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IDENTIFICATION AND MOLECULAR CHARACTERIZATION OF OSTEOCLASTS IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Abstract

Background: Chronic Obstructive Pulmonary Disease (COPD) is one of the chronic diseases that facilitate the development of secondary osteoporosis. Prevalence of osteoporosis is 2 to 5 fold high in COPD patients compared to normal subjects. Molecular characterization of osteoclasts is crucial to understand the in-depth mechanism of osteoporosis development in COPD patients, since osteoclasts are the bone-resorbing cells.

Methods: A study was designed with 13 COPD and 7 normal healthy subjects. Monocytes were isolated from the whole blood of all the study subjects and cultured in the presence osteoclast differentiation factors(RANKL and M-CSF) for 14 days. Matured osteoclasts(3+) were identified by TRAP staining. NFATc1, c-Fos, TRAF6, and Fra-1 levels were determined by immuno blot analysis while cathepsin K levels were identified by RT-PCR.

Results: COPD subjects showed significant increase ($p<0.001$) in the number of TRAP positive multinucleated osteoclast cells when compared to normal subjects. Expression of NFATc1, TRAF6, c-Fos, Fra-1 were significantly increased ($p<0.001$) in the COPD subjects as compared to normal subjects and similarly, cathepsinK were found to be significantly increased ($p<0.001$) in the COPD subjects as compared to normal subjects.

Conclusion: This clearly evidences that the COPD condition facilitates the development of osteoporosis by inducing RANKL mediated osteoclastogenesis.

Keywords: *COPD; Osteoporosis; Osteoclasts.*