June 2020 MND Research Article summary – Jessica Allsop, Research Assistant, University of Sheffield

Results from scientific research looking into using a naturally occurring compound to combat the effects of hypoxia (oxygen deprivation) in a mouse model of MND

6-Deoxyjacareubin, a natural compound preventing hypoxia-induced cell death, ameliorates neurodegeneration in a mouse model of familial amyotrophic lateral sclerosis (Hoshino et al., March 2020, Neuroscience Research)

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The central nervous system, consisting of the brain and spinal cord, uses a lot of oxygen to produce energy. This can be impaired by a reduced blood supply, so oxygen cannot get to the areas it needs to, like the spinal cord. A lack of oxygen supply is called hypoxia and is prevalent in diseases such as ALS/MND, where diaphragm weakness can cause intermittent bouts of hypoxia in people with the disease. Thus, protection against hypoxic insults may be important for brain cell survival.

By using a mouse model of MND, which was engineered to produce a mutant version of SOD1, which causes MND, the researchers from the Kyoto University in Japan aimed to use a compound that they identified in a previous unreleased study, called 6-Deoxyjacareubin. 6-Deoxyjacareubin is a naturally occurring compound which the researchers used to alter the way that hypoxic signalling occurred to reduce motor neuron death.

The results of this study showed that by administering 6-deoxyjacareubin, to the MND mice, their survival time was increased significantly, by around 16 days, and there was also a tendency towards the delay of onset in the mice. They also found that there was recovery in the number of motor neurons as 6-deoxyjacareubin protected them from hypoxia-induced cell death. They also found an increase in the number of activated glial cells in the control mice. Glial cells are the supportive cells of the central nervous system and an example of their function is to provide nutrients to neurons. An increase in the number of glial cells, could increase the number of chemical signals leading to abnormal levels of inflammation which can exacerbate the disease.

Overall the results showed that this compound, 6-Deoxyjacareubin, could present as a potential therapy for MND, as it is suggested to inhibit hypoxia-induced cell death. This inhibition could also prove useful for other diseases that are characterised by hypoxia, including Alzheimer’s Disease and Parkinson’s Disease.