Selective Vulnerability of Motor Neurons and Treatment for Amyotrophic Lateral Sclerosis
Shannon Kim, VCU Medical Science Internship Program

BACKGROUND:
- ALS is a neurodegenerative disease that leads to the gradual deterioration of motor neurons (MNs).
- Oculomotor neurons (OMNs) and Onuf nuclei MNs (ONMNs) are resistant to deterioration.
- Vulnerability depends on physical characteristics along with function.
- Riluzole is the most effective treatment for ALS but there studies on Mesenchymal stem cells (MSCs).

QUESTION:
What are the characteristics that determine vulnerability and what is the most effective treatment?

CONCLUSION:
Selective vulnerability, found in OMNs and ONMNs, in ALS can be attributed to ALS-related proteins and excitability. MNs that are resistant to deterioration are smaller, require less energy to function, are slow-twitching, and differ in their ability to reinnervate. Treatments such as riluzole prolongs survival by blocking ACh receptors along with glutamate through its anti-excitotoxic properties. Patients that were injected with MSCs had greater function stability as they had better outcomes in terms of ALSFRS-R. However, riluzole is more effective as MSCs are not beneficial in advanced stages and have unknown long-term effects due to lack of trials.

FUTURE DIRECTIONS:
Research should focus on the quality of life of ALS patients in regard to riluzole and focus on the effects of riluzole on months specifically. There should be a phase 3 clinical trial for MSCs to study long-term efficacy.

REFERENCES:

ACKNOWLEDGEMENTS:
Virginia Commonwealth University Medical Internship Program (VCU MSIP)