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## 129I concentration in breastmilk and its dose to infants' thyroid

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Radiation exposure dose and potential health risks remain a crucial aspect of public health particularly given the use of the linear no-threshold model which postulates any exposure to radiation can result in harm. The concentration of several long-lived radionuclides has increased in the environment through human nuclear activities. Many of these radionuclides are alpha and beta emitters which if ingested in sufficient quantities, may impact human health. This paper demonstrates a reliable and reproducible method for the measurement of  $^{129}\text{I}$  in human breastmilk, then assessed its dose to infant thyroid.

The procedure used here was a refinement of a method that already established. The  $^{129}\text{I}$  in breastmilk ranged from  $1.26 \times 10^8$  atoms/L to  $6.64 \times 10^8$  atoms/L with a median of  $2.10 \times 10^8$  atoms/L, and the  $^{129}\text{I}/^{127}\text{I}$  ratio ranged from  $1.27 \times 10^{-10}$  to  $9.9 \times 10^{-10}$  with a median of  $2.13 \times 10^{-10}$ . These results suggest a strong correlation between  $^{127}\text{I}$  and  $^{129}\text{I}$  concentrations in breastmilk. We noticed the similarity in isotopic ratios between breastmilk and the Canadian cow's milk, indicating that the milk of both cows and humans may be a reflection of the  $^{129}\text{I}$  concentration of their local environment and the food ingested.

The results confirm that humans are exposed to the  $^{129}\text{I}$  from birth through their mother breastmilk, giving them an average dose of  $1.10 \times 10^{-4}$  Bq/year and thyroid dose rate equal to  $5.92 \times 10^{-10}$  Sv/year.

### Student Submission

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