Overexpression of HSP72 attenuates skeletal muscle pathophysiology in *mdx* dystrophic mice

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An absence of dystrophin in muscle fibres results in fragility, membrane tears, Ca^{2+} influx and an elevated cytoplasmic [Ca^{2+}], resulting in the activation of degenerative pathways. Chronic degeneration and ineffective regeneration results in fibrotic infiltration leading to functional impairments in DMD patients and in muscles from dystrophin-deficient *mdx* mice. Heat-shock protein 72 (HSP72) has potential to protect contractile function and improve Ca^{2+} handling in cardiac muscle. We tested the hypothesis that HSP72 overexpression would ameliorate the pathophysiology of skeletal muscles of *mdx* dystrophic mice. Contractile properties of isolated diaphragm muscle preparations from *mdx* mice overexpressing HSP72 (*mdx*^{HSP72}) and *mdx* littermate control mice (n≥5) were determined according to methods we have described previously. HSP72 overexpression improved normalised force of isolated diaphragm muscle strips ($P < 0.05$), reduced collagen infiltration ($P < 0.05$), and improved the minimal Ferets variance coefficient, indicative of a reduced dystrophic muscle fibre pathology ($P < 0.05$). Serum creatine kinase levels were significantly lower in *mdx*^{HSP72} mice compared with *mdx* littermate controls ($P < 0.05$), indicating a general reduction in muscle degeneration. The findings reveal that overexpression of HSP72 protein improved the dystrophic muscle pathology.