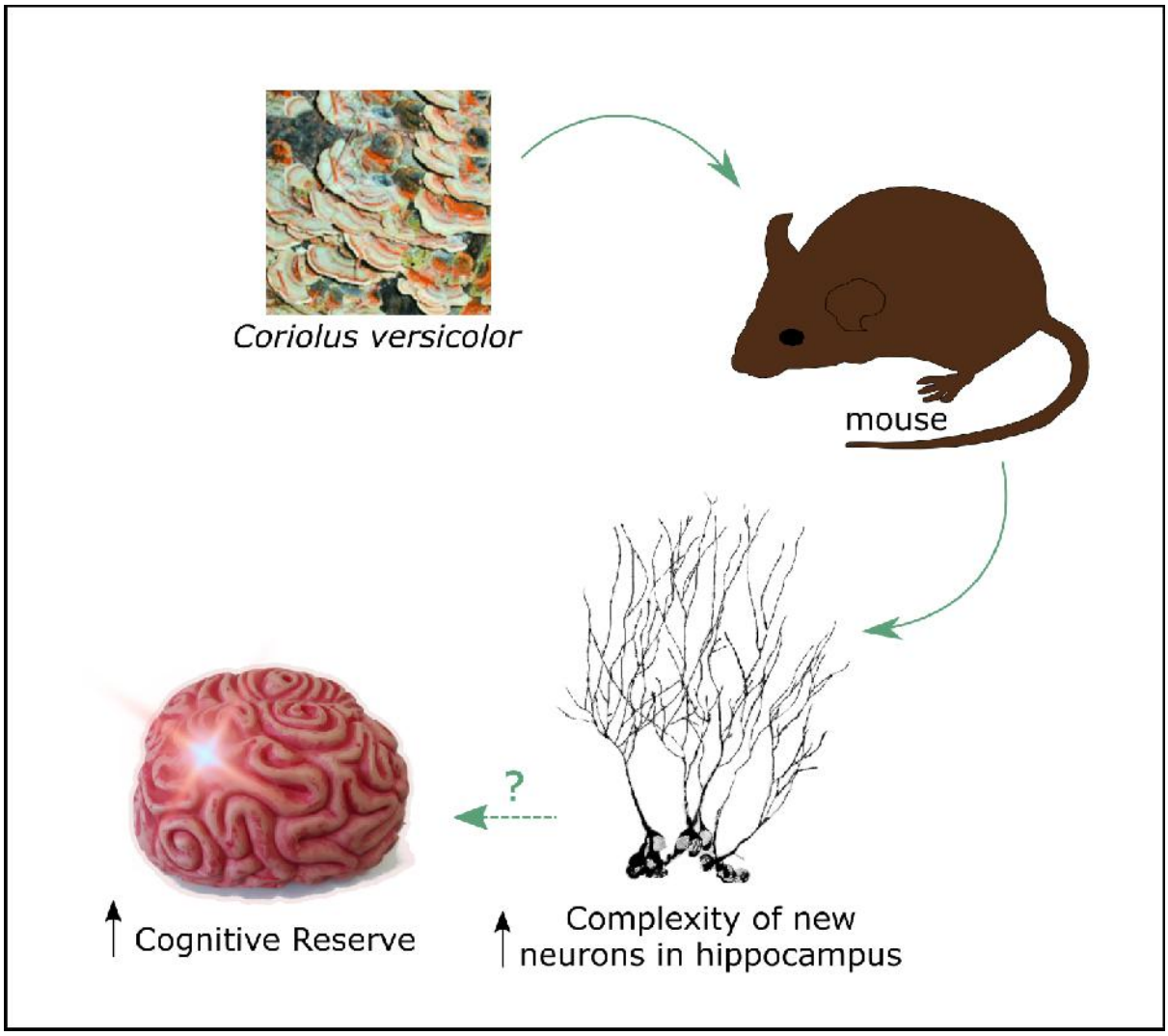
Mushroom Nutrition has Potential for Improving Brain Function



A research team, based in the Faculty of Medicine at the University of Coimbra (FMUC) and in the Center for Neuroscience and Cell Biology (CNC), Portugal, has found that feeding adult mice with the mushroom *Coriolus versicolor* increased the complexity of new neurons (nerve cells) formed in the hippocampus, an area of the brain linked to emotions and memory. This finding may have implications for the development of a disease-modifying therapy to prevent or slow the cognitive decline associated with neurodegenerative diseases.

