

STEM CELLS IN THE THERAPY OF NERVOUS DISEASES

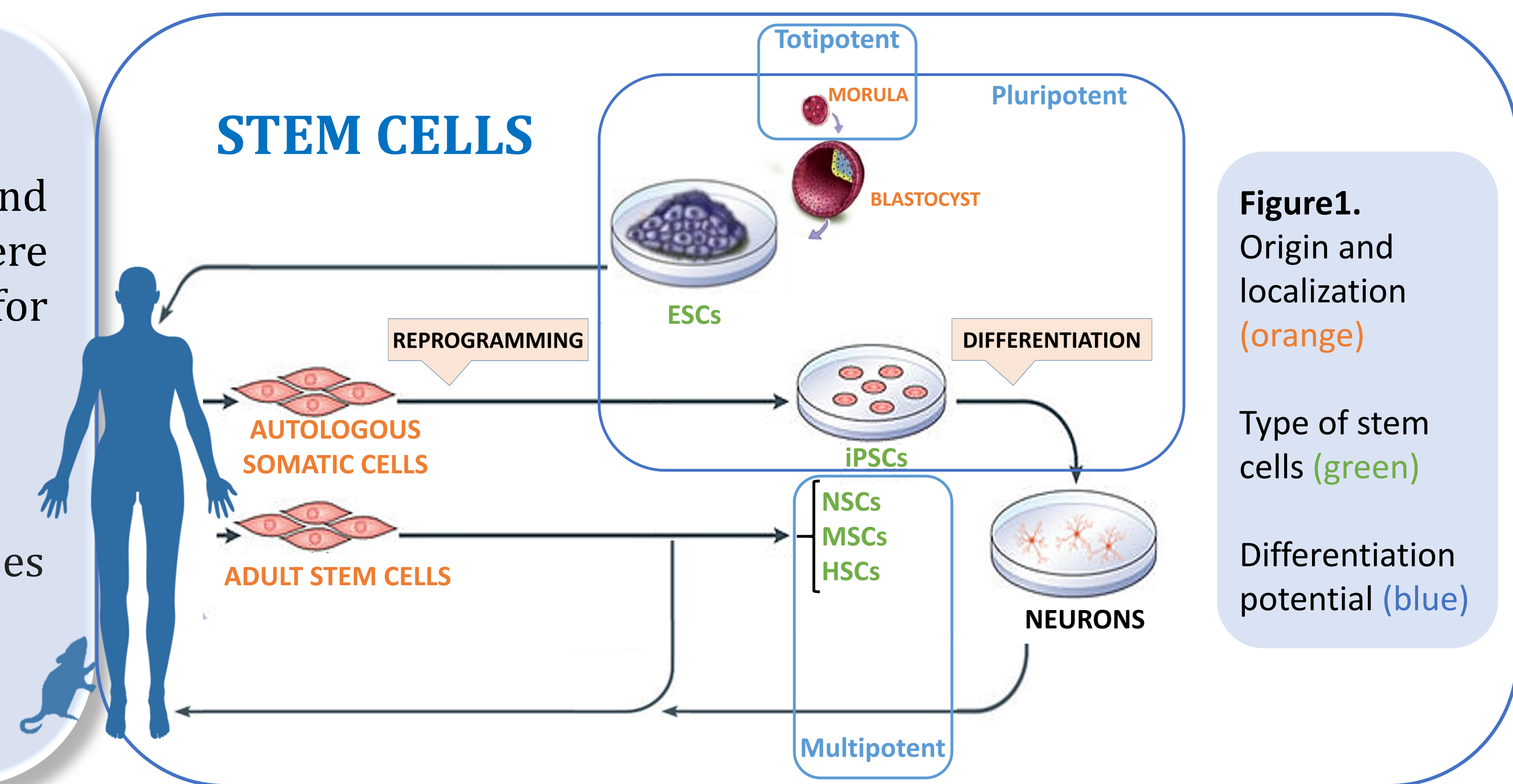
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INTRODUCTION

Stem cells have been studied in a wide spectrum of diseases and have shown a high therapeutic potential. In the nervous system there has been a great interest in stem cells as there is no effective cure for many diseases.

