

Impaired olfaction is associated with cognitive decline and neurodegeneration in the brain

Christina S. Dintica, MSc, Anna Marseglia, PhD, Debora Rizzuto, PhD, et al.

Cite as: *Neurology*® 2019;92:e700-e709. doi:10.1212/WNL.0000000000006919

Correspondence

Christina S. Dintica
christina.dintica@ki.se
or Dr. Xu
xuweili@tmu.edu.cn

Study objective

To determine whether impaired olfaction is associated with cognitive decline and neurodegeneration in the brains of dementia-free older adults.

Summary results

Impaired olfaction is associated with faster cognitive decline and various indicators of neurodegeneration in the brains of dementia-free older adults.

What is known and what this paper adds

Several studies have reported an association between olfactory impairment and cognitive impairment, but the association remains controversial and without a clear mechanistic explanation. This study provides further evidence for the association and provides insights into a potential mechanism.

Participants and setting

This study analyzed data for 380 participants (76% female; mean age, 78 ± 7 years) in the Rush Memory and Aging Project (MAP), an ongoing prospective study of older adults residing in the Chicago area. These 380 participants were initially dementia-free and were followed from 1997 to 2014. Neuroimaging assessments began in 2009.

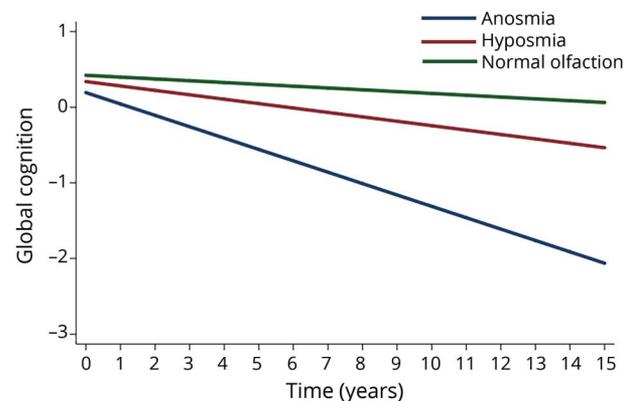
Design, size, and duration

The MAP participants underwent baseline olfaction assessments with the Brief Smell Identification Test. They also underwent annual cognitive function assessments involving 21 tests to measure cognitive decline. High-resolution T1-weighted MRI sequences were analyzed to determine the volumes of various brain structures. Linear regression and mixed-effects models were used to determine whether baseline olfactory function was associated with cognitive decline and brain structure volumes.

Main results and the role of chance

At study entry, 138 participants (36.3%) had normal olfactory function, 213 (56.1%) had hyposmia, and 29 (7.6%) had anosmia. Accelerated cognitive decline relative to participants with normal olfactory function was observed in

Figure Predicted global cognition z-score trajectories in participants with normal olfaction (green), hyposmia (red), or anosmia (blue) at baseline



participants with hyposmia (β , -0.03 ; 95% confidence interval, -0.05 to -0.02) and participants with anosmia (β , -0.13 ; 95% confidence interval, -0.16 to -0.09). Hyposmia and anosmia were associated with volume reductions in the hippocampus and the entorhinal, fusiform, and middle temporal cortices.

Bias, confounding, and other reasons for caution

This study lacked longitudinal neuroimaging data and relied on a brief odor identification test.

Generalizability to other populations

The participants were generally well educated and had high cognitive test scores. This may limit the generalizability of the results.

Study funding/potential competing interests

This study was funded by the Swedish, Chinese, EU, and US governments and various Swedish foundations and research institutes. The authors report no competing interests. Go to Neurology.org/N for full disclosures.

A draft of the short-form article was written by M. Dalefield, a writer with Editage, a division of Cactus Communications. The authors of the full-length article and the journal editors edited and approved the final version.

Neurology®

Impaired olfaction is associated with cognitive decline and neurodegeneration in the brain

Christina S. Dintica, Anna Marseglia, Debora Rizzuto, et al.
Neurology 2019;92:e700-e709 Published Online before print January 16, 2019
DOI 10.1212/WNL.0000000000006919

This information is current as of January 16, 2019

Updated Information & Services	including high resolution figures, can be found at: http://n.neurology.org/content/92/7/e700.full
References	This article cites 43 articles, 6 of which you can access for free at: http://n.neurology.org/content/92/7/e700.full#ref-list-1
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://www.neurology.org/about/about_the_journal#permissions
Reprints	Information about ordering reprints can be found online: http://n.neurology.org/subscribers/advertise

Neurology® is the official journal of the American Academy of Neurology. Published continuously since 1951, it is now a weekly with 48 issues per year. Copyright © 2019 The Author(s). Published by Wolters Kluwer Health, Inc. on behalf of the American Academy of Neurology. All rights reserved. Print ISSN: 0028-3878. Online ISSN: 1526-632X.

