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Enhanced complexity of hippocampal dentate gyrus newly-generated neurons in mice following *Coriolus versicolor* biomass administration

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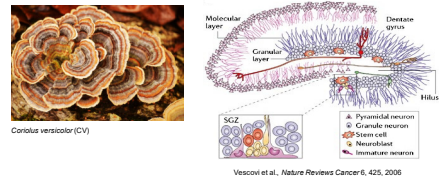
Introduction

Brain cognitive reserve refers to the ability of the brain to manage different challenges that arise throughout life, making it resilient to neuropathology. Hippocampal adult neurogenesis has been considered as a relevant contributor for brain cognitive reserve and brain plasticity. The production of adult hippocampal neurons requires the continuous division of neural stem/progenitor cells, differentiation of newly-generated granule cells and their integration into the pre-existing circuits under specified extracellular conditions. This integration into the hippocampal circuitry relies on newly-formed dendritic branches of pre-matured neurons that reach the dentate gyrus (DG) molecular layer (ML).

The Wnt/ β -catenin signaling pathway and epigenetic mechanism are amenable to modulation by diet and play a major role in neurogenesis. Discovering dietary tools that promote neurogenesis is seemingly an useful strategy for providing the brain with means to cope with several insults including aging.

Coriolus versicolor (CV), a common healthful mushroom, was previously described to have antitumoral, anti-inflammatory, antioxidant, antibacterial, and immunomodulatory properties, including in the hippocampus.

Herein, we analyzed the influence of CV biomass oral administration for 2.5 months on hippocampal neurogenic reserve under normal/physiological conditions.

