Elevated plasma adiponectin levels in patients with chronic obstructive pulmonary disease

Chan, KH; Yeung, SC; Yao, TJ; Ip, MSM; Cheung, AHK; Chan-Yeung, MMW; Mak, JCW

The 15th Medical Research Conference (MRC 2010), Department of Medicine, The University of Hong Kong, Queen Mary Hospital, Hong Kong, 16 January 2010. In Hong Kong Medical Journal, 2010, v. 16 n. 1 suppl. 1, p. 10, abstract no. 4

2010

http://hdl.handle.net/10722/131757

Hong Kong Medical Journal. Copyright © Hong Kong Medical Association.; This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.
Label-free separation of human embryonic stem cells and their cardiac derivatives using Raman spectroscopy

JW Chan1, DK Lieu1,2, TR Huser1, RA Li1,2,3
1Applied Physics and Biophysics Division, Physical Sciences Directorate, Lawrence Livermore National Laboratory, Livermore, CA, United States
2Stem Cell and Regenerative Medicine Program, Department of Medicine and HBHA, The University of Hong Kong, Hong Kong
3Division of Cardiology, Department of Medicine, The University of Hong Kong, Hong Kong

Self-renewable, pluripotent human embryonic stem cells (hESCs) can be differentiated into cardiomyocytes (CMs), providing an unlimited source of cells for transplantation therapies. However, unlike certain cell lineages such as haematopoietic cells, CMs lack specific surface markers for convenient identification, physical separation, and enrichment. Identification by immunostaining of cardiac-specific proteins such as troponin requires permeabilisation, which renders the cells unviable and non-recoverable. Ectopic expression of a reporter protein under the transcriptional control of a heart-specific promoter for identifying hESC-derived CMs (hESC-CMs) is useful for research but complicates potential clinical applications. The practical detection and removal of undifferentiated hESCs in a graft, which may lead to tumours, is also critical. Here, we demonstrate a non-destructive, label-free optical method based on Raman scattering to interrogate the intrinsic biochemical signatures of individual hESCs and their cardiac derivatives, allowing cells to be identified and classified. By combination of the Raman spectroscopic data with multivariate statistical analysis, our results indicate that hESCs, human foetal left ventricular CMs, and hESC-CMs can be identified by their intrinsic biochemical characteristics with an accuracy of 96%, 98%, and 66%, respectively. The present study lays the groundwork for developing a systematic and automated method for the non-invasive and label-free sorting of (1) high-quality hESCs for expansion, and (2) ex-vivo CMs (derived from embryonic or adult stem cells) for cell-based heart therapies.

Elevated plasma adiponectin levels in patients with chronic obstructive pulmonary disease

KH Chan1, SC Yeung1, TJ Yao2, MSM Ip1, AHK Cheung1, MMW Chan-Yeung1, JCW Mak1,3
1Department of Medicine, The University of Hong Kong, Queen Mary Hospital, Hong Kong
2Clinical Trials Center, The University of Hong Kong, Queen Mary Hospital, Hong Kong
3Pharmacology and Medicine, The University of Hong Kong, Queen Mary Hospital, Hong Kong

Introduction: Adiponectin is an anti-inflammatory adipokine and is thought to play a role in chronic obstructive pulmonary disease (COPD) pathogenesis. This study was to investigate plasma levels of adiponectin, interleukin (IL)-8, and C-reactive protein (CRP) in ever-smokers with or without COPD.

Methods: Plasma levels of adiponectin, IL-8, and CRP were measured using commercially available kits respectively in COPD patients (n=71), healthy ever-smokers (n=62), and non-smokers (n=51). Pulmonary function test was also carried out for all subjects recruited in this study.

Results: There were significant increases in plasma adiponectin and CRP in COPD patients (median [IQR], 4.39 μg/mL [2.68-6.98 μg/mL] and 8.75 mg/L [4.26-40.63 mg/L] respectively) compared to healthy ever-smokers (1.90 μg/mL [0.86-2.86 μg/mL] and 3.71 mg/L [1.97-10.37 mg/L] respectively; P<0.001) and non-smokers (1.76 μg/mL [1.34-2.52 μg/mL] and 3.12 mg/L [2.11-5.71 mg/L] respectively; P<0.001). Patients with COPD, however, had a lower plasma IL-8 than healthy ever-smokers. Plasma adiponectin and CRP increased with COPD severity while IL-8 was reduced. Among ever-smokers with or without COPD, plasma adiponectin and CRP levels were inversely correlated with FEV1 (% predicted) after adjustment for age, body mass index, smoking status, and pack-years smoked.

Conclusion: Plasma adiponectin levels are associated with disease severity in COPD patients, suggesting a possible role in the pathogenesis of COPD.