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EBOOK

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CHRONOBIOLOGY

Aging modifies the circadian rhythms of Sirt1 and DNA repair enzymes expression in the rat cerebellum. Effect of caloric restriction.

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Caloric restriction (CR) attenuates the aging process. The circadian molecular machinery and metabolism communicate through Sirtuins. SIRT1 plays a vital role in maintaining genomic integrity, through regulation of the BER repair pathway. We investigated whether in the Sirt1, Ogg1 and Ape1 expression have a temporal pattern in the rat cerebellum, the consequences of aging and the effect of a calorie restricted diet. Male Holtzman: young (3-mo-old), old (22-mo-old) rats fed ad-libitum; and old-CR (22-mo-old rats fed at 40% calorie restricted diet for the last three months) were used. Sirt1 expression showed a circadian oscillation, peaking at night in the cerebellum of the young, aging phase advanced the rhythm of Sirt1 (CT16:07±00:37 vs CT01:31±00:07, p<0.01), while in the old-CR, rhythm's acrophase came near to control values (CT20:07±00:06, p<0.01). No circadian variation was found in the Ogg1 and Ape1 mRNA levels in the young, however, we observed maximal levels at CT4 and CT20, respectively (p<0.05). Ogg1 and Ape1 expression showed a circadian rhythm in the old, with the acrophase occurring at the beginning of the subjective day (CT01:57±00:11 and CT01:09±00:10, respectively). CR phases delayed Ogg1 and Ape1 rhythms in the old-CR (CT13:17±00:03 and CT07:41±00:35, respectively). Our conclusion is that there is a temporal variation in the expression of Sirt1, Ogg1 and Ape1 in the young rat cerebellum, which is altered by aging, and differentially modified by CR.