Function of PAX9 in ligamentum flavum (LF):
Analysis of primary cells of LF from patients with lumbar spinal stenosis

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Ligamentum flavum (LF), spinal ligament connecting upper and lower vertebrae, is known as the tissue with the most in elastic components among the tendon/ligament tissues. Lumbar spinal stenosis (LSS) is characterized as suffering from neurological symptoms such as intermittent claudication, and considered to result from degenerative changes, including bulging of the intervertebral discs, thickening of the LF. Although Scx and Mxx have been described as transcription factors involved in tendon and ligament development, molecular information about the LF is limited. The objective of this study was to investigate the role of PAX9 in LF from patients with LSS as case and Lumbar disc herniation (LDH) as control.

By the expression profiling of LF cells and other mesenchymal cell lines, PAX9 was identified as the one of a transcriptional factor predominantly expressed in LF cells. The expression of PAX9 was reduced in LF from LSS patients. To elucidate whether PAX9 was related to chondrocyte differentiation, a fusion protein comprised of PAX9 and estrogen receptor (PAX9ER) was overexpressed in chondrogenic cells. While the chondrocyte differentiation of PAX9ER-expressed cells was markedly suppressed in the presence of tamoxifen, the gene expression in elastic fiber components of the cells was enhanced. Our results suggest that PAX9 can modulate the expression of elastic fiber components as its downstream targets and play a suppressor role in chondrocyte differentiation.

In summary, it is possible that PAX9 plays a role in homeostasis of normal ligamentum flavum, and that the loss of the function is associated with chondrometaplasia.