The researchers discovered that feeding the mice with *Coriolus versicolor* resulted in a significant increase in the length, volume and arborization (fine branching) of the dendrites (finger-like extensions of the neurons that allow them to communicate with each other) of newly-generated neurons in the hippocampus. They also discovered that this increased 'dendritic complexity' was accompanied by an increase in the levels of the protein β-catenin within these neurons. β-catenin plays a major role in neurogenesis (the development of new neurons) through a process known as Wnt/β-catenin signaling.[1,2,3] Thus, the positive effect of *Coriolus versicolor* on the dendritic complexity of hippocampal newly-generated neurons may be mediated, at least in part, by increased levels of β-catenin and enhanced Wnt/β-catenin signaling. The authors concluded that there is a thus-far unexplored neurogenic

potential of *Coriolus versicolor* supplementation, and that it might represent a preventive strategy for neurological conditions that involve cognitive decline.

Commenting on the results, Professors Ana Cristina Rego (CNC and FMUC) and Frederico Costa Pereira (iCBR and FMUC), coordinators of the research, said:
"Our findings suggest that this mushroom may contribute to the strengthening of neurogenic reserve, and possibly to an increase of cognitive reserve. We suggest that a diet that includes this supplementation may be part of a strategy that promotes healthy aging, including the prevention of cognitive deficits associated with neurodegenerative processes. However, more preclinical studies will have to be performed."

William Ahern, Managing Director of Mycology Reseach Laboratories and sponsor of the study noted:
"It is widely accepted that there is an important link between the microbiome (the microbial population within the body/specific body parts) and neurodegenerative disorders.[4] The finding that supplementation with *Coriolus versicolor* biomass may benefit the hippocampus of mice indicates that more research on the impact of *Coriolus versicolor* on the microbiome and on cognitive reserve is required in order to assess its potential in humans."

The team, from the Center for Neuroscience and Cell Biology (CNC) and the Coimbra Institute for Clinical and Biomedical Research (iCBR) of the Faculty of Medicine, University of Coimbra (FMUC), recently published their findings in the journal Oncotarget (Oncotarget 2018 Aug 31;9(68):32929).

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Notes to editors

- β-catenin, also known as catenin beta-1, is a protein that, in humans, is encoded by the CTNNB1 gene. β-catenin is a dual function protein involved in regulation and coordination of cell–cell adhesion and gene transcription.[5,6]
- Wnts are secreted glycoproteins that function as ligands to stimulate receptor-mediated signal transduction pathways in vertebrates and invertebrates. In the absence of a Wnt signal, cytoplasmic β-catenin is phosphorylated and degraded.[7]
- Wnt/β-catenin signaling is involved in neurogenesis and the maturation of the newly-generated dendritic tree.[1,2,3]

Researchers and funding

- Elisabete Ferreiro, a CNC researcher and Inês Pita, a researcher at iCBR, were the first co-authors of this study that had lasted about 18 months and was sponsored by Mycology Research Laboratories Ltd. (Luton, United Kingdom) – see below.

- The work, led by the Coimbra research team, also benefited from the collaboration of the Faculty of Pharmacy of the University of Coimbra, the Faculty of Veterinary Medicine of the University of Lisbon, the Spanish Institute Achucarro Basque Center for Neuroscience and Biotechnology Sciences of the School of Medicine in the University of Catania in Italy.

Center for Neuroscience and Cell Biology (CNC), Coimbra Portugal
The Center for Neuroscience and Cell Biology (CNC) is a non-profit research institute founded in 1990, aiming to foster biomedical research and multidisciplinary graduate teaching at the University of Coimbra. CNC has steadily increased the scope of scientific competences over the years, with a strong focus on the exploitation of the fundamental mechanisms of aging and brain diseases.

- Website: www.cnbc.pt

Coimbra Institute for Clinical and Biomedical Research (iCBR), Coimbra Portugal
The iCBR - Institute of Clinical and Biomedical Research of Coimbra (Coimbra Institute for Clinical and Biomedical Research), former IBILI, is a multidisciplinary research unit of the Faculty of Medicine of Coimbra. iCBR is an internationally recognized centre of excellence for research in health sciences; a particular strength is translational research in neuroscience.

- Website: www.uc.pt

Sponsor: Mycology Research Laboratories Ltd.
Luton-based Mycology Research Laboratories Ltd. was founded in the United Kingdom in 1997, and is focused on developing mushroom-based nutrition products. Over the past 15 years, Mycology Research Laboratories has had several collaborations with hospitals and universities based in the Netherlands, United Kingdom, Italy and Portugal.

- Website: www.mycologyresearch.com

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CNC, Center for Neuroscience and Cell Biology; **iCBR**, Coimbra Institute for Clinical and Biomedical Research; **FMUC**, Faculty of Medicine, University of Coimbra