VITAMIN E AND RADIATION-INDUCED HAEMOLYSIS

MURRAY A. BROWN

Studies on vitamin E supplementation in relation to increased radiation resistance in laboratory animals have been documented (Haley 1954; Hoffer 1965; Konings 1979). However, because of the dose-reducing effect associated with a uniform distribution of protective agent throughout the tissues, these whole-body irradiation experiments do not provide information on the protective nature of vitamin E within particular membrane structures.

Eight normal human subjects were supplemented with 500 IU vitamin E per day for 16 d. Blood was collected by venepuncture into heparanised tubes and erythrocytes separated by centrifugation using seven washes of isotonic phosphate-buffered saline (pH 7.4). The cells were resuspended to 0.05 per cent Hct, transferred to glass tubes, aerated, and dosed with 500 Gy gamma radiation from a ^{60}Co source. Aliquots were then transferred to cuvettes and haemolysis was monitored spectrophotometrically at 700 nm. The point at which 50 per cent haemolysis occurred was recorded in minutes from the start of irradiation. Plasma and erythrocyte lipid extracts (Rose 1965) were assayed for vitamin E colourimetrically at 532 nm using bathophenanthroline and ferric chloride (AOAC 1980).

The following results were obtained before and after the 16 d supplementation period (Means $\pm$ SE are shown; n = 8; paired t-tests were used).

	Before	After	Significance
Plasma vitamin E (µg/ml)	13.12±0.92	19.82±2.31	p<0.01
Erythrocyte vitamin E (µg/ml)	1.99±0.22	4.56±0.73	p<0.01
50% Haemolysis time (min)	38.95±2.23	51.22±2.87	p<0.0005

It is concluded that supplementary vitamin E increases the level of vitamin E in plasma and in erythrocyte membranes and significantly increases the resistance of erythrocytes to radiation-induced haemolysis. The results suggest that the normal levels of vitamin E in body tissues may not necessarily be optimal levels.

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CSIRO Division of Food Research, Delhi Road, North Ryde, NSW 2113