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## Natural abundance of $^{13}\text{C}$ in serum retinol differentiates between dietary intake of C3 versus C4 plants

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Vitamin A is a micronutrient essential in vision, reproduction, immune function, and cellular differentiation. Provitamin A carotenoids are plant sources of vitamin A. The isotopic distribution of  $^{13}\text{C}$  and  $^{12}\text{C}$  in humans is determined by what foods are consumed. C3 plants, i.e., green vegetables, carrots, and pumpkins, have lower  $^{13}\text{C}:^{12}\text{C}$  than C4 staple crops, i.e., maize, sorghum, and millet. Vitamin A foods from corn-fed animals will reflect the  $^{13}\text{C}:^{12}\text{C}$  feed that the animals eat. The serum retinol  $^{13}\text{C}:^{12}\text{C}$  was previously evaluated as a biomarker for vegetable intake. The retinol  $^{13}\text{C}:^{12}\text{C}$  decreased in humans who increased their vegetable intake (range -26.21 to -31.57‰,  $P = 0.050$ ) and correlated with provitamin A carotenoid intake ( $P = 0.079$ ). The average  $\delta$  difference was -0.526 with increased vegetable intake, while control increased by +0.370. A 2X2X2 study in Mongolian gerbils fed white and orange maize or carrots for an extended period of time. Serum retinol  $\delta^{13}\text{C}\text{‰}$  differentiated between those consuming white maize and white carrots (-27.1±1.2  $\delta^{13}\text{C}\text{‰}$ ) from those consuming orange maize and white carrots (-21.6±1.4  $\delta^{13}\text{C}\text{‰}$ ,  $P < 0.0001$ ) and white maize and orange carrots (-30.6±0.7  $\delta^{13}\text{C}\text{‰}$ ,  $P < 0.0001$ ). This method was applied to Zambian children who had been fed either orange or white maize for two months. Those children who consumed orange maize had a lower  $\delta^{13}\text{C}\text{‰}$  (-26.64±1.98) than their white maize-consuming counterparts (-27.39±1.94) ( $P = 0.049$ ). In the application of this methodology to efficacy or effectiveness trials, it will be important to choose the appropriate control group and number of subjects for comparison analyses.

### Biography

Sherry A Tanumihardjo studies vitamin A and carotenoid metabolism, serves as director of the Undergraduate Certificate in Global Health, and teaches at undergraduate and graduate levels including international field experiences. She is on the Executive Board for the UW Global Health Institute. Tanumihardjo has more than 150 publications and chapters. She has presented at more than 250 domestic and international venues. She has served as a reviewer for many journals. Awards: WHO's Expert Advisory Panel, G. Malcolm Trout visiting scholar at Michigan State University, Ruth Pike Lectureship at Pennsylvania State University, Alex Malaspina ILSI Future Leader, Dannon Creative Leadership Institute, Endowed Chair and Vilas Associate at UW.

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