

Poster

Evaluation of halophyte plant extracts and polyphenolic combinations as neuroprotective therapies for ischemic stroke



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ABSTRACT

Motivation: Ischemic strokes are one of the leading causes of morbidity and mortality among population, and in the last decade there has been a rising in the number of cases reported. The available treatments approved at the moment (thrombolysis and mechanical thrombectomy) are very time sensitive, limiting the number of patients eligible for their use. It has been shown that the risk of suffering an ischemic stroke can be lowered with a healthier lifestyle and an adequate diet. The objective of this project is to study the effect of different dietary polyphenols found in halophyte plants on experimental models of stroke using *Drosophila melanogaster* and a 3D blood brain barrier (BBB) spheroid model.

Methods: On the one hand, we carried out samplings of different halophyte plant species to study seasonal changes on their phenolic content. Aerial parts were freeze-dried and hydroalcoholic extracts were prepared to quantify polyphenol content using the Folin-Ciocalteu method. On the other hand, specific polyphenols and polyphenolic combinations were selected to investigate their effect in a *Drosophila* model of hypoxia-reoxygenation. Flies were subjected to a 5 days treatment followed by 2.5h of severe hypoxia. Mortality and motility were recorded. Finally, cytotoxicity assays were performed with these polyphenols on astrocytes, HBMEC and pericytes to select the adequate concentrations for using them as a therapy in a subsequent experiment using a spheroid model that simulate the BBB.

Results: Here we show the seasonal polyphenolic content of different halophyte species. Six individual polyphenols and 6 polyphenolic combinations were selected and tested against hypoxic damage in the *drosophila* model. In vitro, none of the individual compounds or combinations were found to be toxic in astrocytes, HBMEC or pericytes at the studied doses. The most promising ones will be tested in the BBB spheroid model.

Conclusions: It has been reported that a polyphenol-rich diet can reduce the risk of stroke incidence and recurrence. Halophytes represents a valuable source of polyphenols with promising disease-modifying activities and our polyphenolic combinations could be further studied as an effective food supplement for the prevention or treatment of neurovascular disorders..

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