

## Preface

It is our pleasure to present this special issue of *Biorheology* in recognition of Dr. Harry L. Goldsmith's distinguished stewardship of the journal from 1994 to 2014. *Biorheology* has benefited from the guidance of a select group of editors since its inception in 1963 when Alfred Lewin Copley (New York Medical College) and George William Scott-Blair (Oxford University) became founding editors of the journal [1]. When Al Copley passed away in 1992, Dr. Alex Silberberg (Weizmann Institute) joined with Dr. Pedro Verdugo (University of Washington) for two years as co-Editors-in-Chief. In 1993, Dr. Silberberg passed away and Harry became co-Editor with Dr. Verdugo for the next two years. In 1995, Harry became sole Executive Editor-in-Chief and the editorial office moved to Montreal General Hospital Research Institute in McGill University Medical School. Harry served in that position until he retired in 2014, following which we were honored to attempt to fill his shoes as co-Editors-in-Chief.

During Harry's tenure as Editor, *Biorheology* has matured as the specialty journal representative of the field, and has become a conduit for publicizing and promoting the proceedings of many conferences, and in particular the triennial joint meeting of the *International Society of Biorheology* and the *International Society of Clinical Hemorheology and Microcirculation*. In addition, the journal has maintained a steady stream of first class articles that is highly respected by rheologists seeking to publish their biologically focused research. As a result of Harry's diligence and pursuit of excellence in 1998 Harry forged a strong relationship with our publisher, IOS Press in Amsterdam. Through the efforts of Marleen Berfelo, Head of the Journal Department, IOS Press has provided outstanding support of our mission.

There is no doubt that Harry has parlayed his outstanding scientific contributions to the field of biorheology into a strong foundation for the activities of the journal. To recognize his contributions to the discipline as well as the journal, we have invited two senior scientists, Drs. Shu Chien and Giles R. Cokelet to present a Laudatio that summarizes Harry's contributions and their significance. Dr. Chien of the University of California, San Diego, a recipient of the Poiseuille Medal of the International Society of Biorheology, is a pioneer who has published seminal studies on the viscosity of blood, its dependence on red cell deformability and aggregation, and the rheological basis for micro- and macro-vascular blood flow. He has also published extensively on the role of shear stress in eliciting mechanotransduction responses from endothelium in light of cellular chemical responses and gene expression. Dr. Cokelet, of Montana State University, also a Poiseuille Medal recipient, has been a leading authority on the mechanics of blood flow in the microcirculation, and has published extensively on the yield stress of blood, the Fåhræus effect, and the disparity between systemic and microvascular hematocrits. Both Drs. Chien and Cokelet have worked closely with Harry over the years and highlight his major contributions to biorheology.

These presentations are followed by ten senior biorheologists who present their work that has benefited from the seminal contributions that Harry has made to the field. We begin with a review article by Dr. Scott Diamond and colleagues entitled *In microfluidico: Recreating in vivo hemodynamics using miniaturized devices*. This paper describes the state-of-the-art in replicating many of the rheological properties of cells relevant to the development of lab-on-a-chip devices and describing the mechanics of cell behavior at the microscopic level. This article is followed by a review by Dr. Sriram Neelamegham and colleagues, entitled *Role of fluid shear stress in regulating VWF structure, function and related blood*

disorders, in which the current structure of von Willebrand factor (VWF) is reviewed in the context of the forces that affect cell interactions and adhesion. This is followed by a review from the laboratory of Dr. Geert Schmid-Schönbein, entitled Proteolytic receptor cleavage in the pathogenesis of blood rheology and co-morbidities in metabolic syndrome. It is hypothesized that uncontrolled extracellular proteolytic activity serves as the basis for abnormal blood rheological properties that occur in concert with metabolic syndrome and manifestations such as hypertension and insulin resistance. A fourth review from the laboratory of Dr. Klaus Ley, entitled Leukocyte arrest: Biomechanics and molecular mechanisms of integrin activation, offers an overview of molecular biomechanics during conformational changes of integrins, integrin functions in leukocyte biorheology and the molecules involved in integrin activation.

Following these reviews are six research articles that have clearly benefited from the quantitative foundations laid down by much of Harry's prior research. Each deals with a unique aspect of cell adhesion or deformability that has been studied in Harry's elegant *in vitro* experiments. In the paper from the laboratory of Dr. Herbert J. Meiselman, he and his colleagues examine the effect of neutral polymers on red blood cell adhesion. In the following paper by Dr. Gerard Nash and colleagues, studies are presented on the differential effects of vessel size, hematocrit, and shear rate on adhesion of platelets and leukocytes to the blood vessel wall. This paper is followed by an elegant computational model by Drs. Micah Dembo and Marc Herant that elucidates the mechanics of cell spreading on a surface in light of instabilities introduced by surface tension forces. This is followed by a detailed examination from the laboratory of Dr. Michael Lawrence and colleagues of neutrophil rolling on functionalized surfaces that elucidates the role of cell deformability in affecting the adhesion process. This paper is followed by a study from the laboratory of Dr. Herbert Lipowsky that aims to examine the role of enzymatic processes that degrade the endothelial glycocalyx and affect the barrier between leukocyte and endothelial cells during stimulated adhesion. This is followed by a paper from the laboratory of Dr. Scott Simon that examines the role of hormonal factors, specifically atrial natriuretic peptide, that influence neutrophil adhesion to inflamed endothelium by modulating PMN deformability and the strength of adhesion. All of these authors were extremely enthusiastic and eager to highlight the outstanding contribution that Harry has made to *Biorheology* over the past 20 years.

Having served as co-Editors-in-Chief of the journal for the last two years, we are in awe of the excellence that Harry has demonstrated in overseeing the editorial process. He has clearly set a high standard for us to achieve. We salute him for his outstanding service to the journal and his seminal contributions to the field of biorheology. Well done, Harry!

Herbert H. Lipowsky  
and  
Gerard Nash  
*Editors-in-Chief*

## Reference

- [1] Goldsmith H. 50 years of biorheology. *Biorheology*. 2013;50:1–2.