Epithelial-mesenchymal transition (EMT) is recognized in the various process such as development of embryo, formation of organ, fibrosis and cancer metastasis. The lens is transparent organ. The lens opacity causes visual disturbance (cataract). The formaion of “traumatic cataract” and “after cataract” is related to EMT.

We reported that TGFβ/Smad3 signal is essential to in vivo EMT in lens epithelial cells (LEC) and this Smad signal is regulated by specific extracellular matrix (ECM). We also reported anti-Smad molecules such as Smad7 and Id2/3 inhibited EMT of the LEC in vivo. The ECM expressed immediately after injury activated TGFβ/Smad3 signal and promoted EMT. The anti-Smad effect of Chinese medicine component and the inhibition of EMT and fibrosis of cultured LECs were recognized.

It is reported that the specific basement membrane matrix component relating to wound healing protect epithelial cell from EMT inducing factor.

The stimulated epithelial cells fragment basement membrane and reached ECM and occur EMT. On the contrary, EMT cells lose cell adhesion and epithelial cell pole and migrate on ECM. These findings indicate TGFβ/Smad signal is affected by ECM signal and influence cell behavior.

In ophthalmology, the regulation of EMT of LEC may prevent “traumatic cataract” and “after cataract”. We must understand EMT of not only lens but also the various process and research EMT of LEC with broad outlook.