Radioactive Tracers in Analytical Chemistry

Alfonso Fasanode *
Division of Neurosurgery, University of Toronto, Ontario, Canada

Accepted on May 21, 2021

Editorial

A radioactive tracer, radiotracer, or radioactive label, may be a compound during which one or more atoms are replaced by a radionuclide so by virtue of its decay it are often wont to explore the mechanism of chemical reactions by tracing the trail that the radioisotope follows from reactants to products. Radiolabeling or radio tracing is thus the radioactive sort of isotopic labeling.

Radioisotopes of hydrogen, carbon, phosphorus, sulfur, and iodine are used extensively to trace the trail of biochemical reactions. A radioactive tracer also can be wont to track the distribution of a substance within a natural system like a cell or tissue, or as a flow tracer to trace fluid flow. Radioactive tracers also are wont to determine the situation of fractures created by hydraulic fracturing in gas production. Radioactive tracers form the idea of a spread of imaging systems, such as, PET scans, SPECT scans and technetium scans. Carbon dating uses the present carbon-14 isotope as an isotopic label.

The principle behind the utilization of radioactive tracers is that an atom during a compound is replaced by another atom, of an equivalent element. The substituting atom, however, may be a radioactive isotope. This process is usually called radioactive labeling. The facility of the technique is thanks to the very fact that decay is far more energetic than chemical reactions. Therefore, the radioactive isotopes are often present in low concentration and its presence detected by sensitive radiation detectors like Geiger counters and scintillation counters. George de Hevesy won the 1943 Nobel Prize for Chemistry "for his work on the utilization of isotopes as tracers within the study of chemical processes".

Tracers are materials that are used as markers to point out the situation of a substance or to follow the pathway of a substance during a reaction or physical process. Such tracers need to show an equivalent physical and chemical behavior within the system under observation because the material that's actually observed.

Racer conditions are common medical conditions (or procedures) that diagnostic criteria are well established and clear, there are effective preventions or treatments, and a scarcity of treatment can cause significant harm to the patient. Samples of tracer conditions include otitis, appendectomy, cesarean delivery, and hysterectomy. These conditions, if evaluated in terms of incidence and actual chart review, can provide useful insights into departmental medical standards. Incident reports by nursing staff and nosocomial infections are samples of the functioning of the tracer condition concept.

Radiotracers are often utilized in conjunction with pharmacologic stressors, particularly for the detection of arterial coronary disease. Recent evidence suggests that radiotracer pharmacokinetics could also be influenced by the sort of pharmacologic stress applied.155–158 Therefore; biological models have a crucial role in evaluation of pharmacologic stressors.

The effects of pharmacologic stress on radiotracer kinetics are often initially evaluated in short-term anesthetized models. However, the consequences of inotropic agents like dobutamine and arbutamine on global hemodynamics, regional myocardial flow, and performance could also be greatly influenced by the sort of anesthesia. For instance, the anesthetized dog is more sensitive to inotropic stimulation; in contrast, it requires much higher doses of adenosine to elicit an equivalent effect on coronary flow. These differences must be taken into consideration when designing experimental protocol involving a pharmacologic stressor. Ultimately, pharmacologic stressors must be evaluated in long-term, conscious experimental models to define their true effects on radiotracer kinetics.

Tracer kinetic methods provide unique and accurate methods for measuring rates of physiologic, biochemical, and pharmacokinetic processes.

Citation: *Alfonso Fasanode, Division of Neurosurgery, University of Toronto, Ontario, Canada. J Biomed Imag Bioeng. 2021; 5(5):1*