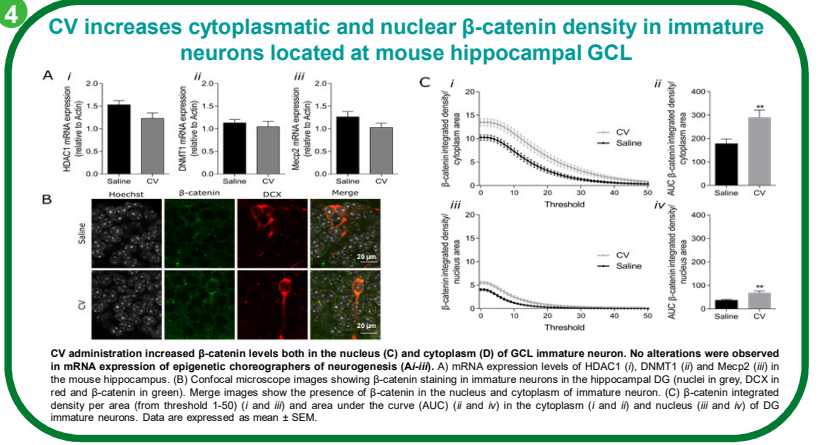
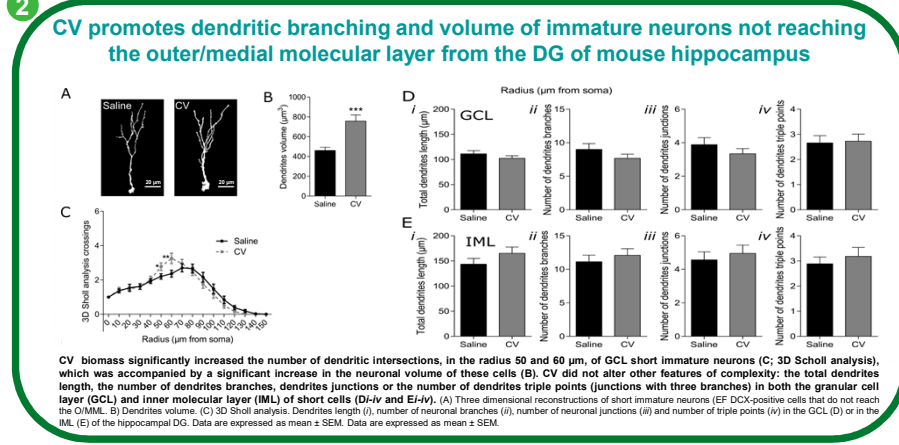
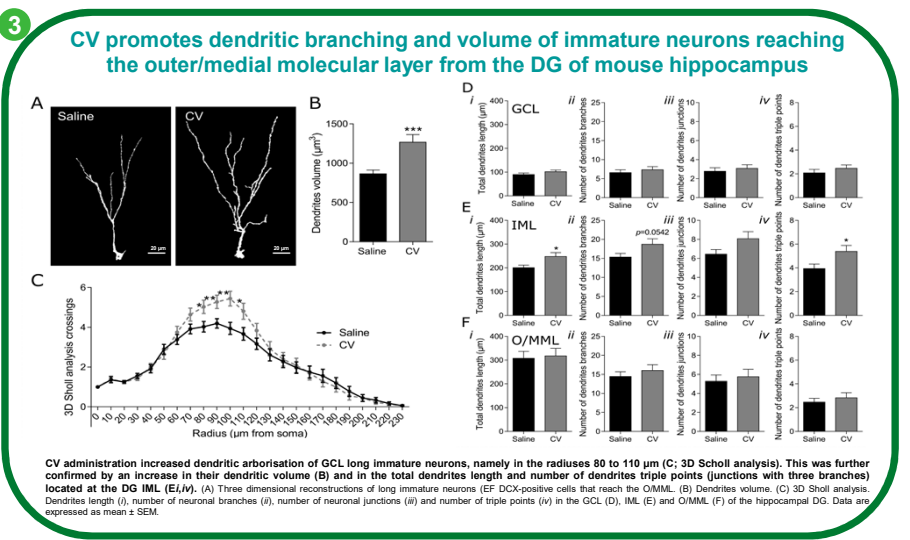
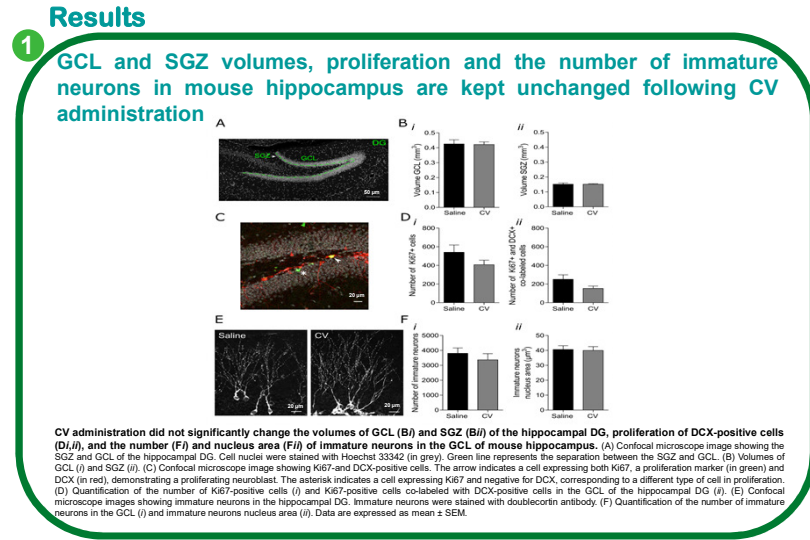
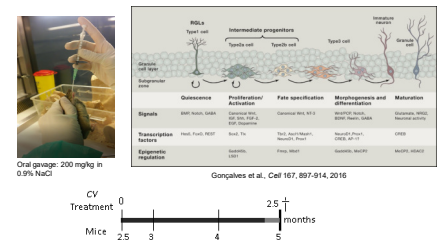


Methods

Two and a half-month-old wild-type mice (C57BL/6 x 129 background, male) were randomly divided in two experimental groups (n=10 per group): i) Saline-administered and ii) CV-administered (200 mg/kg bw, suspended in saline). The administration of CV or saline was performed every day for 2.5 months by oral gavage. CV biomass was supplied by Mycology Research Laboratories Ltd, Luton, U.K.

Hippocampal dentate gyrus (DG) granular cell layer (GCL) and subgranular zone (SGZ) volumes and number, and dendritic complexity of hippocampal newly-generated neurons were quantified by immunohistochemistry, as well as β -catenin levels in DG newly-generated immature neurons. Levels of mRNA expression of epigenetic choreographers of neurogenesis (HDAC1, DNMT1 and Mecp2) were measured by quantitative real time PCR in total hippocampus.

Statistical significance was determined using One-way ANOVA with repeated measures followed by Bonferroni post hoc test, unpaired Student's t-test or non-parametric Mann-Whitney test. p<0.05 was considered statistically significant.



Conclusions

- CV biomass oral administration promotes a significant increase in dendritic length and branching, and total dendritic volume of immature neurons, suggesting a positive effect in the hippocampal neurogenic reserve.
- Increased β -catenin levels in cytoplasm and nucleus of DG immature neurons suggests that Wnt/ β -catenin signaling plays an important role in CV positive effect on dendritic complexity of hippocampal newly-generated neurons.
- This so far unexplored neurogenic potential of CV supplementation emerges as a possible preventive strategy for different neurological conditions.