Smad3 Regulates Tendon Matrix Organization and Binds Key Tendon Transcription Factors

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Current challenges to tendon repair

• Flexor tendon injury remains a significant problem
• Repair complicated by adhesion and re-rupture
• “Biologic” Solution
• Limited knowledge of pathways of normal tendon development

How can we apply a molecular understanding of tendon development to improve tendon healing?

We have nothing to disclose
Matrix production is regulated by tissue specific transcription factors

- Collagen1
- Scx
- Tenomodulin

Liu et al. Molec Cell Bio 2010
Shukunami et al. Dev Bio 2006

- Collagen1
- Mlx
- Tenomodulin

Smad3 is essential for the formation of normal tendon architecture

- WT
- Smad3⁻/⁻

H & E, SHG

Dispersion Angle (°)

Smad3 is required for normal matrix protein expression in tendon

- WT
- Smad3⁻/⁻

Col1, Tnc, IgG

Dispersion Angle (°)

Smad3 is required for normal gene expression in tendon
Smad3 modulates the activity of tissue specific transcription factors

**Conclusions**

- Smad3 is a critical regulator of tendon formation
- Smad3 regulates gene and protein expression in mature tendon
- Smad3 can bind Scleraxis and Mohawk
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