Measurement of mitochondrial function in equine blood lymphocytes

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SUMMARY

The morphopathological features of “equine atypical myopathy” are consistent with a primary mitochondrial disease but this hypothesis hasn’t been confirmed yet. The cationic dye JC-1 exhibits potential-dependent accumulation in mitochondria that is detectable by a fluorescence shift from green to orange. So, mitochondrial membrane potential can be measured by the orange/green fluorescence intensity ratio. This ratio has been already used as an indicator of mitochondrial potential in isolated mitochondria but also in intact cells (spermatozoa, myocytes, neurons). The purpose of this study was to obtain reference values of mitochondrial function in lymphocytes of healthy horses by a flow cytometric standardized analytic procedure. This assay will prove to be useful if and only if the mitochondrial muscular dysfunction is the consequence of a polysystemic mitochondrial disease that affects circulating leucocytes too. A group of 31 horses clinically normal were enrolled into the study. Results showed a great stability of the JC-1 fluorescence lymphocytes values over time, their independence of age and sex and their hypersensitivity to intoxication with a mitochondrial potential dissipator. So, whenever a quantitative measurement of mitochondrial function in a horse is desired, blood samples should be taken in sodium citrate tubes and kept at room temperature for a maximum of 5 hours before the beginning of laboratory procedure.