P) Miscellaneous

Whole Body Autoradiographic Studies on the Distribution of ^{10}B compound in Mice by the Solid State Track Detection Method

O. Matsuoka
National Institute of Radiological Sciences, Chiba
H. Hatanaka
Department of Neurosurgery
M. Miyamoto
Department of Dermatology
University of Tokyo, Tokyo

The basis of neutron capture therapy, a new technique of whole boy autoradiography was developed. Under thermal neutron irradiation, ^{10}B emitts 1.4 MeV α-ray by ^{10}B (n.α) -Li reaction. The photographic emulsion, however, has to be exposed simultaneously to neutron in reactor in contact with tissue specimen, and which produces the heavy background exposure to the emulsion other than those by α-ray from neutron capture reaction in tissue sample because of co-existence of neutron and α-ray in the reactor field.

Solid state track detection (S.S.T.D.) using cellulose nitrate film was introduced into macro-autoradiography in place of photographic emulsion. The principle of which is as follows; the invisible crack at molicular level in cellulose nitrate film produced by the penetration of α-ray is etched by the immersion into hot 6 N. NaOH solution and this produces a visible image of α-emitting substance existing in the specimen.

Two different types of tumor bearing mice such as C57BL male mice implanted with glioblastoma like tumor in brain and or dorsal subcutaneous tissue and DD mice implanted with melanoma in dorsal subcutaneous tissue were examined as to their ^{10}B distribution by new S.S.T.D. autoradiography at whole body level.

^{14}C-labelled thymidino was simultaneously injected with ^{10}B eompound as a indicator of tumor growth before killing of mice for whole body sectioning. Examination was made of its ^{14}C-Thymidine incorporation pattern by ordinary way after S.S.T.D. processes.

The results elearly showed accumulation of ^{10}B into implanted tumor parts compared with normal tissue. Comparative examination of both autoradiograms of ^{10}B and ^{14}C-Thymidine seems to be very useful in elucidating the incorporation mechanism of ^{10}B compound into growing tumor.

Presented by Medical*Online