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EARLY-ONSET AND LATE-ONSET CALORIE RESTRICTION DIFFERENTLY MODULATE ANXIETY-LIKE BEHAVIOR IN AGING FEMALE WISTAR RATS

POSTER SESSION 07 - SECTION: AGING AND THE BRAIN

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Aims: Calorie restriction (CR) is known to prolong lifespan and healthspan, - life period free of age-related diseases. However, generality of CR’s beneficial effect is being questioned recently. Few studies showed that the outcome of CR could vary depending on its onset and duration. Herein, we examined and compared potential of different CR paradigms to modulate anxiety-like behavior. Methods: Ad libitum (AL) fed animals were used as controls. Female Wistar rats of different age (adult, middle-aged and aged) were exposed to CR (60% of AL), to examine the effect of early-onset CR (EOCR) and late-onset CR (LOCR). Open field (OF) and Light-dark box (LDB) test were used for anxiety assessment. Results: Aged LOCR animals had decreased number of entries and time spent in the central area of the OF. LDB test results, however, implied a protective effect of EOCR since both middle-aged and aged EOCR animals showed increased number of entries in the light compartment and spent more time in the door area or in the light compartment. LOCR had different effect depending on animals’ age at the CR onset. Conclusions: EOCR ameliorates anxiety-like behavior and this effect seems to persevere till old age. Implementing CR later in life should be taken with caution, since its’ effect could vary from protective to detrimental, depending on the onset. Additionally, different results were obtained using OF and LDB, suggesting that more than one test should be used to provide proper insight in certain behavioral changes.

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34957511: Prvulovic MR, Milanovic DJ, Vujovic PZ, Jovic MS, Kanazir SD, Todorovic ST, Mladenovic AN
Late-Onset Calorie Restriction Worsens Cognitive Performances and Increases Frailty Level in Female Wistar Rats.
The current study aims to determine the potential benefits of calorie restriction (CR), one of the most promising paradigms for life span and healthspan extension, on cognitive performances in female Wistar rats during aging. As a measure of a healthspan, we evaluated the effects of different onset and duration of CR on frailty level. Female Wistar rats were exposed to either ad libitum (AL) or CR (60% of AL daily intake) food intake during aging. Two different CR protocols were used, life-long CR with an early-onset that started at the adult stage (6 months) and 3-month-long CR, started at the middle (15 months) and late-middle (21 months) age, thus defined as a late-onset CR. The effects of CR were evaluated using open-field, Y-maze, and novel object recognition tests. We broadened 2 tools for frailty assessment currently in use for experimental animals, and in alignment with our previous study, we created a physical-cognitive frailty tool that combines both physical and cognitive performances. Our results clearly showed that CR effects are highly dependent on CR duration and onset. While a life-long restriction with an early-onset has been proven as protective and beneficial, short-term restriction introduced at late age significantly worsens an animal's behavior and frailty. These results complement our previous study conducted in males and contribute to the understanding of sex differences in a response to CR during aging.
J Gerontol A Biol Sci Med Sci, 2022; 77
33279620: Mladenovic Djordjevic AN, Kapetanou M, Loncarevic-Vasiljkovic N, Todorovic S, Athanasopoulou S, Jovic M, Prvulovic M, Taoufik E, Matsas R, Kanazir S, Gonos ES
Pharmacological intervention in a transgenic mouse model improves Alzheimer's-associated pathological phenotype: Involvement of proteasome activation.
Alzheimer's disease (AD) is the most common form of dementia worldwide, characterized by a progressive decline in a variety of cognitive and non-cognitive functions. The amyloid beta protein cascade hypothesis places the formation of amyloid beta protein aggregates on the first position in the complex pathological cascade leading to neurodegeneration, and therefore AD might be considered to be a protein-misfolding disease. The Ubiquitin Proteasome System (UPS), being the primary protein degradation mechanism with a fundamental role in the maintenance of proteostasis, has been identified as a putative therapeutic target to delay and/or to decelerate the progression of neurodegenerative disorders that are characterized by