CIRCULATING CCL5/RANTES: A POTENTIAL BIOMARKER FOR HUMAN INTERVERTEBRAL DISC DEGENERATION

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INTRODUCTION: Clinical studies have shown that moderate to severe lumbar disc degeneration (DD) on MRI increases the risk of developing low back pain and its severity. The pro-inflammatory chemokine CCL5/RANTES is released by degenerative discs and has been associated with discogenic back pain. As such, this study addressed if circulating CCL5/RANTES may be increased in subjects with DD compared to physiological concentrations in individuals with no DD.

METHODS: Based on the Hong Kong Disc Degeneration Population-Based Cohort of Southern Chinese, a case-control study was performed. DD profile was based on T2W sagittal MRI. Plasma samples were obtained from peripheral blood of subjects who were noted on MRI to have no DD (Group 1: n=40; DDD score =0) and compared to those with moderate to severe DD (Group 2: n=40; DDD score >5). All cases were matched for age, sex, body mass index (BMI), and workload. Concentrations of CCL5/RANTES were measured using ELISA.

RESULTS: Females accounted for 65% in both groups. The mean ages for Group 1 and 2 were, 49.2 years and 49.5 years (p=0.853), respectively. The mean BMIs for Group 1 and 2 were 23.3 kg/m2 and 23.4 kg/m2, respectively (p=0.885). CCL5/ RANTES plasma concentrations were significantly increased in Group 2 subjects (mean: 19.8 ng/mL; 95% CI: 14.7-25.0 ng/mL) compared to Group 1 control subjects (mean: 12.8 ng/mL; 95% CI: 10.3-15.2 ng/mL) (p=0.023).

DISCUSSION: This is the first study to note that elevated systemic levels of CCL5/RANTES are associated with moderate to severe stages of lumbar DD in humans. The findings suggest that this chemokine may be released from affected discs into the circulation during the degenerative process. Serological tests have several advantages among diagnostic tools; they are non-invasive, simple, convenient, quantitative and reproducible. CCL5/RANTES may therefore be considered as a systemic molecular biomarker for the diagnosis and monitoring of clinically –relevant disc pathology.