

# This Week's Citation Classic

**Matthews C M E.** The theory of tracer experiments with  $^{131}\text{I}$ -labelled plasma proteins. *Phys. Med. Biol.* 2:36-53, 1957. [National Institute for Medical Research, Mill Hill, London, England]

**The mathematical theory of Rescigno for exchange of tracer in a system of compartments is applied to the distribution of  $^{131}\text{I}$  labelled plasma proteins injected intravenously. A method is given for finding catabolic rate, extravascular protein mass and exchange rates between intra and extravascular compartments. [The *SCI*<sup>®</sup> indicates that this paper has been cited over 350 times since 1961.]**

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"This was the first paper I wrote in the field of biophysics. Cooperation between those trained in different disciplines is not easy, and physicists and biologists have very different points of view. To the physicist, the biologist seems to have an unscientific disregard for the mathematical exactitudes of the situation, whereas to the biologist the physicist seems unnecessarily fussy over trifles. However, in the end we managed to find a method which was sufficiently mathematically correct to satisfy me and also practical enough to satisfy my colleagues. I am grateful to these colleagues, especially A.S. McFarlane, S. Cohen, and A.H. Gordon, who helped me to express the mathematical equations in a form that was meaningful to biologists.

"Owing to the well worked out iodination method of McFarlane,<sup>1</sup> we were able to use labelled protein whose properties were the same as those of unlabelled protein, so that the mathematical analysis was not spoiled by initial elimination of a rapidly degraded component. I think this paper has been cited often because it establishes the basis of a method which has since been widely used.

"In research requiring knowledge of more than one discipline, it is not often that a single person can be found who has sufficient knowledge of all the different fields, and, as I have already said, cooperation between those from different disciplines is not easy. However, an attempt at cooperation seems well worthwhile as the bringing together of comparatively simple theory from different fields may lead to useful new ways of looking at the problem.

"I wrote this paper a few years after obtaining my PhD in physics, and at that time I had never done any systematic study of biology or physiology. I went into medical research as I wanted to make some useful positive contribution to human welfare. Since then my field of work has changed considerably. After working for about 13 years in the field of biophysics and publishing more than 50 papers, I then changed to the even more inexact social sciences and have been working on health education as a missionary in India for the past eight years. I feel now that this kind of work is much more important and needed, considering the actual health problems in most of the world today. But I still use mathematics, and I find my physics background and interest in research is useful. It helps me to use more scientific methods in my new field."

1. McFarlane A S. Labelling of plasma proteins with radioactive iodine. *Biochemical J.* 62:135-43, 1956.