

MALDI reveals membrane lipid profile reversion in MDX mice

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Duchenne muscular dystrophy (DMD), the most common and severe X-linked myopathy, is characterized by the lack of dystrophin, a sub-sarcolemmal protein necessary for normal muscle functions. In a previous study of the lipid content of skeletal muscles of dystrophic (mdx) mice, the animal model for DMD, by in situ Matrix-Assisted Laser Desorption-Ionization Mass Spectrometry (MALDI-MS), an inversion of the phosphatidylcholine PC34:2/PC34:1 ion peaks intensity ratio was observed between destructured (abnormal fiber morphology) and structured (normal fiber morphology). A possible treatment for this dramatic disease is to introduce an exogenous nitric oxide (NO) donor into the organism, leading to an increase of utrophin and a regression of the dystrophic phenotype. In the present work, after confirmation by tandem mass spectrometry of the structure of these two phospholipids, their intensity ratio inversion was used to evidence a restoration of membrane lipid composition very similar to those of wild-type mice after the treatment of mdx mice with molsidomine, a NO donor. This was associated with the observation by immunohistology of an increase of the regeneration process in the mice.

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