Online journal ISSN - 1676-5680
GMR Genetics and Molecular Research
EVOLUTION AND TECHNOLOGY

Increased ROS generation and SOD activity in heteroplasmic tissues of transmitochondrial mice with A3243G mitochondrial DNA mutation

J. Li[1], K. Zhou[2], X. Meng[1], Q. Wu[1], S. Li[1], Y. Liu[2] and J. Wang[1]

[1]Department of Laboratory Animal Science, Capital Medical University, Beijing, China
[2]Department of Biochemistry, Guangdong Medical College, Dongguan, China

Corresponding author: J. Wang
E-mail: wangju53@263.net

Genet. Mol. Res. 7 (4): 1054-1062 (2008)
Received June 9, 2008
Accepted June 30, 2008
Published October 14, 2008

ABSTRACT. The mitochondrial A3243G tRNALeu(UUR) mutation associated with a variety of mitochondrial disorders results in a severe respiratory deficiency, an increase in reactive oxygen species (ROS) production and activities of anti-oxidative enzyme *in vitro*. However, the phenotypic implications of this mutation have not been described *in vivo*. Here, mitochondria carrying A3243G transition from the peripheral blood of diabetes mellitus patients were microinjected into zygotes. Influence of this mutation on mitochondrial respiratory enzyme activities, ROS generation, and anti-oxidative enzyme activities in the heteroplasmic tissues of transmitochondrial mice was evaluated. The chimeric mice exhibited a subtle impaired oxidative phosphorylation, reduced activity of complex I/IV, increased activity of superoxide dismutase, and in turn, enhanced ROS generation. Our results suggest that mitochondrial

A3243G mutation may be responsible for the high ROS production *in vivo*. Increased generation of ROS caused by mtDNA mutation may also play a role in the pathogenesis of the A3243G mutation-associated diseases.

Key words: Mitochondria; Mitochondrial DNA; A3243G mutation; Mitochondrial disorders; Transmitochondrial mice; Transmitochondrial

