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December 15, 1964

Robert A. Conard, M.D.  
 Brookhaven National Laboratory  
 Upton, Long Island, New York

Dear Bob,

I apologize for the long delay in sending you the data on the Marshall Island subjects. To avoid further delay I am enclosing rough drafts of a table and chart that summarize these data.

Total body water was determined with tritiated water (HTO) given by mouth and assayed in urine samples collected at intervals starting four hours after administration. Urine samples were lyophilized and tritium in the water portion counted in a Nuclear-Chicago liquid scintillation counter. Quenching was corrected by use of an internal standard and confirmed by the channel-ratio method.

Fat was estimated by the formula,  $\%fat = 100 - (\%TBW/0.72)$ , in which % TBW is total body water (in kg) as percent of gross weight. Lean body mass (LBM) was taken as the difference between gross weight and fat (kg).

There is nothing unusual in these subjects relative to total body water, fat, or lean body mass. There is no "normal" range for these quantities, but taking the subjects as a group, their average values are not very different from averages for Caucasian subjects from this area (San Francisco Bay region).

The red cell volumes, however, are decidedly smaller than what we and other investigators would consider normal. The average ml RCV per kg LBM for the Marshallese subjects is only 28.3. I would expect a value of about 35 ml/kg based on our studies.

In the enclosed chart, I have plotted blood volume (liters) and red cell volume (liters) against total body water (liters). You will note that all but one of the Marshallese subjects lies well below the regression lines that both Francis Moore and I have found for healthy Caucasian subjects. My data have not yet been published. Moore's data will be found in The Body Cell Mass and Its Supporting Environment, W.B. Saunders Co., Phil., 1963.

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There is no doubt in my mind but that the red cell volumes you found in the Marshallese are significantly smaller than what we have regarded as "normal". It is my impression that plasma volumes may also be slightly smaller but I will need a little more time to confirm this.

There is nothing more I can add at the moment except perhaps to note that the correlations between EV and TBW, and between RCV and TBW appear to be better than I have seen for data on other groups of subjects.

Please phone or write if you have any questions about the data or their interpretation.

Sincerely,

William E. Siri

Enclosures.  
Cc: Dr. L. Meyer  
WES:pb