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Preface: In Focus Issue on Blood–Biomaterial Interactions

Ilya Reviakine and Steffen Braune

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Preface: In Focus Issue on Blood–Biomaterial Interactions

Ilya Reviakine, Guest Editor
Institute of Functional Interfaces (IFG), Karlsruhe Institute of Technology (KIT), Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany And Department of Bioengineering, University of Washington, Seattle, Washington 98105

Steffen Braune, Guest Editor
Department of Biointerface Engineering, Institute of Biomaterial Science, Helmholtz-Zentrum Geesthacht, Kantstrasse 55, 14513 Teltow, Germany

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But anyway the cart's still there today.
I. A. Krylov, "Swan, Pike and Crawfish"

Studies of blood–biomaterial interactions can be traced back more than a century. Surprisingly little progress has been made during that time, either in terms of understanding what goes on at the surface of materials that come into contact with blood, or improving the properties of these surfaces, prompting the quote from a famous fable as a parable for the unsatisfactory state of affairs: all existing artificial materials that come into contact with blood induce adverse reactions such as thrombosis and inflammation.

The reliance of clinical practice on artificial materials in implants and other devices continues to increase, and so does the success with which implants and other devices help save and improve patients' lives. Underlying this progress is the ability of clinicians to therapeutically manage the adverse reactions caused by biomaterials rather than the improvements of the materials themselves. In an effort to correct this imbalance, we initiated a number of activities, including the *BloodSurf* meeting that took place in 2014 in Fréjus (74th International IUVSTA Workshop on Blood–Biomaterial Interactions: *Surface Analysis meets Blood Compatibility*, http://www.vide.org/bloodsurf) and this In Focus collection dedicated to the subject. An impressive range of topics is covered here in the form of experimental papers, reviews, and opinion pieces.

As protein adsorption and platelet activation at biomaterial surfaces are still considered central to the development of adverse reactions, both feature prominently in several papers. In this context, the report of Cornelius *et al.*[1] on the interaction of lipoproteins with bare and polyethylene glycol-modified polyurethane surfaces can be highlighted, as well as the two reports pointing to differences in plasma protein adsorption and activation at different surfaces.[2,9] Szott *et al.*[2] and Gupta *et al.*[3] also report differences in platelet activation between different surfaces. The two latter studies contribute to the growing body of evidence that platelet spreading may not be representative of other activation phenomena. Endothelialization of a vascular implant (a heart valve prosthetic) is considered by Ghanbari *et al.*[4] Testing and screening approaches are discussed in their own right and as a part of larger, systematic studies. The importance of fresh blood in hemocompatibility testing is revisited by Blok *et al.*[5] Another important topic—that of biomaterials for platelet storage—is raised by Farrugia *et al.*[6] Current conditions of platelet storage are utterly unsatisfactory due to limited duration and the requirement for relatively high temperatures, which contribute to the risk of bacterial contamination. Jung and Braune[7] discuss principles of thrombogenicity and hemocompatibility testing, emphasizing that future studies have to show which of the *in vitro* test assays has predictive value for thrombotic processes at implant surfaces. Some fundamental aspects of the bio/non-bio interfaces relevant to various types of implants (not only vascular) are discussed by Reviakine.[8]

The practitioners of the field of biological surfaces and interfaces are uniquely poised for advancing hemocompatibility research through their ability to bridge disciplines. We hope that this In Focus collection becomes a stepping stone toward further progress.

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