

UDC 575.854

EFFECTS OF INTERMITTENT FASTING ON RESPIRATORY CAPACITY OF MITOCHONDRIA AND ACTIVITY OF ACONITASE IN CEREBRAL CORTEX OF C57BL/6 MICE

T. M. PANKIV

Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Ukraine;
e-mail: pankivtetiana@ukr.net

Introduction. Recently several studies have found that intermittent fasting may improve health. We have assumed that positive effects of intermittent fasting on healthspan can be mediated by mitochondrial electron transport chain (ETC). Therefore, the aim of our work was to investigate the effects of intermittent fasting on respiratory capacity and activity of aconitase, a marker of oxidative stress, in isolated mitochondria of mouse cerebral cortex.

Methods. The experiment was conducted on 12- and 18-month-old mice. The control group had unlimited access to food (*ad libitum*). Mice subjected to intermittent fasting (IF) received food every other day.

Results. *Ad libitum* 18-month-old males had 1.6-fold lower NADH-linked oxygen consumption as compared to 12-month-old males. Such difference was not observed between females of different ages on both regimes and between IF males. Those belonging to IF subgroup of 18-month-old males showed 2-fold higher NADH-linked oxygen consumption than those *ad libitum* fed. The activity of cytochrome-*c*-oxidase was not affected by age, sex,

and feeding regimen. The respiratory control ratio (RCR) was 1.5-fold lower in 18-month-old *ad libitum* males as compared to 12-month-old males on the same feeding regimen. However, RCR did not drop with age in IF males. Age did not influence RCR in *ad libitum* fed females, while 18-month-old IF females had 2-fold lower RCR than the 12-month-old ones. Fasted 18-month-old males had 2.2-fold higher RCR as compared with *ad libitum* one. Activity of aconitase in 18-month-old males was 1.2-fold lower as compared with 12-month-old ones. Age did not influence aconitase activity in females.

Conclusions. Intermittent fasting prevents age-related decline in mitochondrial respiratory capacity in males while does not have positive effects on mitochondrial respiration in females. Also, intermittent fasting does not have an effect on aconitase activity.

Acknowledgments. I thank to Volodymyr Lushchak for the idea of the research, Maria Bayliak – for supervising, Dmytro Gospodaryov – for help with polarographic measurements, and Maria Lylyk – for technical assistance.