Alzheimer's Disease: Reflection and Hope

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With increasing life expectancy and an aging population, there are more and more people with Alzheimer's disease (AD). According to a 2025 report by the World Health Organization, it is estimated that more than 55 million people worldwide live with dementia, with Alzheimer's accounting for 60-70% of cases, and that this figure could reach 139 million by 2050. This represents a huge impact on the quality of life of patients and their families, as well as a significant economic burden on society. Furthermore, mortality from AD has increased significantly, with an estimated rise of 145.2%.

It is believed that factors such as age, genetics, environment, and diet influence Alzheimer's disease, but how the disease develops and progresses is not yet fully understood. For this reason, there are no truly effective preventative measures. Current treatments only achieve modest effects, do not halt the progression of the disease, and in many cases produce side effects.

Given this situation, the need to seek different and more effective approaches is evident. In this context, stem cell and regenerative medicine research has become one of the major lines of work in current medical science. Among the different types of stem cells, much research has focused on mesenchymal stem cells (MSCs) due to their special properties. Through 2025, MSCs research in neurology remains very active, forming part of a global ecosystem of more than 1,100 active clinical trials in various disciplines, including neurological diseases such as Alzheimer's.

Although many studies have shown that MSCs are safe and may have some efficacy, the results have not met all expectations. This is due to several problems with cell therapy: immunological incompatibility, risk of tumor or embolism formation, difficulty in producing sufficient cells, potential transmission of infections, cell aging during culture, complexity in assessing safety, dosage, and potency, strict storage requirements, and very high costs. In neurological diseases, additional difficulties arise: when MSCs are administered intravenously, many are retained in the lungs, and the blood-brain barrier hinders their access to the brain. All of this limits the widespread use of cell therapy in clinical practice and highlights the need to develop new strategies related to MSCs.

Our Research Group has been working for years on solutions to these barriers. The first milestone was the identification and functional characterization of stem cells located in the human cervix, called hUCESCs (human uterine cervical stem cells). Later, we developed a significant innovation: obtaining the secretome of these cells in *in vitro* cultures. The secretome is the set of substances released by the cells that reproduces

their beneficial effects, avoiding the problems associated with using live cells as a treatment. This biological product contains higher quantities of factors with therapeutic potential than other types of stem cells.

In *in vitro* studies and animal models, we have found that the secretome of hUCESCs has potent regenerative effects, promotes blood vessel formation, reduces inflammation and oxidative stress, and also exhibits antitumor and neurotrophic (neuron-protective) properties. All these characteristics are especially interesting for treating neurological diseases. We believe that these extraordinary properties are related to the location of these cells in the cervix, an area that could be symbolically described as the gateway to the "treasure chest of life."

We have recently designed a project to administer our biological product intranasally to patients with cerebral palsy. Cerebral palsy is a group of psychomotor developmental disorders that limit a person's activity and are due to alterations in the brain structures of the fetus or child. The intranasal route is considered particularly promising because, in addition to being non-invasive and easy to administer, it allows the secretome to reach the brain more directly, largely bypassing the blood-brain barrier.

The project plans to begin with experimental studies followed by clinical trials, in collaboration with Dr. Ezquer's Research Group at the Center for Regenerative Medicine of the Faculty of Medicine at Clínica Alemana, Universidad del Desarrollo (Santiago, Chile), and Dr. Morales of the Department of Neuroscience at the Faculty of Medicine of the University of Santiago, Chile, both of whom have extensive experience in neurological research. In addition to FICEMU and Gistem Research, this major project has the primary support and promotion of the Argentine Foundation "Dalen Que Valen," dedicated to fostering research and continuously seeking innovative and effective health solutions that improve the well-being of children with this condition and enable them to reach their full potential.

I am convinced that the effort and enthusiasm of so many years have been worthwhile in launching this comprehensive project. It can not only contribute to the treatment of cerebral palsy, but the technology developed could also be key to addressing other neurodegenerative diseases, such as Alzheimer's. I would also like to express my gratitude to the Alzheimer's Foundation of Asturias for its outstanding work supporting patients and for the moral and emotional support it has always provided to our research. In fact, the first scientific presentations on our neurological projects were given at events organized by this valuable Foundation.

Alzheimer's disease is an illness that arises from life itself and ultimately turns against it. Faced with this illness, this article aims not only to offer reflection but also to awaken hope and encourage action. The only possible failure would be not trying.

All contributions are important for this project to continue. You can access the donation process through the following link: https://ficemu.org/haz-tu-donacion/ or make a Bizum payment to the code 02516.