

Cutting Edge Engineering Solutions

The development and application of technologies to engineer antibodies (and proteins as a whole) has grown beyond recognition over the last few decades to the point where engineering is now a critical aspect of the design and development of therapeutic candidates. This stage typically occurs early in the discovery process and so it is essential to get it “right first time” since the costs of molecule re-design or optimizing processes at later stages of development can be significant.



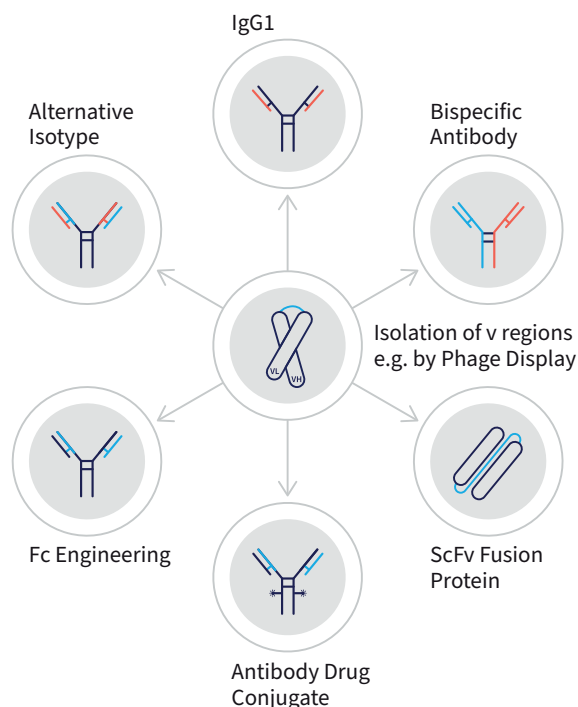
At Abzena, we eliminate the guesswork from protein engineering by offering robust solutions tailored to your specific needs. Our expert team combines cutting edge *in silico* tools and extensive practical experience to design molecules with the desired properties. These designs are, in turn, expressed and characterized by state-of-the-art screening and analytical methods to ensure that your molecules show the appropriate functionality and manufacturability profiles to ensure successful drug development.

Innovative Approaches

At Abzena, we have developed a range of innovative design and engineering solutions across a range of modalities including:

- **Composite Human Antibody™ and Composite Protein™ Platforms:** Humanization and deimmunization is an essential part of the process for the development of therapeutic antibodies and proteins derived from non-human sources. Abzena’s proprietary platforms facilitate the design process by eliminating human T cell epitopes, significantly reducing potential immunogenicity and improving the safety profile of therapeutic candidates.
- **Customizable Platforms for Bispecific Antibodies:** Bispecific antibodies combine multiple specificities into a single construct and many different “flavors” of bispecifics have been developed, each with their own advantages and challenges. To help address the complexity of combining multiple specificities into a single construct we offer a custom design approach to meet particular design requirements. Alternatively, if a preferred format has not yet been established, it may be desirable to take advantage of our experience with a limited panel of simple “go to” formats to explore the space.
- **Corrective Engineering:** Manufacturability of an antibody is an important aspect of design that should be considered from the very earliest of stages. By combining *in silico* tools as well as biophysical characterization using state of the art analytics, we can identify potential sequence liabilities that may be present within a molecule. Once identified, we can design sequences that address these liabilities with the aim of improving the manufacturability profile of your molecule.

- Isotype Switching and Fc Engineering:** The Fc part of an antibody is more than just a scaffold for the variable domains. The Fc plays a critical role in the overall function of the antibody and is responsible for mediating immune effector functions and *in vivo* IgG stability. Abzena has significant experience in Fc engineering to modulate the function of an antibody through, e.g. either reducing or increasing effector function, or through modulating the half-life of a therapeutic.
- Affinity Maturation:** Antigen binding affinity is one of the most critical properties of a therapeutic antibody, however, occasionally a candidate antibody may have a too low affinity to show the desired efficacy. In this situation we would apply affinity maturation utilizing our scFv-based phage-display platform to enhance binding affinity. By following a streamlined library design, selection and characterization process we are able to ensure high specificity and functionality of the resultant antibodies.
- Developability:** Engineering of any kind will, by its nature, change the physico-chemical properties of the molecule compared to the starting sequence. By applying a range of stage-appropriate analyses we are able to rapidly select candidates that have the optimal properties for development.
- Bioconjugation:** Site-specific approaches towards conjugation are increasingly gaining traction due to the ability to generate homogeneous constructs with precise drug loading and predetermined sites of attachment. Of these site-specific approaches, several require engineering of a site-specific handle or tag into the sequence for efficient conjugation. At Abzena, we have significant experience of both engineering different site-specific motifs as well as of the conjugation itself, thereby allowing the exploration of a wide range of different conjugation approaches.



Bioconjugation

Fig. 1 Graphical overview of antibody engineering strategies

Bespoke Development Packages

We appreciate that every antibody and every scenario is different. The Abzena team takes into consideration the different requirements to deliver a tailored solution that aims to meet your objectives.

Take Your Project to the Next Level

Partnering with Abzena means gaining access to a vast portfolio of services and products designed to meet diverse protein engineering needs. Whether you need specific solutions or a fully customizable package, we are flexible and can align our offerings to fit your unique requirements. Our expertise has led to numerous successful humanized antibodies reaching the clinic, and we are committed to adding your project to our list of achievements. With Abzena, you can trust that your project will benefit from our extensive experience and dedication to excellence.



To discover how Abzena could support antibody and protein engineering in your program, get in touch with us today at abzena.com or info@abzena.com.