Quantifying the Electron Transport Chain Enzyme Transcripts in *Aspergillus fumigatus* Exposed to Menadione

Rodrigues, R.V.¹, Cardoso, F.G.¹,³, Suzuki, S.¹,³, Gimenes-Teixeira, H.L.¹, Curti, C.², Uyemura, S.A.³

¹DACTB, ²DFQ - FCFRP; ³Bioquímica, FMRP; USP – Ribeirão Preto, SP, Brazil

The role of mitochondrial enzymes in antioxidant processes required for *A. fumigatus* survival in hosts is still poorly understood. *A. fumigatus* electron transport chain (ETC) possesses alternative enzymes (alternative oxidase, AOX), which may be related to stress adaptation. Thus, we evaluated the interaction between ETC enzymes and AOX within oxidative environment, quantifying the transcript production of these enzymes in AOX-knockouted (ΔAOX) strains treated with menadione. Responses in germinants and hyphae were studied. Transcripts were quantified with TaqMan qPCR, comprising 8 genes, including those related to classical and alternative ETC enzymes. Lower relative levels of mRNA for classical ETC enzymes were detected in ΔAOX germinants compared to untreated CEA17 control strain. In contrast, ATP synthase, UCP-like and external NADH dehydrogenase (NDE) showed slightly increased levels (0.6, 2.3 and 0.9-fold compared to control, respectively), suggesting an electron displacement from ETC to alternative enzymes. In hyphae, ΔAOX ETC enzymes showed an increased relative level of their transcripts, except complex III (no variation compared to untreated CEA 17 hyphae). In the same condition, higher quantities of UCP-like and NDE transcripts (increase of 9.4 and 16.1) were detected, but ATP synthase levels decreased 98%. Those results suggest the higher sensitivity of hyphae to menadione. Furthermore, comparison of UCP and ATP synthase indicates the uncoupling effect by UCP to compensate the burst of superoxide. We detected increased levels of NDE gene expression in both treated ΔAOX and CEA17. Interestingly, it seems that NDE expression is AOX-dependent, suggesting a coordinated action to reestablish the electron flow.

Keywords: *Aspergillus fumigatus*, alternative oxidase, electron transport chain, menadione

Supported by FAPESP, CNPq, CAPES
This document was created with Win2PDF available at http://www.win2pdf.com.
The unregistered version of Win2PDF is for evaluation or non-commercial use only.
This page will not be added after purchasing Win2PDF.