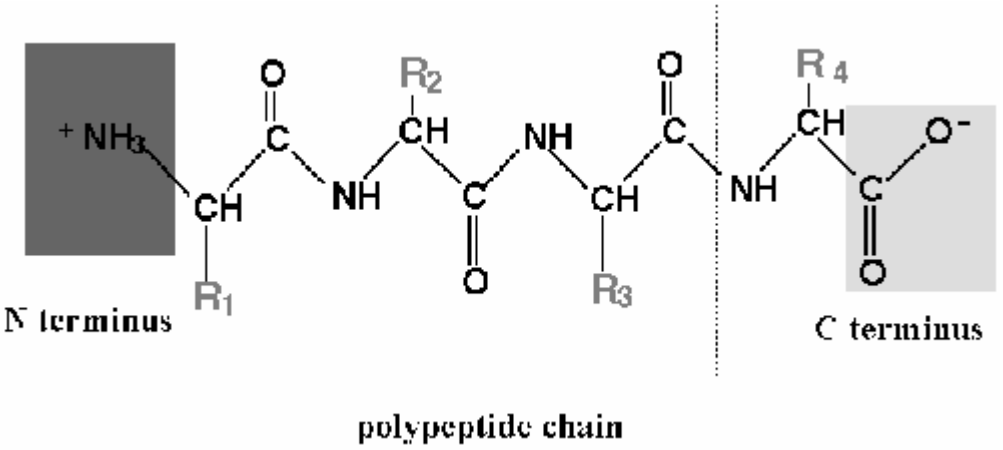
Peptide Computing

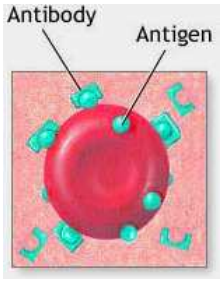
Peptide Computing refers to the form of model computing using Peptides and Molecular biology instead of the common silicon based chip technology. Peptide Computing rely on the fact that Antibodies show affinity towards Peptides and Proteins. Like DNA computing, Peptide computing uses the interaction between the peptide chains and antibodies.

Peptide chains are the building blocks of Proteins. During Protein synthesis, Amino acids join together one by one with Peptide bonds between them. This Polypeptide is the Primary structure of Proteins which then folds to form the Secondary structure and then the Tertiary structure which is the functional protein.

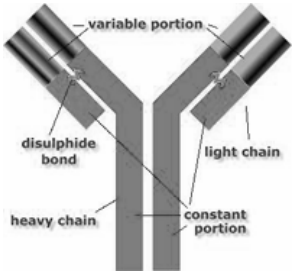


polypeptide chain

Antibodies are proteins specifically synthesized in the body in response to the presence of foreign bodies including germs. The antibodies specifically bind with the Antigens and inactivate or destroy them.



Antibodies on RBC



Structure of Antibody

Peptide computing is the advanced research field using computational models similar to DNA computing. The parallel interaction between the Peptides and Antibodies is used to solve the NP Complete Problem which is a class of decision problems in Computational complexity theory. For example the Hamiltonian problem (It is the problem of determining whether the Hamiltonian path exists in a given graph whether in the directed or undirected way) and Set cover problems (approximation algorithms) are two NP complete problems solved so far using the Peptide computational model.

Peptide computing has advantages over the DNA computing. For example, the DNA is composed of 4 building blocks (Purine, Pyrimidine, Pentose Sugar and Phosphate) while the Peptides are composed of 20 building blocks (20 types of Amino acids - the Magic 20). Interaction between the Peptide and Antibodies is more flexible than the interaction between the DNA strands. Unlike DNA computing, Peptide computing is in the initial stage and there is limitations in the computing since specific Monoclonal Antibodies (MAB) are required for the Peptide computing.

dmohankumar.wordpress.com