

Identification of the cellular/skin gene-set that is ubiquitously
altered by mechanical stress in new culture and animal models

Keisuke Okabe, Noriko Aramaki-Hattori, Shigeki Sakai, Tatsuya Kato, Yukari Nakajima,
Kazuo Kishi

Department of Plastic and Reconstructive Surgery, Keio University School of
Medicine, Tokyo, Japan

Mechanical stress has long been known to significantly influence the development and progression of keloids. Recent research has started to elucidate the mechanisms by which mechanical stimuli on keloid-scar cells are converted into intracellular signals that then alter their cellular behaviors, including fibroblast proliferation and overproduction of extracellular matrix. To further understand this process, which is known as mechanotransduction, we developed new 3-dimensional culture models and mouse models and used them to identify the gene-set that is altered in all models by mechanical stress. The clinical validity of this gene-set was assessed by comparison with the keloid-associated altered gene-set in tissues derived from keloid patients. Our future research will focus on elucidating the roles of each mechanical stress-altered factor in wound healing and keloid pathogenesis.