Autoradiography

Radiography is the visualisation of the pattern of distribution of radiation consisting of X-rays, gamma or beta rays, and the recording medium is a photographic film. When using X-rays, the specimen is placed between the source of radiation and the film, and the absorption and scattering of radiation by the specimen produces its image on the film. In contrast, in **autoradiography** the specimen itself is the source of the radiation, which originates from radioactive material incorporated into it. The recording medium which makes visible the resultant image is usually a photographic emulsion.

History

Going back intothe history, first autoradiography was obtained accidently around 1867 when a blackening was produced on emulsions of silver chloride and iodide by uranium salts. Such studies contributed directly to the discovery of radioactivity. The development of autoradiography as a biological technique started with the development of photographic emulsions made of silver halide. Now, any biological compound can be labelled with radioactive isotopes which lead to the opening of many possibilities in the study of living systems.

Radioisotopes

By nature, in radiosiotopes, the mass of the atomic nuclei can vary slightly (=isotopes) for a particular element although the number of electrons remains constant and all the isotopes have the same chemical properties. The nuclei of them are unstable and they disintegrate to produce new atoms and, at the same time, give off radiations such as electrons (beta rays) or radiations (gamma rays). Naturally occurring radioisotopes are rare because of their instability, but radioactive atom can be produced in nuclear reactors by bombardment of stable atoms with high-energy particles. The disintegrations can be detected in 3 ways.

Detection

(i) ***Electrical:*** This depends on the production of ion pairs by the emitted radiation to give an electrical signal that can be amplified and registered and used in Geiger counter, ionisation counter and gas flow counter

(ii) ***Scintillation:*** Some materials have the property of absorbing energy from the radiation and re-emitting this in the form of visible light. In a *scintillation counter* these small flashes of light are converted into electrical impulses. Both of these techniques count the pulses of the disintegrating atoms. They are fast and quantitative.