

# Social isolation increases anxiety and asymmetry in brain atrophy in Alzheimer's disease

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Researchers at the Universitat Autònoma de Barcelona (UAB) have conducted a study which allows estimating the effects of isolation in the

current pandemic scenarios in elderly patients with dementia. The findings could serve as a guide to the rethinking of these conditions after the COVID-19 crisis. The study was published in a special edition of *Frontiers in Psychiatry* dedicated to assessing the effects of the pandemic.

The researchers analyzed the effects of [isolation](#) in male mice models suffering from advanced stages of Alzheimer's disease through a series of behavioral tests, which could be compared to several areas found in elderly residence homes. They compared these results with mice models of Alzheimer's that were not isolated, and with other healthy animal models undergoing a normal aging process. The study was conducted with male mice because they are more affected by COVID-19 and are also the ones to show more deterioration of the neuro-immuno-endocrine system and worse survival conditions when suffering dementia.

The main findings demonstrate that isolation exacerbates hyperactivity up to twice as normal in mice with Alzheimer's disease, and also causes the appearance of strange behaviors. This increase was demonstrated consistently in the gross motor skills related to the movement of arms, legs, feet or the entire body. However, it also affected fine motor skills, small movements made by hands, wrists, fingers, toes, lips and tongue. The isolated animals showed emotional patterns comparable to anxiety and changes in their stress management strategies.

"The results are concerning, given that anxiety is one of the main neuropsychiatric symptoms associated with dementia, which produces a large burden on the caregiver and, in some cases, makes clinical management a challenge," says Aida Muntsant, first author of the research, which is included as part of her Ph.D. thesis.

## Effects of isolation on memory

The researchers also analyzed the effects of isolation on other neuropathological variables, and obtained different results. "Although the characteristic variables of the disorder, like tauopathy, were not modified, others, such as asymmetric hippocampal atrophy, increased with isolation. This dysfunction was recently described in human patients with dementia and modeled here for the first time with animal models of Alzheimer's disease. The finding is important, given that asymmetry has been linked to greater vulnerability to stress factors," states Lydia Giménez-Llort, professor in psychiatry and researcher at the INc directing the study.

The study also confirmed that the mice suffering from Alzheimer's disease lost body and renal mass, effects also observed in COVID-19 patients, although the loss was greater with those in isolation. The loss in spleen mass, an important organ of the peripheral immune system, was only observed in isolated animals.

## **Rethinking isolation among the elderly**

"Thinking of what the post-COVID-19 era will be like for the elderly implies a great deal of effort in redesigning all conditions of life, interventions in care and rehabilitation, and the management of forced solitude as part of new physical distancing measures. Therefore, it is necessary and urgent to estimate the impact these measures will have on the more vulnerable elderly population, such as those suffering from dementia," the researchers point out.

The study also highlights the need for personalized interventions adapted to the heterogeneous and complex clinical profile of people with [dementia](#), and to consider how all of this affects the obligations of caregivers, whether they be professionals or members of the patient's family.

**More information:** Muntsant-Soria et al., Impact of social isolation on the behavioral and functional profiles and hippocampal atrophy asymmetry in dementia in times of coronavirus pandemic (COVID-19): A translational neuroscience approach. *Frontiers in Psychiatry* (2020). DOI: [10.3389/fpsy.2020.572583](https://doi.org/10.3389/fpsy.2020.572583)

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