

## **ABSTRACT**

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**Title of the Diploma thesis:** Study of platelet-monocyte aggregates induction *in vitro*

Platelets, or thrombocytes, are biconcave disk-shaped cells without a nucleus that originate in the bone marrow. They play an important role in the process of primary hemostasis. By forming a thrombus, they ensure hemostasis and prevent blood loss when the vessel wall is broken.

Aggregation of platelets with monocytes, so-called PMA (Platelet-monocytes aggregates), can occur in several ways, but platelets, have to be activated. PMA serves as a tool to detect cardiovascular disorders and is increased in inflammation, autoimmune diseases and thrombotic conditions.

This thesis is focused on the study of the formation of PMA *in vitro*. We studied the presence of these species in blood from 14 patients, divided equally between men (7) and women (7), aged between 22 and 42 years. We further divided the patients according to gender, age and BMI.

Patient blood samples were treated with arachidonic acid (AA) in different concentrations (1, 10, 50, 100, 125, 250, 500  $\mu$ M) and results were analysed by means of a flow cytometer. Since AA is known to be a platelet activator, a dose-dependent incidence of PMA was observed.

4-methylcatechol (4-MC) is a naturally-occurring catechol with antiplatelet activity. In the second part of the work, we examined whether this compounds affects the formation of PMA.

Our results show that the formation of PMA is influenced not only by activating agents (such as AA), but also by external factors, i.e. gender, age and BMI. Women are more rezistent to the formation of platelet aggregates, which is why lower PMA values were measured in them than in men. Higher PMA values were measured in patients with a higher BMI value, which may be due to the fact that excess weight is one of the risk factors for the development of inflammation and thrombosis in the body.

In samples treated with 4-methylcatechol prior to AA treatment, the number of PMA was lower. These results support the antiplatelet effect described previously and poses 4-MC as an interesting compound for future research.