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### Research Interests

Dr. Goldman's research uses fish to study CNS regeneration and mammalian muscle to study muscle activity-dependent gene expression.

In the fish system the Goldman Lab focuses their studies on mechanisms mediating successful optic nerve, spinal cord and retina regeneration using transgenic zebrafish as a model system. They recently showed that retinal Muller glia can dedifferentiate and function as retinal stem cells, regenerating retinal neurons and glia following injury of the zebrafish retina. They have identified cis-acting injury responsive promoter elements and trans-acting transcription factors that are necessary for gene induction during regeneration. Microarrays have identified genes that are regulated during regeneration and the role these genes play in mediating successful regeneration are being explored using various knockdown and overexpression strategies.

In the muscle system the Goldman lab studies muscle activity-dependent gene expression in mice. Nerve-induced muscle activity controls synapse formation, muscle fiber type composition, metabolism and muscle atrophy. The Goldman lab has recently identified chromatin modifying enzymes and signal transduction cascades that mediate the effects of muscle activity on a large array of muscle genes that encode proteins affecting muscle metabolism, synapse formation and atrophy. The mechanisms by which these enzymes/signaling cascades are regulated and mediate their effects on muscle gene expression are being pursued.



## Selected References

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