Preface

This is the second volume I have edited on techniques utilizing green fluorescent protein (GFP) for the *Methods in Molecular Biology* series. When I began the first, there were only about 1,500 total publications, so it was relatively easy to get a broad survey of the fields making use of GFP; I read nearly 1,000 abstracts covering more than half of everything that had been published. When Humana contacted me to do another volume, I knew I would not be able to do that. Searching the SciFinder database for GFP now produces nearly 50,000 hits. Refining that search to GFP and virus in the past 5 years still produces almost 8,000 hits. Thus, even the topic of *Viral Applications of Green Fluorescent Protein* is too broad to thoroughly cover in a single volume, but I hope that, collectively, these chapters can aid anyone wanting to expand viral GFP methods into their own research. Numerous examples of both construction and application of GFP viruses are provided, and unlike the primary literature, the additional detail available can help newcomers get productive results more rapidly.

Just how important are fluorescent proteins to biomedical research today? It is almost impossible these days to pick up a recent issue of *Science*, *Nature*, *Cell* or the *Proceedings of the National Academy of Science USA*, and not find one, or more commonly, several, articles utilizing GFP. Comparing the number of publications and the rate of increase in publications utilizing GFP with some of the other very important topics (DNA microarrays, Prions and RNAi) is informative. As a reminder, Prions received the 1996 Nobel Prize in Physiology or Medicine, RNAi received the 2006 Nobel Prize in Medicine, and many have suggested that it is just a matter of time until microarray technology garners the honour. In Fig. 1 a graph indicates the total number of publications per year from 1994 to 2005 for these four topics. Not surprisingly to anyone conducting biomedical research, there have been more publications every year of the past decade utilizing GFP than on any of the other three

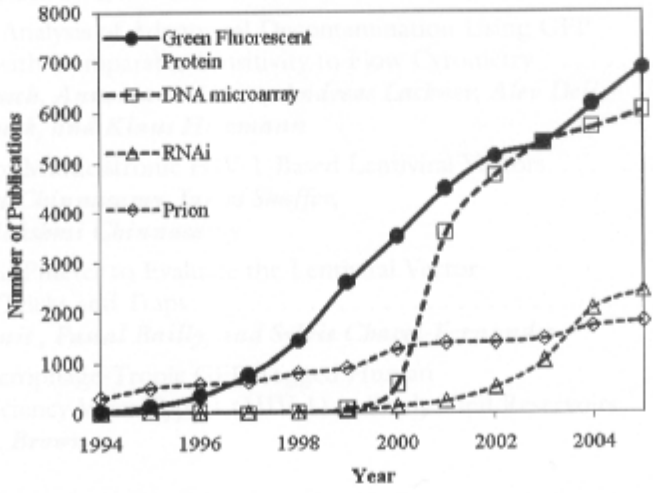

Fig. 1. The number of publications found in the SciFinder database on GFP, prions, DNA microarrays and RNAi.

topics. Does this mean that the development of GFP as a tool in biomedical research deserves the Nobel Prize? Unequivocally yes, and I am not alone in believing that it is just a matter of time until the committee comes to the same decision.

I have been using GFP in my courses at the US Air Force Academy for the past decade. We have done everything from simple bacterial transformation to computer comparisons of various crystal structures, to utilizing GFP-expressing transgenic mice and pigs to study bone marrow transplantation as a treatment for traumatic brain injury and to utilizing baculovirus expression of GFP in insect bioreactors. In that time, I have had the pleasure of collaborating with dozens of investigators from around the world who have done some amazing research enabled by GFP technology. My students and I are richer for that experience. I thank those students for challenging me to stay abreast of the rapidly advancing biomedical research front; it has been my pleasure to learn along with them. I also thank my wife and children for allowing me the extra hours away from home to do that work and to put this volume together and to go to the lab at strange hours of the night to look at glowing bacteria, mice brains or caterpillars. Without the motivation and support from those people, this volume would not have emerged.

Barry W. Hicks
USA