

# Tissue to Wholebody Conversion

Models developed to assess radiation doses to wildlife focus on estimation of wholebody dose rates using wholebody activity concentrations of radionuclides, in part because available effects data are largely based on observations of whole-body exposure. Obviously to estimate wholebody internal dose rates, there is a need to determine wholebody activity concentration of radionuclides. However, much of the available transfer data originate from studies to determine radiological exposure to humans and are focused on tissues utilised in the human food chain (e.g., muscle tissue). Use of a single tissue activity concentration data could under- or over-estimate wholebody values. Therefore, there is a need for wholebody:tissue concentration ratios that allow for estimation of wholebody concentrations from commonly measured tissue data.

Yankovich *et al.* (2010) presents a compilation of wholebody:tissue concentration ratios for a range of different radionuclides and terrestrial and aquatic animals. Look-up tables adapted from Yankovich *et al.* can be viewed from the links below.

**i** To use the ratios a tissue-specific activity concentrations should be multiplied by the appropriate wholebody:tissue concentration ratio.

Given the uncertainty around the collated values Yankovich *et al.* recommended that ratios of between 0.75 and 1.5 should not be applied and that a value of 1.0 should be assumed instead. In the tables which can be accessed below and values between 0.75 and 1.5 have been replaced with a value of 1.0.

Tables of wholebody:tissue concentration ratios:

[Marine molluscs \(bivalves and gastropods\)](#)

[Marine crustaceans of different sizes](#)

[Freshwater fish, marine fish and amphibians](#)

[Reptiles - ratios are presented separately for turtles/tortoises and other reptiles species](#)

[Birds](#)

[Terrestrial mammals](#)

**i** Refer to Yankovich *et al.* for a discussion of the derivation and limitations of the data presented, and details of source references used.

## Reference

T.L. Yankovich, N.A. Beresford, M. Wood, T. Aono, P. Andersson, C.L. Barnett, P. Bennett, J. Brown, S. Fesenko, J. Fesenko, A. Hosseini, B.J. Howard, M. Johansen, M. Phaneuf, K. Tagami, H. Takata, J. Twining and S. Uchida 2010. Whole-body to tissue concentration ratios for use in biota dose assessments for animals. *Radiation and Environmental Biophysics* 49, 549-565