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Title of diploma thesis: Comparison of platelet aggregation in healthy population

Platelets have an irreplaceable role in the process of aggregation. Nevertheless, their increased activity is associated with the development of many cardiovascular diseases. This process can be influenced by clinical used substances from the group of antiplatelet drugs, which differ in their effectiveness within the population. Within this study, platelet aggregation was tested using impedance aggregometry, whose principle is the change in electrical impedance between electrodes caused by the adhesion of activated platelets. Firstly, whole blood was incubated with clinically used antiplatelet drugs (ticagrelor, vorapaxar, and acetylsalicylic acid) and a flavonoid metabolite, 4-methylcatechol. Subsequently, a platelet aggregation inducer (ADP, thrombin receptor activating peptide 6 /TRAP/, collagen, arachidonic acid, ristocetin, U-46619, and platelet-activating factor /PAF/) was added, and the process was monitored for 6 minutes. The most potent inhibitor of the aggregation induced by arachidonic acid was acetylsalicylic acid in a concentration of 70 μM while in the case of the aggregation induced by collagen, it was 4-methylcatechol in the same concentration. Ticagrelor has proven to be effective and consistent imhibitor of ADP-triggered platelet aggregation in all donors. For vorapaxar, an antagonist at thrombin receptors, its effect was significantly dependent on age and dose. Women also showed a higher response to some inducers of aggregation (ADP and TRAP), however, no differences were observed between male and female donors in the case of aggregation induced by collagen and arachidonic acid. In women, there was a lower response to the administration of certain drugs, such as acetylsalicylic acid and vorapaxar. Increasing age was also associated with loweing the responses to aggregation induced by arachidonic acid and TRAP in both sexes. In women, the response to aggregation induced by some other inducers (ADP, U-46619, and PAF) also decreased with age. The results of this work, despite the relatively small number of healthy individuals, point to significant differences in the responses of thrombocytes to administered drugs and the need for individualized therapy.