

NATURE OF ANTIGEN-ANTIBODY REACTIONS

- **A. Lock and Key Concept**

The combining site of an antibody is located in the Fab portion of the molecule and is constructed from the hypervariable regions of the heavy and light chains.

- X-Ray crystallography studies of antigen-antibody interactions show that the antigenic determinant nestles in a cleft formed by the combining site of the antibody.
- Thus, our concept of antigen-antibody reactions is one of a key (i.e. the antigen) which fits into a lock (i.e. the antibody).
- The bonds that hold the antigen to the antibody combining site are all non-covalent in nature. These include hydrogen bonds, electrostatic bonds, Van der Waals forces and hydrophobic bonds.
- Since antigen-antibody reactions occur via non-covalent bonds, they are by their nature reversible.

How antigen – antibody reactions in vitro helps in Dx?

- **Infectious disease**

- By determining whether an individual has developed antibodies in response to infection.

By detecting antigen of a particular infectious agent from blood or other body fluids

- **Autoimmune disease**

- By detecting antibodies against particular self antigen in case of autoimmune diseases

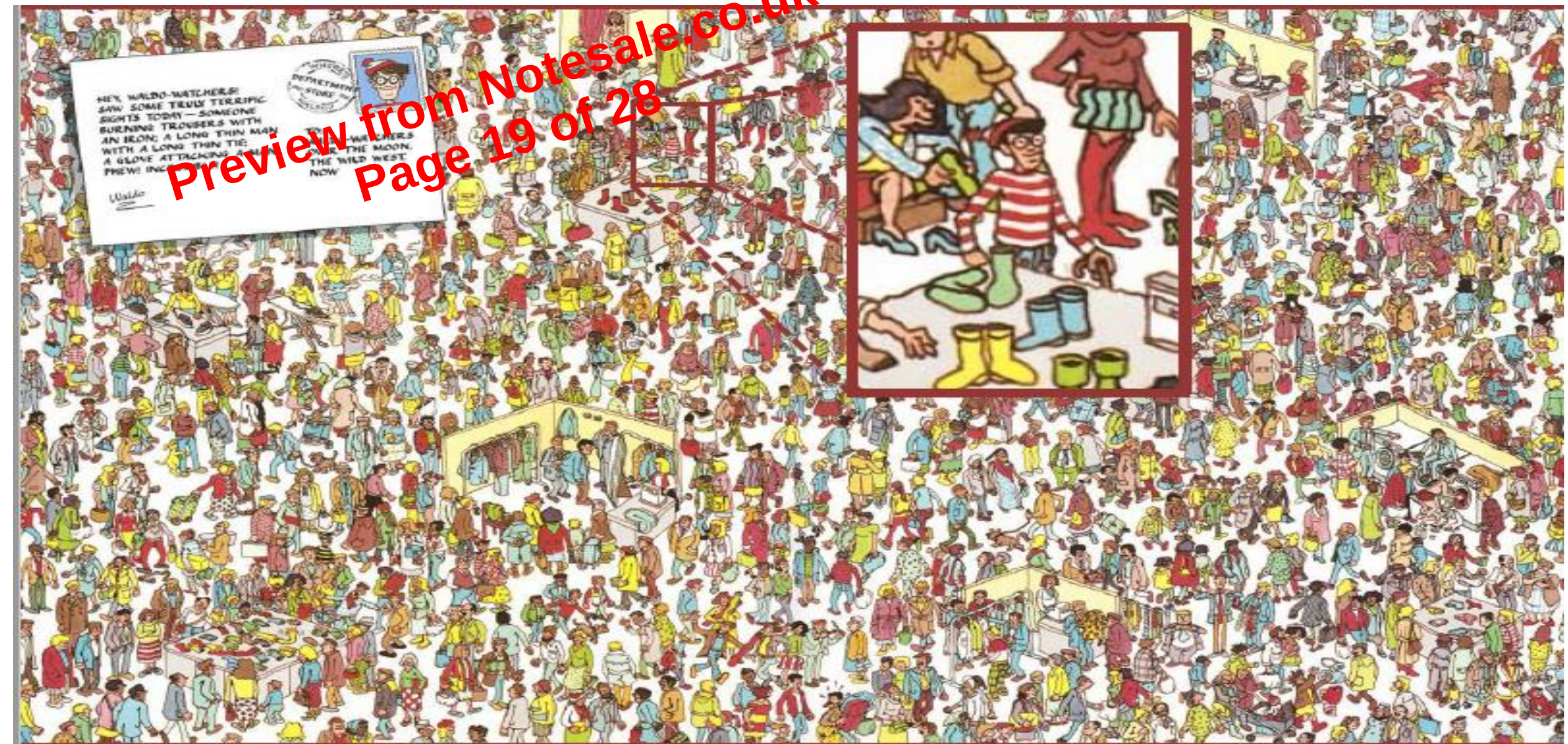
- **Tumors**

- By detecting tumor markers.

- **Metabolic diseases**

- Physiological conditions

Enzymes and Signal Amplification Systems



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