PREFACE

We are honored to have the opportunity to coedit this *Methods in Enzymology* volume on Intermediate Filaments (IFs). An exciting aspect of our effort is that this volume comes with a companion, also published in January 2016 (coedited by Kathleen Wilson and Arnoud Sonnenberg) which focuses solely on IF-associated proteins. These two companion volumes are indeed complimentary, with the need for the second related volume simply reflecting the expansion of the IF field as more binding protein partners have become identified and studied.

IFs along with microfilaments and microtubules form the three filamentous systems in the cell. Microfilaments and microtubules are composed of the highly conserved actins and tubulins, respectively. There are six mammalian actin genes with each gene encoding one protein (Perrin & Ervasti, 2010) and six mammalian tubulin gene families (Oakley, 2000). In contrast, IFs vary widely in sequence and in size, and form a large family of proteins. Many researchers may only be familiar with individual subgroups of this large family of IF proteins, or may know specific subgroup members, such as keratins (epithelial cell or hair, which make up types I and II); desmin, glial fibrillary acidic protein, peripherin, and vimentin (type III); α-internexin, nestin, neurofilaments, syncoilin, and synemin (type IV); lamins (type V); and the lens beaded filament structural proteins 1 and 2 (type VI). In all, IFs encompass 70 human genes, with >70 related human diseases (Omary, 2009; Szeverenyi et al., 2008), that include among them 54 functional human keratin genes (Schweizer et al., 2006). Except for those in the IF field, not many may realize that all these proteins belong to a single family that share a prototype structure, with family members having unique cell and tissue distribution. The name *intermediate filaments* comes in part because of their intermediate size (10 nm) as compared to microfilaments (4–5 nm) and microtubules (25 nm), although their initial description compared them to actin and myosin filaments (Ishikawa, Bischoff, & Holtzer, 1968).

In reaching out to the outstanding group of authors who have published extensively in the area that they covered in their respective chapters, we had two primary goals in mind. First, we aimed to assemble a volume that serves the community of investigators at-large who are either working directly in the IF field or whose work is bringing them to the IF field. Second, we wanted to put together not only an update but also a somewhat unique

volume, as compared with the most recent IF-related methods book that was published in 2004 (*Methods in Cell Biology*, Volume 78, edited by Bishr Omary and Pierre Coulombe). Although some of the tools have remained unchanged, there have been many refinements in the way by which science is done including a huge expansion of available resources and reagents. Furthermore, the 2004 book had five chapters on IF-associated proteins, but now the field has developed to such an extent that inclusion of a separate volume on IF-associated proteins became clearly warranted.

This current volume includes 26 chapters that make up three major sections. The first section includes 10 chapters that cover general methods related to studying IF proteins. The second section includes 11 chapters that cover different mammalian IF proteins. The third section includes 5 chapters that span nonmammalian IF protein systems. All the chapters provide essential how-to techniques, including suppliers of the reagents being covered, and caveats and pearls that are typically not found in the Materials and Methods sections of manuscripts. Our goal is to help investigators avoid unnecessary efforts of trials and errors, while being able to quickly explore how their experimental system or to-be-tested hypothesis might relate to a given IF protein.

We are very excited about the broad spectrum of methods that have been covered in this book and hope that readers at all levels of their research careers or training will find the chapters in this volume and the companion volume of benefit and interest.

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