access protocols provision will facilitate uptake by academia and industry, thereby maximising potential for human and animal welfare improvement, which is the ethical argument for human tissue retrieval. Primary cultures of viable, neurophysiologically active, human DRG neurons suitable for functional & pharmacological studies are produced. Viability (weeks) is maintained after shipping nationally/internationally.

The team are more than aware of the altruism shown, and greatly respect those authorising tissue donation at such a difficult time. Hopefully their generosity will be repaid overtime by relief of pain by many.

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