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Control of platelet aggregation and thrombosis: Molecular and cellular factors

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Platelet aggregation is central to the arrest of bleeding upon injury and to pathological thrombosis. A subset of bleeding disorders is due to platelet protein deficiencies. Dysregulated platelet aggregation manifests not only in atherothrombosis, but also in a broad range of diseases such as idyopathic thrombocytopenic purpura (ITP), vascular dementia, acute lung injury, and cancer-related thrombosis. Whereas platelets circulate in a resting, unactivated state, many biochemical, physical and cellular factors can activate these cell derivatives to promote binding of platelet adhesion receptors to soluble plasma protein ligands or to extracellular matrix proteins such as collagen and laminins, or to strings of von Willebrand factor which are secreted by endothelial cells and rebind to their surface. An extensive intracellular signaling network functions to regulate platelet activation, stabilize initial receptor-ligand binding and to transmit signals for cytoskeletal reorganization and clot stabilization. Although coagulation inhibitors, such as Coumadin and oral and parenteral platelet antagonists such as Plavix or Abciximab, are already part of the medication arsenal, these drugs, often have therapeutic windows that must be closely monitored in order to control thrombosis without inducing accompanying bleeding complications. This presentation will firstly describe central control pathways in platelet adhesion, discuss current thoughts in treatment of platelet bleeding disorders such as Glanzman Thrombasthenia, and Bernard Soulier syndrome that lead to bleeding, and lastly, address the need for novel approaches to platelet antagonism in thrombosis that are built on an enhanced understanding of the molecular and cellular factors regulating platelet aggregation.

Biography

Ana Kasirer-Friede is a Research Scientist in the Hematology/Oncology Division at University of California, San Diego. She studies signal transduction pathways in hematopoietic cells under static and hydrodynamic fluid shear stress conditions, utilizing mouse thrombosis models, biochemical and molecular biology techniques and high-end microscopy. She has served as a reviewer of original articles for several journals, and is herself the author of 24 publications in top tier journals, in the medical textbook "*Hemostasis and Thrombosis*", and in the Springer "*Online Encyclopedia of Signaling Molecules*". Additionally, she has presented her work at numerous national and international meetings.

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