

## SUMMARY

Nicotine consumption is closely related to the prevalence of cardiovascular diseases, which are mainly caused by atherosclerosis. Atherosclerotic-related morbidities are statistically the leading causes of death worldwide. During the last twenty years, the development of atherosclerotic plaques has been largely elucidated. The chronic inflammation of the intima of the vessel walls plays a central role, where monocytes contribute to substantially. The monocytes can be differentiated into three subpopulations. Concerning atherogenesis the proinflammatory considered intermediate CD14<sup>++</sup>CD16<sup>+</sup> monocytes are significant; the ratio of the different subpopulations of monocytes tends to the intermediate monocytes in established atherosclerosis as well as in inflammatorily caused morbidities too.

As smoking cigarettes demonstrably leads to increased formation of atherosclerotic plaques on the artery walls and the intermediate monocytes are in close relation to atherosclerosis, our hypothesis should examine if smokers – in contrast to non smokers - have an increased number of intermediate CD14<sup>++</sup>CD16<sup>+</sup> monocytes in their peripheral blood.

This paper therefore analyzed monocyte subpopulations in relation to the smoking state of 415 healthy volunteers. For this the monocyte subpopulations of the subjects were examined by flow cytometry. In addition, the nicotine state and the cardiovascular risk factors of the subjects were recorded using a standardized questionnaire and set in relation to the individual monocyte subpopulations and the inflammatory marker CRP. To clarify the pathophysiological signal cascades, the effect of polycyclic hydrocarbons, which are present in cigarette smoke was investigated *in vitro* on monocyte cell cultures.

The results did not confirm our hypothesis: The number of total monocytes was increased in nicotine consumption, however, contrary to our expectations, not the proinflammatory CD14<sup>++</sup>CD16<sup>+</sup> monocytes, but the classical CD14<sup>++</sup>CD16<sup>-</sup> monocytes were to be found in increased numbers in the peripheral blood of smokers. It could be demonstrated *in vitro* that polycyclic hydrocarbons have an immunosuppressive effect. On the one hand, these agents promote an early transition of immature monocytes from the bone marrow into the blood, on the other hand the receptor expression of monocytes is lowered.