Identification and characterization of the CD4+AT2R+ T cell subpopulation in rats and humans

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Published on 23 Oct 2010

Introduction: Following acute myocardial infarction (MI), the heart suffers, beside ischemia-induced direct myocardial injury, from a subsequent indirect damage through improper inflammatory reaction. A wealth of information indicates that the renin-angiotensin system (RAS) can interfere with acute cardiac remodelling and inflammation processes during cardiovascular injury. Given the recent observations showing that AT2 receptors (AT2R) are abundantly expressed in immunocompetent cells and involved in cell-mediated inflammatory injury, it appears likely that AT2R may exert their actions through interfering with CD4+ T cell-involved inflammatory processes in response to ischemia-induced cardiac injury.

Methods: We isolated CD4+ T cells from peripheral blood of rats with acute myocardial infarction and healthy donors using Ficoll gradient centrifugation and MACS technology. The CD4+AT2R+ and CD4+AT2R- T cell populations were further purified by FACS sorting. The purity of isolated cells and the expression of AT2R and various cytokines were confirmed using FACS analysis, cytopsin staining and RT-PCR methods. To study the role of AT2R on cytokine production, the CD4+AT2R+ and CD4+AT2R- T cell were treated with AT2R agonist (compound 21), or angiotensin II in combination with AT2R antagonist PD123319 (PD).

Results and Discussion: Here, we defined the CD4+AT2R+ T cell subpopulation in the peripheral blood of rats and humans. These blood CD4+AT2R+ T cells were characterized by upregulated expression of transcription factor forkhead box protein FOXP3 [Figure Nr.1] and various cytokines (anti- and proinflammatory). In addition, AT2R activation enhanced production of anti-inflammatory cytokine IL-10 in the CD4+AT2R+ T cells, but not in the CD4+AT2R- T cells [Figure Nr.2]. This study suggested a novel AT2R-mediated cellular
mechanism via the CD4+AT2R+ T cell subpopulation in suppressing inflammatory injury in the heart.

figure 2