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# The evaluation of a novel bone marrow stem cell based silk sling on rat model of stress urinary incontinence

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**Stress urinary incontinence (SUI) remains a worldwide problem affecting women of all ages across different cultures and races. Surgical management including the suburethral sling is the cornerstone of treatment for SUI. Current options of slings include autograft sling, xenograft slings and synthetic material slings. Each material is related to inherent advantages and disadvantages. Our group proposed to develop a novel sling which possessed a higher biocompatibility as well as good efficacy. The experiment was designed to evaluate the functional effects of a bone marrow stem cell (bMSC) based silk sling on rat model of stress urinary incontinence (SUI). bMSCs were obtained from Sprague-Dawley (SD) rats and were characterized by adipogenic and osteogenic differentiations in vitro. Layered bMSC cell sheets were formed after two weeks cultured in the conditioned medium and then were labled by green fluorescent protein (GFP) before use. Twelve female SD rats were divided randomly into four groups: control group (Group A) had no intervention before the leak-point pressure (LPP) was measured; SUI rat group done by bilateral proximal sciatic nerve transection (PSNT) and with no sling placed (Group B); SUI rat group treated with silk sling (Group C); and SUI rat group treated with bMSC based silk sling (Group D) . LPP was done to evaluate the efficacy of this novel sling, and hematoxylin and eosin staining was done two months after sling implantation to evaluate the inflammatory response. The result showed that Group B had a significantly lower LPP after PSNT. With the implantation of silk sling or bMSC based silk sling, LPP of Group C and D were restored and reached to the normal level as Group A. Importantly, the investigation of both cytotoxicity of novel silk *in vitro* and inflammatory response *in vivo* showed an good biocompatibility. In conclusion, the novel bMSC based silk sling show a convincing functional effect for the treatment of SUI in rat model. And the low inflammatory response also encouraged the necessary long-term study.**

***Keywords*:** bone marrow stem cell, sling, stress urinary incontinence, leak-point pressure

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