

## INCONTINENCE

## Shockwave treatment promotes urethral smooth muscle proliferation

Stress urinary incontinence (SUI) is the most prevalent form of urinary incontinence among women. Patients with SUI whose symptoms cannot be managed using surgery might receive stem-cell injections as an alternative approach, although the regenerative capacity of such cells remains uncertain. Now, researchers have demonstrated that low-intensity extracorporeal shockwave therapy (Li-ESWT), an intervention currently used for the treatment of musculoskeletal disorders, promotes the differentiation of urethral muscle-derived stem cells (uMDSCs) *in vitro*.

Researchers harvested uMDSCs from Zucker lean rats, followed by dissociation, filtration and flow cytometry to generate pure uMDSC cultures with uniform expression of several marker proteins, including hematopoietic progenitor cell antigen and myogenic factor-5. Cultured cells were exposed to Li-ESWT (0.02 mJ/mm<sup>2</sup>, 3 Hz, 200 pulses) in the presence or absence of the phospho-extracellular signal related kinase (p-ERK) inhibitor GSK2656157: cells exposed to Li-ESWT had significant

increases in both myotube area and number of nuclei per myotube compared with both control cells and those exposed to GSK2656157 plus Li-ESWT. Researchers noted that the uMDSCs used in this study in fact reflected two populations of cells: an active population required for immediate muscle repair, and a quiescent population of satellite cells intended for future muscle repair. However, the patterns of marker expression among expanded uMDSC populations indicated a high level of satellite-cell activation, suggesting that Li-ESWT promotes cellular differentiation through the activation of cells that would otherwise maintain a quiescent state. These findings demonstrate that Li-ESWT can promote uMDSC proliferation *in vitro*, and that this effect is pERK dependent. Investigations of the *in vivo* effects of such cells in animal models of SUI are eagerly awaited.

Peter Sidaway

**ORIGINAL ARTICLE** Wang, B. *et al.* Low-intensity extracorporeal shock wave therapy promotes myogenesis through PERK/ATF4 pathway. *NeuroUrol. Urodyn.* <http://dx.doi.org/10.1002/nau.23380> (2017)