

## Abstract

The system of mononuclear phagocytes includes macrophages that modulate their phenotype based on microenvironmental signals. Their properties vary considerably in a differentiated stage. M1 macrophages, which are classically activated (typically by IFN- $\gamma$ ), are involved in phagocytosis and produce some pro-inflammatory cytokines, that can stimulate other immune cells. A phenotypically different cell population are M2 macrophages, which are alternatively activated by exposure by Th2 cytokines. M2 macrophages produce preferentially anti-inflammatory cytokines IL-10, TGF- $\beta$  and participate in repair and tissue healing. The main aim of this study was to standardize a model of differentiation of THP-1 cells and human monocytes towards the M2 phenotyp using an *in vitro* model. This is represented in particular by increased expression of CD163 and CD206 molecules. The second aim was to assess the dynamics of expression (and co-expression) of CD163 and CD206 molecules in monocytes of patients after kidney transplantation. Expression of surface markers was determined by flow cytometry. Both THP-1 cells and human monocytes, isolated from buffy coat fraction, were stimulated by IL-4, TNF- $\alpha$ , TGF- $\beta$  and IL-10. Changes in CD163 and CD206 expression were measured after day 1, day 3 and day 6 of stimulation. The most significant changes in expression were achieved by stimulation of monocytes, isolated from buffy coat fraction, by IL-10. The increase in CD206 expression also occurred after stimulating these monocytes with IL-4. THP-1 cells have shown not to be a suitable model for modulation towards the M2 phenotype in this study, because the measured values were not reproducible. Expression of CD163, CD206 and CD209 molecules was also investigated *in vivo* in patients before and after kidney transplantation. There was a significant increase in CD163<sup>+</sup> cell population after renal transplantation, whereas expression of the CD206 molecule did not change significantly after transplantation. Detection of marker CD163 is supposed to be of diagnostic significance in rejection after transplantation and CD163<sup>+</sup> cells induction might have a positive effect on tissue healing and repair processes in some diseases.