Understanding cell damage in Spinal Muscular Atrophy to help develop future therapies

Spinal muscular atrophy (SMA) is a recessive, genetic condition with an incidence of 1:10,000 births, making it the commonest inherited cause of infant death Worldwide, but which you have probably never heard of. The most severe patients will not survive for more than 2 years after they are diagnosed at 6-8 months of age, which perhaps explains why so few of us have heard of SMA. SMA is a childhood form of motor neurone disease, where a steady loss of the motor neurone cells which control our every movement leads inexorably to muscle wasting, reduced movement and ultimately respiratory failure and death. However, my group in Aberdeen and others have described widespread disease in many other types of cells, tissues and organs in the body. Much of this work has been carried out in animal models, but here we will utilise post mortem tissue to determine if this is also the case in patients. This work is becoming increasingly important, as now that there is an approved therapy for SMA (Spinraza™/ Nusinersen), survival of the most severely affected children is increasing dramatically. But, as this therapy only targets the nervous system, we are concerned that these significant, non-neuronal pathologies will become unmasked as survival increases, and this project will help us to understand these.



Figure legend

One key finding from our ongoing research is that the blood vessels in the spinal cord, where the important motor neurone cells (shown in green) are found, are dramatically reduced in SMA. Compare the red-stained blood vessels on the right in SMA with those on the left in a normal spinal cord.