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PAPER TITLE

A PBPK Model for Carbon; for describing metabolism in humans for use in internal dosimetry.

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3.1 Internal Dosimetry

ABSTRACT (See instructions overleaf)

The metabolism of carbon has been extensively studied and is well known. Despite this, models currently being used to describe intake, distribution, and retention following a pulsed intake are not adequate for internal dosimetry. Carbon-14 is encountered in the nuclear industry primarily as CO_2, and in nuclear medicine and biomedical research as organic carbon compounds. Environmental ^{14}C will become bound in a variety of hydrocarbons. On occasion, ^{14}C will exist as an insoluble aerosol (inhalation Type S). The dose per unit intake from these different compounds will have a large range, as will the relationship between intake and excretion. This paper describes a physiologically based pharmacokinetic (PBPK) model that has been developed for use with bioassay to evaluate the dose from an intake of ^{14}C. The model has been used to calculate committed effective and equivalent dose following inhalation intakes of compounds containing ^{14}C as gases and vapors, and as Type F, M, and S compounds, as well as from ingestion intakes. Data useful in relating measurable quantities (chest contents, and urine and fecal excretion) to organ contents are given.

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