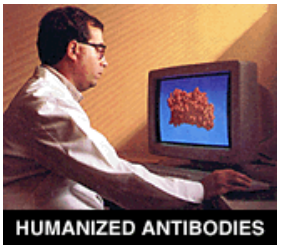
Technology

Protein Design Labs Fulfilling the Promise of Antibodies for Treating Disease



The human body naturally produces millions of antibodies, proteins that fight disease by binding to specific targets on the surfaces of bacteria or viruses. In the 1970s, scientists first developed techniques to immunize mice with a foreign organism and clone (isolate) and grow single cells that pump out antibodies against the intruder. Despite their initial promise, these mouse monoclonal antibodies have fallen short as therapeutics. They are rapidly eliminated from the body and so must be infused into patients almost daily. More important, the body's own antibodies mount an immune reaction (known as a human anti-mouse antibody or HAMA response) against the mouse antibody, rendering it ineffective for further therapy.

To overcome these limitations, PDL uses computer modeling and genetic engineering to convert mouse antibodies into human-like SMART (TM) Antibodies.

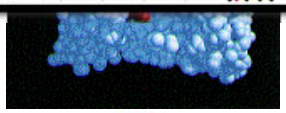
①

DNA from cells producing a mouse antibody is isolated and placed in a sequencing machine to determine the chemical structure of the genes that encode the antibody. Using the genetic code, the amino acids composing the antibody itself are then determined.

②

Proprietary computer software compares the amino acid sequence of the mouse antibody to the sequences of antibodies whose structure has been determined using X-ray diffraction, and then builds a 3-dimensional model of the key part of the mouse antibody.

- **Click Here to see a computer modeling demonstration of PDL's humanization strategy.**

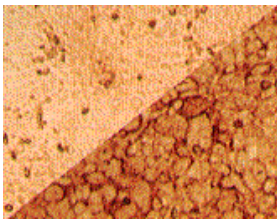


③

The minimum number of mouse amino acids (shown in red and dark blue) identified as necessary for binding to the target are combined with amino acids from a human antibody (light blue).

④

The chemical structure of the genes to make the new SMART Antibody are programmed into a DNA synthesizer to synthesize the genes.



⑤

The genes are inserted into a mammalian cell, which produces the antibody. In the lab, a humanized anti-herpes antibody blocks the virus from spreading from infected cells (dark spots, left); without the antibody, the virus infects all cells (right).

Additional Technologies:

- **Human Antibodies**
- **Novel Antibiotics**
- **Small Molecules**

Additional Information: