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To protect your brain, don't be (too) kind!

Using brain imaging, a team from the University of Geneva and the HUG show that elderly people with low agreeableness are better protected against Alzheimer's disease.

Alzheimer's disease, the main cause of dementia in the elderly, is a neurodegenerative disease caused by the irreversible destruction of neuronal networks in certain brain structures affecting memory. While some risk factors are known, such as hypertension or diabetes, the potential role of non-biological factors begins to be discovered. Scientists from the University of Geneva (UNIGE) and the University Hospitals of Geneva (HUG), Switzerland, demonstrated, through brain imaging and psycho-cognitive evaluations conducted over several years on a community-based cohort of elderly people, that certain personality traits protect brain structures against neuro-degeneration. Among them, people who are less agreeable but with a natural curiosity and little conformism show better preservation of the brain regions that tend to lose volume, both in normal aging and in Alzheimer's disease. These results, to be discovered in the journal *Neurobiology of Aging*, highlight the importance of taking personality into account in neuropsychiatric disorders and pave the way for more precise prevention strategies against neurodegeneration.

For several decades, Alzheimer's disease specialists have been trying unsuccessfully to develop therapeutic vaccines that could repair brain damage caused by the accumulation of amyloid – a small protein that, in large numbers, is harmful to the central nervous system – and the resulting destruction of neurons. Today, a new avenue of study is beginning to be explored: would it be possible to limit the damage by acting on non-biological factors? Are some individuals more protected than others because of their personality or way of life? “Between the destruction of the first neurons and the appearance of the first symptoms, 10 to 12 years elapse”, says Professor Panteleimon Giannakopoulos, a psychiatrist at the UNIGE Faculty of Medicine and Head of the Division of Institutional Measures at the HUG, who has directed this work. “For a long time, the brain is able to compensate by activating alternative networks; when the first clinical signs appear, however, it is unfortunately often too late. The identification of early biomarkers is therefore essential for an effective disease management.”

A follow-up of several years

To this end, the specialists recruited a large cohort of people over 65 years of age in a longitudinal study. Various methodologies were used, including functional and structural brain imaging, to assess amyloid accumulation and brain volume. Atrophy of certain brain regions is indeed one of the major features preceding memory loss and Alzheimer's disease. “In order to get as complete a picture as possible, we decided to look at the non-lesional determinants of brain damage, i.e. the environment, lifestyle and psychology,” says Professor Giannakopoulos. “So we conducted cognitive and personality assessments.” To ensure the statistical validity of their work, they used a restrictive



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Professor Panteleimon Giannakopoulos, a psychiatrist at the UNIGE Faculty of Medicine and Head of the Division of Institutional Measures at the HUG.

High resolution pictures

model to control for possible demographic, socio-economic or psychiatric bias. In the end, 65 people – men and women – were examined several times over a five-year period.

A plea for selfishness?

The results are surprising: people who are unpleasant, who are not afraid of conflicts and who show a certain anti-conformity have better protected brains. In addition, this protection takes place precisely in the memory circuits that are damaged by Alzheimer's disease. "A high level of agreeableness characterizes highly adaptive personalities, who want above all to be in line with the wishes of others, to avoid conflict, and to seek cooperation", notes the specialist. "This differs from extraversion. You can be very extroverted and not very pleasant, as are narcissistic personalities, for example. The important determinant is the relationship to the other: do we adapt to others at our own expenses?"

Open-mindedness is also important

Another personality trait seems to have a protective effect, but in a less clear-cut way: openness to experience. "This is less surprising, as we already knew that the desire to learn and interest in the world around us protects against cerebral ageing." But why? What are the biological mechanisms at work? For the moment, this remains a mystery, which the Geneva team would like to decipher, as does the stability of their observations. Indeed, does the phenomenon last for decades? And how can these results be used for prevention purposes? "If it seems difficult to profoundly change one's personality, especially at an advanced age, taking this into account in a personalized medicine perspective is essential in order to weigh up all the protective and risk factors of Alzheimer's disease. It is an important part of a complex puzzle," the authors conclude.

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