



Figure 10.1. Determination of SZP expression by contact stress distribution on femoral condyles through transforming growth factor (TGF)- β -mediated signaling pathways. (A) Representative pressure distributions during compressive loading and simulated in-vivo postures, determined using pressure-sensitive film and a load application system for joint testing. For a normal load equal to 1, 2, and 3 times body weight in the 135° neutral posture and 115° flexed posture, regions of contact stress were consistently located in the anterior regions of the joint, corresponding to SZP expression patterns. (B) Significant increase in SZP expression levels during shear loading of explants from location M1, but not from location M4, compared to unloaded controls. (C) Decrease in SZP expression levels at location M1 to control levels during shear loading of explants in the presence of SB431542, a specific inhibitor of TGF- β receptor type I kinase activity. (D) SZP expression levels at location M1 in unloaded control samples, samples treated with DMSO (the carrier vehicle for SB431542), and samples treated with DMSO plus SB431542. (E) Immunostaining for phospho-Smad2/3. Staining was particularly enhanced in superficial zone chondrocytes from location M1 compared with untreated controls or explants treated with SB431542.