

Anais da Academia Brasileira de Ciências

ISSN: 0001-3765 aabc@abc.org.br Academia Brasileira de Ciências Brasil

## SCHUCK, PATRÍCIA FERNANDA

Mitochondrial DNA, anti-tuberculosis drugs-induced hepatotoxicity and Alzheimer's disease Anais da Academia Brasileira de Ciências, vol. 86, núm. 2, junio, 2014, pp. 523-524 Academia Brasileira de Ciências Rio de Janeiro, Brasil

Available in: http://www.redalyc.org/articulo.oa?id=32731288001

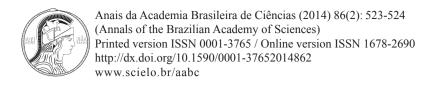


Complete issue

More information about this article

Journal's homepage in redalyc.org





### **EDITORIAL NOTE**

# Mitochondrial DNA, anti-tuberculosis drugs-induced hepatotoxicity and Alzheimer's disease

### PATRÍCIA FERNANDA SCHUCK

Laboratório de Erros Inatos do Metabolismo, Unidade Acadêmica de Ciências da Saúde, Universidade do Extremo Sul Catarinense, Av. Universitária, 1105, 88806-000 Criciúma, SC, Brasil

The present issue of the *Annals of the Brazilian Academy of Sciences* (AABC) harbors various interesting manuscripts. For instance, Siqueira et al. demonstrates the common mutations in mitochondrial DNA (mtDNA) from rat heart exposed to radiation. mtDNA is responsible for the expression of several subunits of respiratory chain complexes, which ultimately leads to ATP production, the most important energy currency of the cell. It is well known that alterations in mitochondrial functions, such as activity and expression of respiratory chain complexes, are involved in the pathophysiology of common degenerative diseases, such as Alzheimer's disease (Biffi et al. in press), Parkinson's disease (Gatt et al. 2013), diabetes (Watanabe et al. in press), sepsis (Bozza et al. 2013), and inherited metabolic disorders (Wajner and Goodman 2011).

Moreover, in this current issue, Brito et al. presented significant data showing the most frequent polymorphisms and their involvement in important enzymes for detoxification of anti-tuberculosis drugs (ATD), such as encoding genes for cytochrome P450 2E1, glutathione S-transferase, and N-acetyltranferase (Roy et al. 2001, Leiro et al. 2008). They showed that an alteration in the gene that encodes N-acetyltranferase slows the acetylator profile, which might play an important role in the ATD-induced hepatotoxicity.

Alzheimer's disease (AD) is one of the most frequent neurodegenerative disorders in aging, affecting cognitive functions. Many studies have demonstrated the role of acetylcholinesterase, an important enzyme related to memory and learning processes (D'Addario et al. 2012), in the pathophysiology of this disease, and anti-cholinesterase inhibitors are widely used for the treatment of AD (Aisen et al. 2012). In this scenario, many natural-occurring acetylcholinesterase inhibitors have been identified, such as physostigmine, galanthamine, and hyperzine A (Orhan et al. 2009). In the present issue, Hajimehdipoor and colleagues demonstrated that the sesquiterpens lactones obtained from *Inula oculus christi* and *I. aucheriana*, gailardin and pulchelin C, exerts inhibitory effects on acetylcholinesterase activity. They suggested that acetylcholinesterase inhibitors from natural sources are potential medicines for AD treatment. By compiling these manuscripts, we hope to enrich AABC readers with regards to novelty advances on various fields of researches.

524 EDITORIAL NOTE

#### REFERENCES

- AISEN PS, CUMMINGS J AND SCHNEIDER LS. 2012. Symptomatic and nonamyloid/tau based pharmacologic treatment for Alzheimer disease. Cold Spring Harbor Perspective Medicine 2: a006395.
- BIFFI A, SABUNCU MR, DESIKAN RS, SCHMANSKY N, SALAT DH, ROSAND J AND ANDERSON CD. IN PRESS. Alzheimer's disease Neuroimaging Initiative (ADNI). Neurobio Aging.
- BOZZAFA, D'AVILAJC, RITTER C, SONNEVILLE R, SHARSHAR T AND DAL-PIZZOL F. 2013. Bioenergetics, mitochondrial dysfunction, and oxidative stress in the pathophysiology of septic encephalopathy. Shock 39: 10-16.
- D'ADDARIO C, DI FRANCESCO A, AROSIO B, GUSSAGO C AND DELL'OSSO B. 2012. Epigenetic regulation of fatty acid amide hydrolase in Alzheimer disease. PlosOne 7(6).
- GATT AP, JONES EL, FRANCIS PT, BALLARD C AND BATEMAN JM. 2013. Association of a polymorphism in mitochondrial transcription factor A (TFAM) with Parkinson's disease dementia but not dementia with Lewy bodies. Neurosci Lett 1557 Pt B: 177-180.
- LEIRO V, FERNÁNDEZ-VILLAR A, VALVERDE D, CONSTENLA L, VÁZQUEZ R, PIÑEIRO L AND GONZÁLEZ-QUINTELA A. 2008. Influence of glutathione S-transferase M1 and T1 homozygous null mutations on the risk of antituberculosis drug-induced hepatotoxicity in a Caucasian population. Liver International 28: 835-839.
- ORHAN G, ORHAN I, SUBUTAY-ÖZTEKIN N, AK F AND SENER B. 2009. Contemporary anticholinesterase pharmaceuticals of natural origin and their synthetic analogues for the treatment of alzheimer's disease. Recent Patents on CNS Drug Discovery 4: 43-51.
- ROY B, CHOWDHURY A, KUNDU S, SANTRA A, DEY B, CHAKRABORTY M AND MAJUMDER PP. 2001. Increased risk of antituberculosis drug-induced hepatotoxicity in individuals with glutathione S-transferase M1 'null' mutation. J Gastroen Hepatol 16: 1033-1037.
- WAJNER M AND GOODMAN SI. 2011. Disruption of mitochondrial homeostasis in organic acidurias: insights from human and animal studies. J Bioenerg Biomembr 43: 31-38.
- WATANABE T, SAOTOME M, NOBUHARA M, SAKAMOTO A, URUSHIDA T, KATOH H, SATOH H, FUNAKI M AND HAYASHI H. IN PRESS. Roles of mitochondrial fragmentation and reactive oxygen species in mitochondrial dysfunction and myocardial insulin resistance. Exp Cell Res.