

[2-¹⁴C]Thymidine incorporation activity of stem cells in either tumor or cradle tissues in a normal or transplanted animals

AKIYO SHIGEMATSU, JOJI YUI, YUKO HAMAI and AKIKO HATORI

Institute of Whole Body Metabolism, 340-2, Nauchi, Shiroy City, Chiba, Japan

SUMMARY

A novel autoradiographic procedure was developed for such continuously cycling cells as stem cells on account of proliferating rate of which is astronomically high per min. Negative visualization is observed over any mitotic image by use of a biomarker, "[2-¹⁴C]thymidine" for a few minutes in both cases, either in vivo or in vitro systems. But, good visualization images were realized by many ¹⁴C-β tracks over stem cells with a few minute labeling of [2-¹⁴C]thymidine in originated cradles as predicted by Burkitt, H.G(1993). It is clearly elucidated that a short and quick labelling procedure of [2-¹⁴C]thymidine is useful to evaluate toxicity and efficacy of new drug candidates and to diagnose cluster of unknown malignity or proliferation rate of respective stem cell in in vivo or Ex-vivo system.

Results show that the cell proliferation rate of the stem cells in respective tissues was markedly suppressed, dependent on time after dosing and the dose of ⁹⁰Y; 3.7, 37, 370, 3,700, and 37,000 kBq per mouse (25g). In addition to the above, the sensitivity of the proliferation rate was dependent on amitosis or mitosis and the AUC value of ⁹⁰Y-concentration at specific locations of the cells in the mouse body. The most sensitive cells were the plasmacytoma cells, followed by the pluripotent and unipotent stem cells, the intestinal crypts, epiphysial growth plate and liver cells.