

Pro-Inflammatory and Pro-Thrombotic Phenotype of Spontaneously Differentiated Human Monocyte-Derived Macrophages in Coronary Heart Disease Patients: Implications for Plaque Morphology and Activity

Hesham Rafaat, Sonia Eligini, Nicola Cosentino, Giampaolo Niccoli

OBJECTIVE:

characterization of MDMs obtained from CAD patients and healthy subjects, and then assessed the association between MDM profile and coronary plaque features evaluated by optical coherence tomography (OCT) in CAD patients.

METHODS AND PATIENTS:

The morphological analysis of MDMs obtained from a spontaneous differentiation of monocyte isolated from CAD patients showed a higher prevalence of round MDMs as compared to spindle MDMs, in contrast to healthy subjects where the prevalence of these two morphotypes was similar. MDMs of CAD patients showed a lower efferocytic capacity compared to healthy subjects, lower transglutaminase-2 levels, and higher tissue factor (TF) levels, with a TF peak in NSTEMI and STEMI. At OCT, evaluated at the minimal lumen area in stable angina and at the culprit lesion in acute myocardial infarction patients, patients with a higher round MDMs prevalence exhibited more frequently a lipid rich plaque, a thin cap fibroatheroma, a greater intra-plaque macrophage accumulation, and a ruptured plaque. In addition, the efferocytic capacity of MDMs correlated with minimal lumen area.

CONCLUSION:

The behavior of an *in vitro* differentiation of human MDMs obtained from CAD patients show a morpho-phenotypic heterogeneity with a prevalence of round MDMs displaying pro-inflammatory and pro-thrombotic properties. The MDMs profile allows to identify a subset of patients with features of high risk coronary atherosclerosis.

KEYWORDS:

atherosclerosis; macrophages; efferocytosis; tissue factor; optical coherence tomography.