

# Antibody Engineering Volume 2

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# Preface

More than a century after the first Nobel Prize was awarded for an antibody-based therapy, these molecules continue to fascinate researchers and inspire novel therapeutic approaches. More than ever, antibodies are used for a very broad and still steadily expanding spectrum of applications – from proteomics to cancer therapy, from microarrays to in vivo diagnostics. Responsible for the renaissance of this class of molecules are recombinant approaches that allow the modification and improvement of almost all properties. Today, affinity, valency, specificity, stability, serum half-life, effector functions, and even the species origin and thus the immunogenicity, just to name a few aspects, can be engineered at will. More than 20 antibodies are approved for clinical use, and almost all are genetically engineered, recombinant molecules. The next generations of these antibodies are already in the pipeline, and a plethora of alternative antibody formats are under development for various applications.

We look back on exciting 25 years of development from humble beginnings in the early 1980s, when the mere production of an antibody chain in *Escherichia coli* was a goal hard to achieve, to today's impressive list of protein engineering tools. Among them, in particular, the methods that allow us to make human antibodies outside the human body, such as transgenic human Ig mice and phage display, have shaped and driven the developments during the past decade.

Ten years ago, in the preface of the first edition of *Antibody Engineering* – which was comprehensive at its time with less than half of the pages – we predicted that “...it can be expected that recombinant antibody based therapies will be a widespread and acknowledged tool in the hands of the physicians of the year 2010.” This vision has become true within the past decade, and even was exceeded, since we also see that these technologies have broadly entered basic research, allowing us to bring to reality the vision of generating sets of antibodies to entire proteomes – in high throughput robots without a single animal involved.

*Antibody Engineering* aims to provide the toolbox for many exciting developments, and it will help the reader to stay up-to-date with the newest developments in this still fast moving field. It is designed to lead the beginners in this technology in their first steps by supplying the most detailed and proven protocols, and also by supplying professional antibody engineers with new ideas and approaches.

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