OBJECTIVES

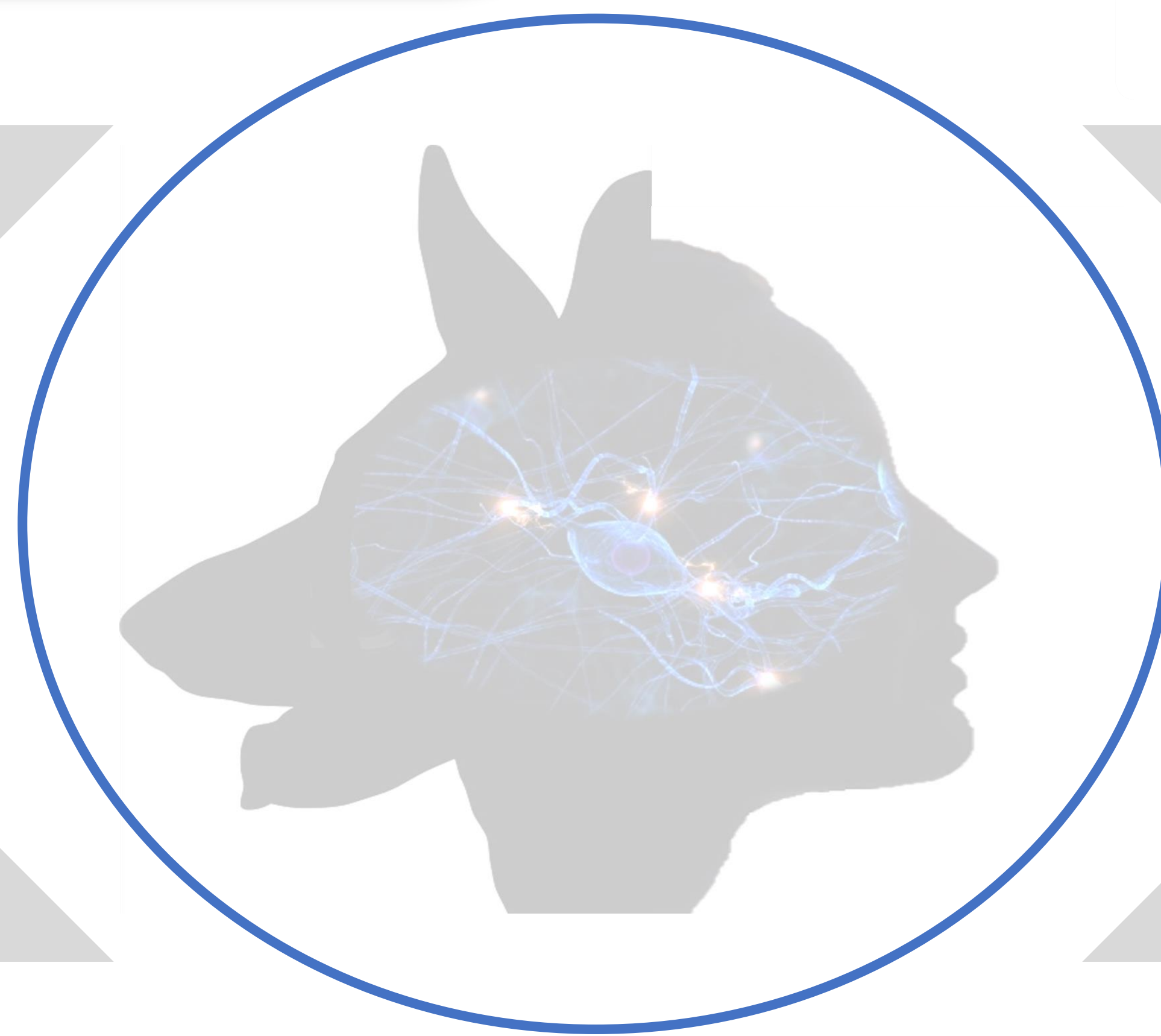
- To review the use of stem cells in therapy of neurological diseases with high prevalence in human medicine.
- The role of animals as a model for human counterparts.



CANINE MODELS

Canine
cognitive dysfunction

Canine
degenerative myelopathy



FOR HUMAN DISEASES

Alzheimer disease

Amyotrophic Lateral
Sclerosis

STEM CELL THERAPY

ALZHEIMER DISEASE (AD)

❖ Preclinical trials

Significant improvement in learning and memory
Decrease of A β protein aggregates

❖ Clinical trials*

Efficacy shown in preclinical trials is not presented

AMYOTROPHIC LATERAL SCLEROSIS (ALS)

