



4th International Congress of Turkish Neuroendocrinology Society | ISTANBUL

26 | 28
November
2020



Effects of Different Types of Calorie Restriction on SIRT1 Levels in Mouse Brain

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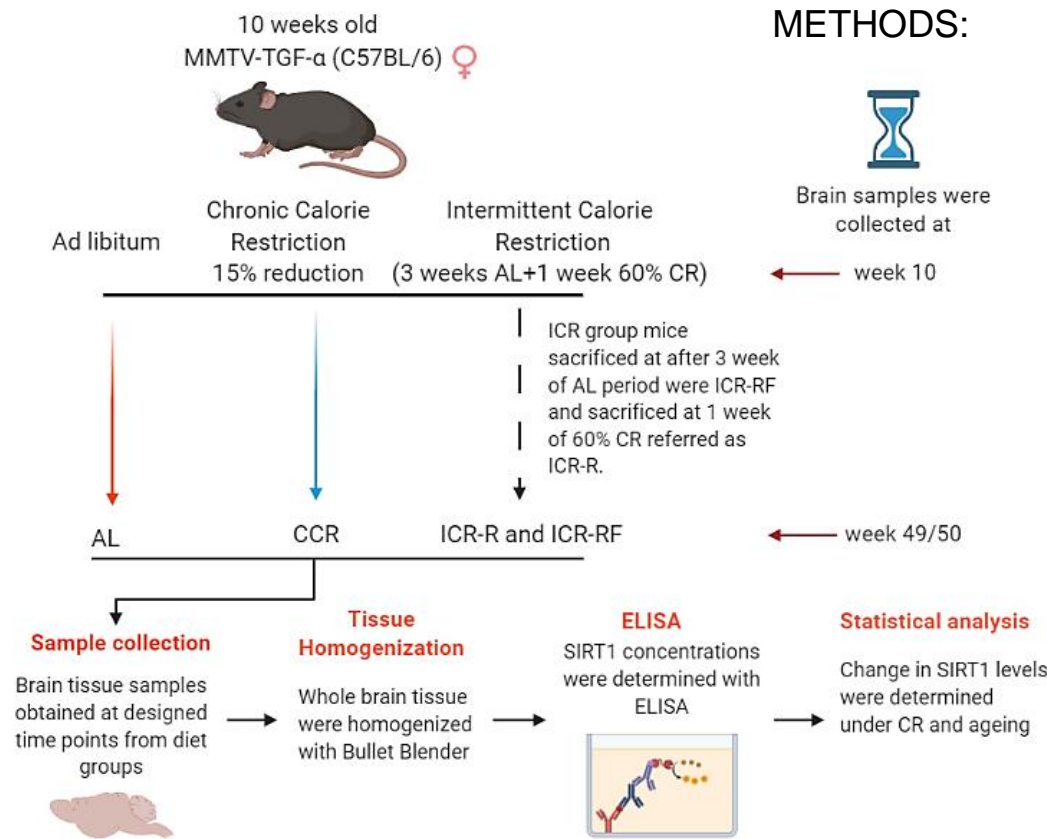
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Poster # PC33

AIM: Sirtuin 1 (SIRT1) is a NAD⁺-dependent deacetylase that maintain cell homeostasis by playing an important role in cellular processes. Calorie restriction (CR) modulate SIRT1 activity lead to increment in lifespan and metabolic rate. In this research, we aimed to report a biological link between Sirtuin 1 activity and effects of different types of CR and their role on aging brain in mice.

METHODS:



To investigate SIRT1 expression due to aging and calorie restriction, we used female C57BL/6 mice at 10 and 49/50 weeks of age and from four different dietary groups. Enzyme-linked immunosorbent assay was employed to examine the concentration of SIRT1 from brain homogenates and explore the underlying mechanisms of chronic calorie restriction (CCR) and intermittent calorie restriction (ICR) in relation to aging at the proteomic level.

Figure 1. Experimental design



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RESULTS:

SIRT1 levels were measured in brain samples from BL (n:8)(364.25 ± 43 ng/mg) and in the AL (n:7) (354.42±63ng/mg), CCR (n:7) (402.85±41 ng/mg), ICR-R (n:7) (445.0±62ng/mg), and ICR-RF (n:7) (344.71±86 ng/mg) groups. SIRT1 level of the ICR-R was significantly higher than the Baseline (P = 0.016). SIRT1 levels in the ICR-R were also significantly higher than in the AL and ICR-RF. (P = 0.012 and P=0.011 respectively).

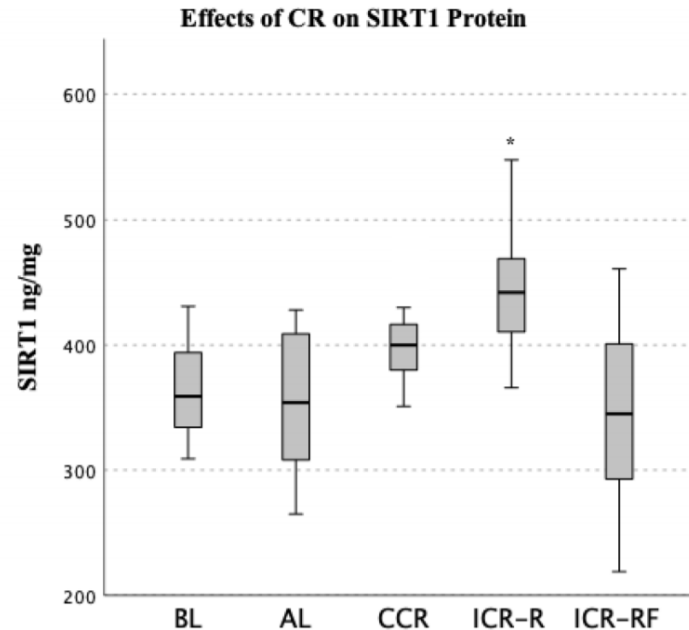


Figure 2. Sirtuin 1 ELISA results demonstrating significant difference in ICR-R from the BL, AL and ICR-RF groups. (*P=0.016, *P=0.012 and *P=0.011. BL: Base line; AL: Ad- libitum group; CCR: Chronic calorie restriction group, ICR-R: intermittent calorie restriction group, ICR-RF: intermittent calorie restriction refeeding group



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CONCLUSION:

ICR-R has an increasing effect on SIRT1 levels in brain which is suggested to be protective against aging and neurodegeneration. ND may lead to several essential systems to deteriorate. The pathophysiological mechanisms of ND are most probably controlled by specific genes, such as SIRT genes. Therefore many therapeutic interventions, including diet modifications and specifically designed calorie restrictions, may be possible in the future.



Figure 3. Schematic view of ageing