**Detection Methods Using Specific Interactions between Molecules**

A molecule present in a tissue section may be identified by using compounds that specifically interact with the molecule. The compounds that will interact with the molecule must be tagged with a label that can be detected under the light or electron microscope (Figure 4). The most commonly used labels are fluorescent compounds (which can be seen with a fluorescence microscope), radioactive atoms (which can be detected with autoradiography), and metal (usually gold) particles that can be observed with light and electron microscopy. These methods are mainly used for detecting sugars, proteins, and nucleic acids.

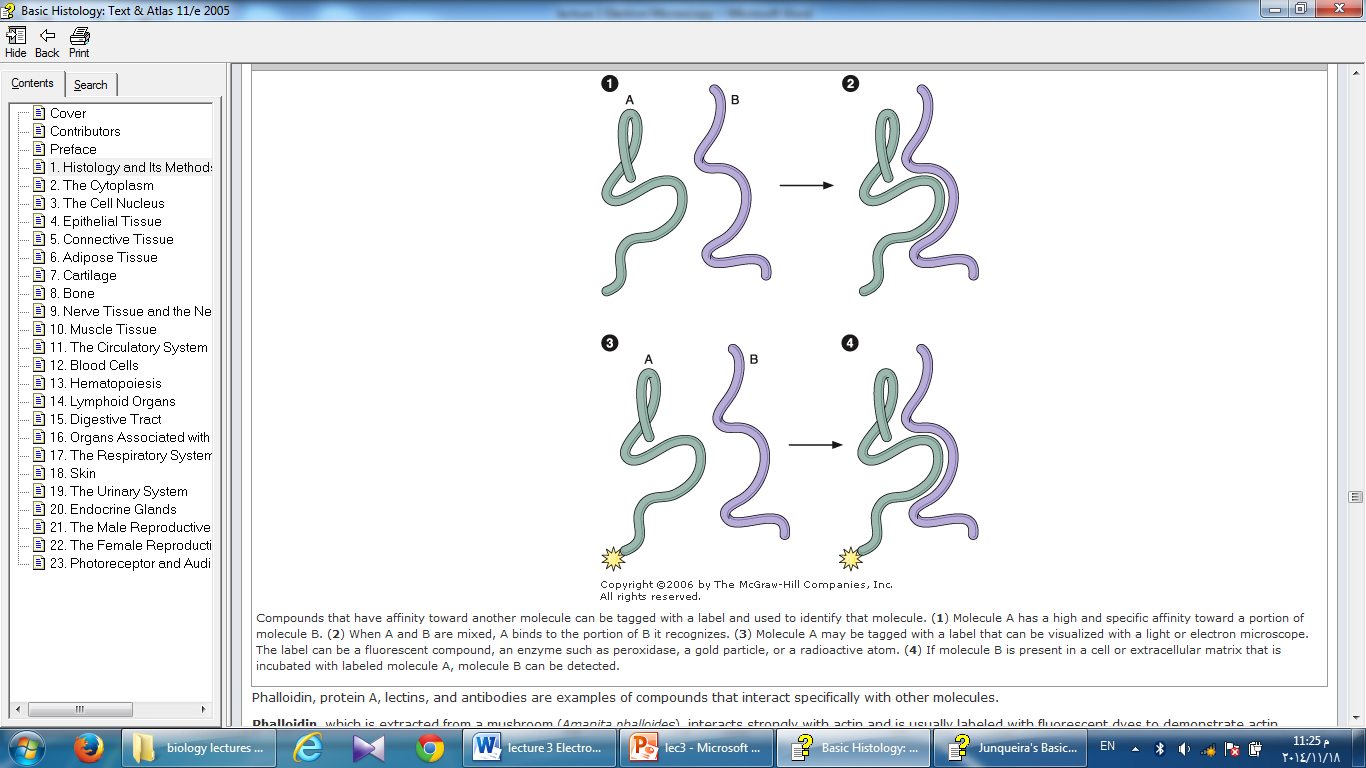


Figure 4: Compounds that have affinity toward another molecule can be tagged with a label and used to identify that molecule

**Immunohistochemistry**

A highly specific interaction between molecules is that between an antigen and its antibody. For this reason, methods using labeled antibodies have proved most useful in identifying and localizing specific proteins and glycoproteins.

The body has cells that are able to distinguish its own molecules (self) from foreign ones. When exposed to foreign molecules called **antigens**, the body may respond by producing proteins **antibodies** that react specifically and bind to the antigen, thus helping to eliminate the foreign substance. In Immunohistochemistry, a tissue that may contain a certain protein is incubated in a solution containing labeled antibody to this protein which will binds to it and can be detected by microscopy.

For both diagnostic and research purposes, immunohistochemistry is very widely used to detect specific proteins (or other molecules) of interest in cells and tissues. This technique requires an antibody against the protein that is to be detected, which means that the protein must have been previously purified using biochemical or molecular approaches so that antibodies against it can be produced. To produce antibodies against protein x of a certain animal species (eg, a human or rat), the isolated protein is injected into an animal of another species (eg, a rabbit or a goat). If the protein's amino acid sequence is sufficiently different for this animal to recognize it as foreign ( as an antigen) the animal will produce antibodies against the protein.

H.W: Medical applications of immunocytochemistry.