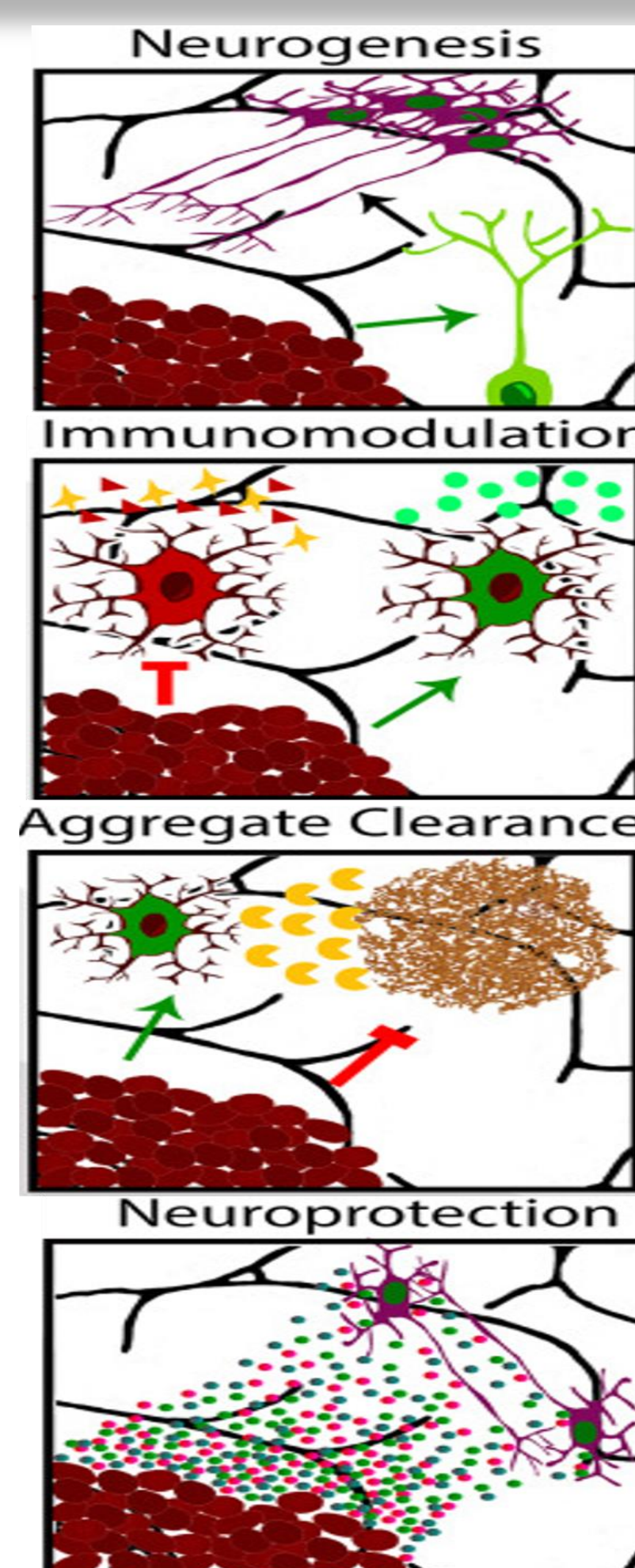
❖ Preclinical trials

Improvement in motor functions and lifespan
Decrease of onset and progression of symptoms

❖ Clinical trials*

Some of them even showed improved motor function and slower progression of the disease

*Feasible, safe and without adverse effects



STROKE

❖ Preclinical trials

Decrease of lesional size and improved neurological functions

❖ Clinical trials*

No significant functional improvement
Decrease of mortality and lesional size

SPINAL CORD INJURY (SCI)

❖ Preclinical trials

Partial recovery of motor and bladder function
Increased axonal regeneration and myelination

❖ Clinical trials*

No significant functional improvement
Increased improvement in acute than in chronic SCI patients

CONCLUSIONS

- ✓ There is evidence about the beneficial effects of stem cells thanks to paracrine secretion and integration into the neuronal circuit that can improve motor and cognitive functions of AD, ALS, stroke and SCI in animal models.
- ✓ Canine models of spontaneous disease could be a great model to study AD and ALS.
- ✓ The MSCs are the most used cells in the preclinical and clinical trials of the four diseases reviewed.
- ✓ Most of the completed clinical trials are designed to assess the safety and tolerance of stem cells and not their effectiveness, but due to the promising efficiency in preclinical trials and safety results in clinical studies there are many clinical trials underway in advanced stages.

Bibliography

Selvaraj et al. 2012, Dasari 2014, Hao et. Al 2014, Chhabra and Sarda 2017, Volkman and Offen 2017, Wang et al 2017, Lo Furno et al. 2018, Czarzasta et al. 2017, Sinden et al. 2017