Researchers define new equation for doubly labeled water studies

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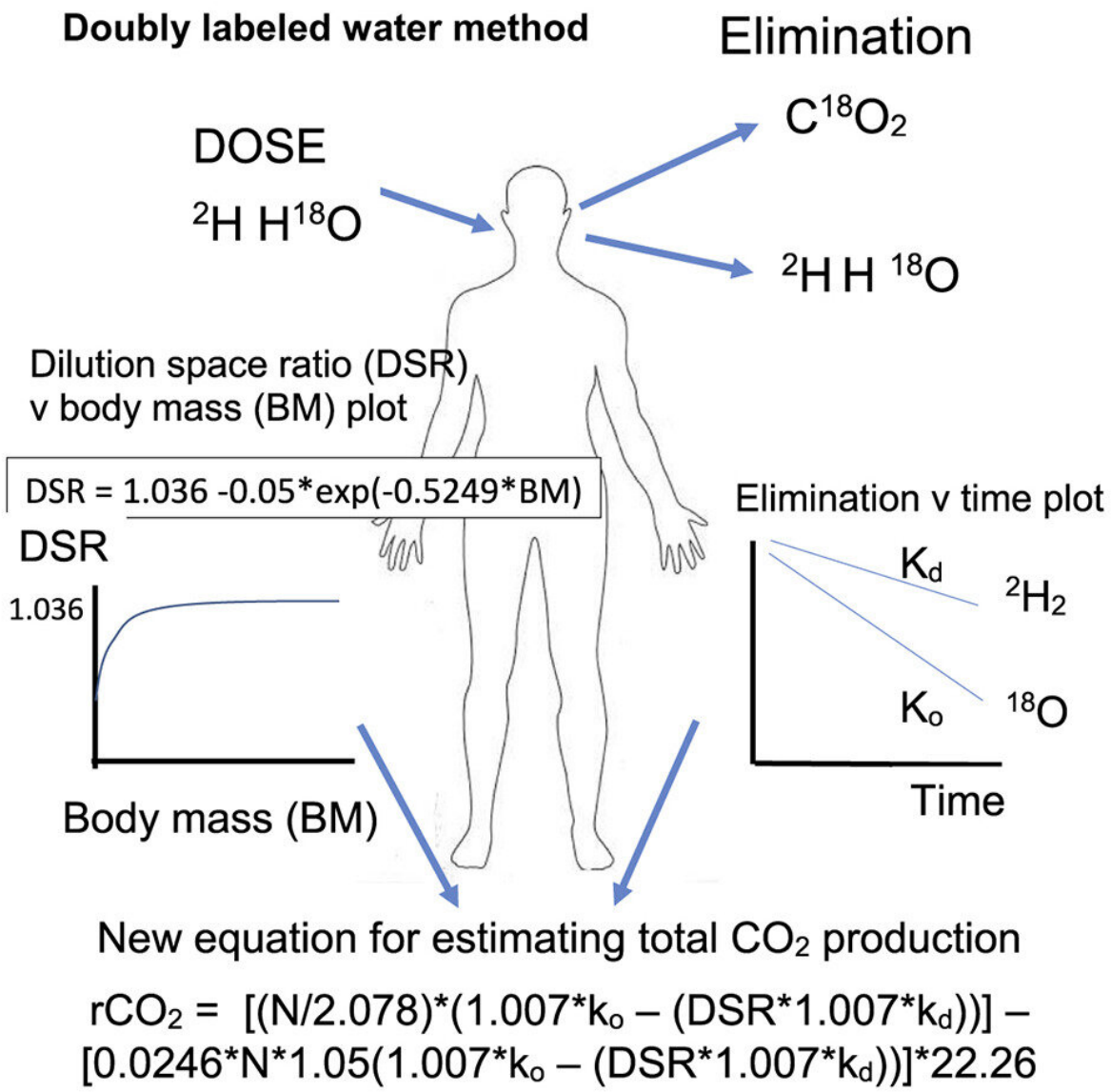

Graphical Abstract. Credit: *Cell Reports Medicine* (2021). DOI: 10.1016/j.xcrm.2021.100203

The doubly labeled water (DLW) method can be used to measure the energy expenditure of individuals. It is based on the differential elimination of oxygen and hydrogen isotopes. Individuals drink some dose water and then they can go about their daily lives. Periodic urine samples are taken to measure isotope washout rates.

Although this method is the gold standard for making free-living energy expenditure measurements, there is actually no consensus on the exact equations that should be used to convert the isotope measures into the final expenditure estimate.

Now a consortium of users led by Prof. John Speakman from the Shenzhen Institute of Advanced Technology (SIAT) of the Chinese Academy of Sciences has compiled a database of over 5500 measurements using the technique. These measurements were from the DLW database of the International Atomic Energy Agency (IAEA).

Using the raw data and the database consortium could recalculate all the measurements using one standard equation and then look at how far out the original measurements were to this standard. But the first problem was what equation to choose as standard?

To solve this problem, they used the database to derive a new equation which performed better than all the other available equations in published validation studies.

The new equation was then tested against all the original calculations. The result showed that in previous estimates, the average difference was

1-4%, but occasionally up to 20%. These differences could compromise making comparisons across studies.

"We have defined a new equation for use in all future DLW studies. This has allowed us to recalculate all the previous studies in the database to facilitate analyses of data combined across different studies, and to answer the big questions in energy balance and nutrition," said Prof. Speakman.

The study was published in *Cell Reports Medicine*.

More information: John R. Speakman et al. A standard calculation methodology for human doubly labeled water studies, *Cell Reports Medicine* (2021). DOI: 10.1016/j.xcrm.2021.100203

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