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Investigating the Therapeutic Benefit of Spermidine in a Pre-Clinical Model of Muscular Dystrophy

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Research into treatment for Duchenne Muscular Dystrophy (DMD) typically focuses on deterioration of muscle, however bone health is also severely compromised. Current treatment with corticosteroids exacerbate bone loss, so novel therapies targeting both muscle and bone are needed. Studies on bone health in a pre-clinical model, mdx mice, are limited and have conflicting results.
Objective of study: To characterise aspects of bone health in mdx mice and investigate whether spermidine might attenuate disease symptoms and spare bone.
Bone structure and function were assessed in 16-week-old mdx mice femurs by three-point bending, microarchitectural assessment using the Imaging and Medical Beamline (IMBL) at the Australian Synchrotron, and by histological analysis. Cortical thickness and cortical bone area fraction were lower in dystrophic mice compared to wild-type controls (WT). No differences were observed in metaphyseal trabecular bone morphometry. Three-point bending indicated that mdx femurs required less stress to reach yield point and failure but were able to sustain damage for a longer period (post-yield displacement) compared to WT mice. Despite this, mdx femurs required more energy to reach failure. Histology revealed lower osteoblast numbers in mdx mice. Spermidine treatment did not appear to compromise bone health in either WT or mdx mice which is important as current treatments typically worsen bone quality. This study provides novel data about aspects of skeletal morphology in mdx mice at 16 weeks of age, and provides new techniques using pre-clinical models to investigate potential therapies for DMD patients that might target both muscle and bone.

Level of Expertise

Student

Presenter Gender

Woman

Pronouns

She/Her

Which facility did you use for your research

Australian Synchrotron

Students Only - Are you interested in AINSE student funding

Yes

Do you wish to take part in the Student Poster Slam

No

Condition of submission

Yes

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