Protein Engineering:-

A process using recombinant DNA to modify the structure of natural protein to improve or change their function.

Antibodies are best example for protein engineering because their structure is greatly understood.

Another way in which antibodies are being engineering is by changing their effector domain, the region of the heavy chain that specify antibodies function.

eg. Killing of cells marked by antibodies.

In this way mode of action of a monoclonal antibody can be reprogrammed.

to replace the effector domain entirely with the sequence encoding a toxin.

An antibody-toxin fusion protein deliver toxin specifically to cells bearing the targets proteins as antigen.

This product could be exceptionally potent treatment for cancer and to viral disease such as AIDs.

Antibody engineering is also being used to to construct bispecific antibodies

In these antibodies, each of two arms recognizes a different antigen thus allowing to bridge

the two antigen.

eg Bispecific antibodies could recognize a tumor cellprotein with one arm and a protein on the surface of a killer T-cells with other. bring killer cells directly to the tumor.

Protein Engineering is used to improve a Detergent Enzyme:-

Subtilisin is a serine protease produced by bacteria. Due to its broad specificity for protein that commonly soil clothing, this enzyme was developed for commercial use in laundry detergents.

Biochemical analysis determined that loss of activity due to oxidn of methionine at position 222.

once this happened, the modified enzyme lost got of its activity.

Because they knew which amino acid was bleach sensitive.

To do this, Site directed mutagenesis mutant were constructed in the gene encoding subtilisin The mutant gene were cloned into expression vectors and 19 different subtilisin were expressed. Analysis shows that the Cysteine 222 enzyme was even more active than the wild type protein.