Development of a novel treatment for interstitial cystitis using filtered adipose-derived stem cells lysate

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Hypothesis Interstitial cystitis (IC) is a chronic inflammatory disease characterized by pain in the bladder and voiding symptoms. To date, there are no effective treatments for IC. We investigated whether filtered adipose-derived stem cell lysate (FADSCL) alleviates IC in a rat model of HCl-induced cystitis.

Materials and methods Rat adipose-derived stem cells were collected from the subcutaneous fat of rats, and FADSCL (lysate of 1×10^7 cells/PBS) was prepared. Female Fisher 344 rats, aged eight weeks, were divided into the sham +PBS (sham, n=10), HCl+PBS (HCl, n=12), and HCl+FADSCL (FADSCL, n=9) groups. Saline or 0.1 M HCl (250 μ l/body) was intravesically administered from a transurethral catheter. Bladder function was investigated after one week by cystometrography. A sample of bladder tissue was used for RNA-seq analysis.

Results The intercontraction intervals (ICIs) in the HCl group were significantly shorter than those in the sham group ($P < 0.01$), while the ICIs of the FADSCL group were significantly longer than those of the HCl group ($P < 0.01$). There was no significant difference between the groups with respect to the maximum voiding pressure and bladder weight. RNA-Seq analysis revealed an increase in immune and inflammatory signaling in the HCl group compared to that in the sham group, and these signals were suppressed in the FADSCL group.

Conclusion FADSCL might alleviate IC via anti-inflammatory actions and suppress the immune response. Thus, FADSCL could serve as a novel therapeutic agent for IC.