Muscle Regeneration Levels in the canine model of Duchenne Muscular Dystrophy

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What is Duchenne Muscular Dystrophy?

- DMD is a genetic disease resulting from mutations that prevents the production of dystrophin
- Dystrophin prevents muscle damage when contraction occurs
- DMD patients born after 1970 is ~41 years¹

Proposal

• To study we evaluate the DMD pathogenesis in DMD canine model as they share similarity with DMD human patients and represent a great pre-clinical model to evaluate new therapy approaches.

Methods

- 50 muscle tissues were sampled from 3 DMD affected dogs and 3 normal dogs
- Muscle tissues are stained through
 - Hemotoxylin & Eosin (HE) staining
 - Laminin and Embryonic Myosin Heavy Chain (eMyhc) staining
 - Masson's trichrome (MTC) staining

HE Staining

- Allows us to see individual muscle cells as well as the cell nucleus
- Nucleus' positioning in the cell is a determining factor in the state of muscle regeneration²
 - Regenerated muscle cells are cells that have the nucleus in the center
 - Healthy muscle cells have nucleus on the peripheral

Quantification at 20x Magnification

Normal

Affected



Laminin & Embryonic Myosin Heavy Chain (eMyhc) Staining

- Stains for Laminin, which is present on the cell membrane
- Stains for Embryonic Myosin Heavy Chain, which is involved during muscle regeneration³

Quantification of eMyhc







MTC Staining

- Stains for fibrotic tissue, which is formed around inflamed or damaged tissue⁴
- Fibrotic tissue was stained in blue, while the rest of the tissue was stained in purple



Quantification of MTC

Normal





Application of ImageJ

Normal



Affected





Discussion

- There is a general trend, that DMD affected dogs had higher center nucleation percentages, eMyhc percentage area, and fibrotic tissue area
- Supports muscle damage thesis
- Direct relation to human model

References

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Acknowledgements

- Special thanks to Dr. Dongsheng Duan and Dr. Chady Hakim for making this project possible!
- Thanks to the Cell & Molecular Biology for funding my research
- More thanks to the other members of the lab for helping out with this project
 - Matt Burke
 - James Teixeira
 - Keqing Zhang

