Human Mast Cells Enhance Collagen Gel Contraction by Human Elbow Capsule Cells

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INTRODUCTION
Post-traumatic elbow contracts are associated with increased numbers of myofibroblasts and mast cells in the joint capsule. Recent work has determined that the mast cell stabilizer, ketotifen, can decrease contracture severity in a rabbit model of post-traumatic contractures. The objective of the present study was to determine whether human mast cells can modify behavior of human elbow contracture capsule cell in an in vitro collagen gel contraction assay.

METHODS
With prior approval from our ethics board, posterterior elbow joint capsule was obtained from the wall and the bottom of culture plate wells, and photographed a time-course (2.5×10⁵) and 7.5×10⁵ mast cells (1:3) were then casted into wells of a 24-well tissue culture plate. The gels were maintained with 0.5 ml DMEM composed with 2% BSA and incubated at 37°C for 12 h for gelation to occur. After 12 hr initial culture, the gels were detached from the wall and the bottom of culture plate wells, and photographed at 0h, 2h, 4h, 6h, 24h, 48h, and 72h post-release. HMC-1 cells were unable to contract the collagen gels by themselves. Experiments with antibodies to the mast cell – fibroblast direct cell-cell communication determinants SCF or c-kit showed inhibition of the enhanced contraction at 24 hours between 43–72% (Table 1). Combining the highest dose of SCF and c-kit led to 82% inhibition.

DISCUSSION
This study has shown that cells isolated from human elbow joint contracture capsules respond to mast cells in a collagen gel assay. This response was dependent on the mast cell – joint capsule cell ratio. The enhanced response was mitigated by antibodies to SCF and c-kit. As SCF and c-kit are involved in the direct cell-cell interaction of mast cells and (myo)fibroblasts and the joint capsule cells are the effector cell, the findings support the contention that mast cell – capsule cell contact may be important in the observed enhanced responsiveness. Furthermore, serum free medium was used in these studies, again strengthening the importance of the mast cell – joint capsule cell interaction.

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REFERENCES