

BODY OF REPORT

SEATO CRC Study No. 16 The Relationship between Vitamin A blood level and vision as tested by the Electroretinogram (ERG)¹

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S. E. Asia

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Objective: 1. To study the relationship between Vitamin A blood level and vision as tested by the Electroretinogram (ERG).

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2. To study the Vitamin A Nutrition in the subjects living in Ubol area.

Description: The electroretinogram (ERG) is a bioelectric potential generated by the retina in response to a short duration flash of light. It is a multi-component response, consisting of two major waves, the a-wave and the b-wave. Because the ERG may be considered a measure of the functional integrity of the retina, alterations in the a-wave and/or b-wave are used as diagnostic features.

As is well known, vitamin A is essential in the structural formation of rhodopsin, which in turn is involved in the photochemistry of rod vision. The studies of Dowling have clearly shown, in rats, that the ERG is significantly affected by reduced availability of this vitamin. In addition, to a decrease in the sensitivity of the eye to light (increased threshold), the a-wave of the ERG is also influenced. If the same response is obtained in human with vitamin A deficiency, the ERG can be used as a survey procedure for vitamin A nutrition. Of equal importance, it could be developed to determine, objectively, a person's capability of working effectively under low ambient illumination.

Progress: Ubol Province was chosen on the basis of: (1) low vitamin A intake and low serum vitamin A level from ICNND survey in 1960; (2) bladder stone project is on progress in Ubol area; and (3) maximum cooperation from the health officers and Ubol hospital doctors been obtained in the past.

Preliminary random survey was carried out in October 1964. Serum vitamin A and carotene level were determined in 76 subjects living in 2 villages (Kud-Peng and Sri-Kai) and Ubol city. Vitamin A level of less than 15 % (deficient range) is found in 20% of subjects living in the villages. None of the subjects from the city has vitamin A level less than 20 %. Results are shown in Table I.

Subjects were drawn from four villages: Kud-peng, Sri-Kai, Nong Hohn and Bantar Korpai. Additional subjects were drawn from students at the Ubol Teachers' Training School and enlisted men from the 6th Regimental Combat Army, Royal Thai Army. The distribution of the subjects according to age and sex is given in Table II.

The general procedure followed during the course of the study consisted of four parts: (1) a general physical examination with special emphasis on signs of deficiency diseases; (2) a fasting blood sample for vitamin A level (method of Carr and Price); (3) an ERG examination; and (4) an eye examination of the cornea lens, conjunctiva and fundus.

Follicular hyperkeratosis was found in one subject from Kud-Peng. None of the subjects showed any signs of vitamin A deficiency on the eye examination. Vitamin A determination on 173 serum samples has been completed. The ERG interpretation is being carried out by Dr. Genest in U.S.A.

Summary and Conclusions: The objective of this study is to determine the relat-

Table I

RESULTS OF THE PRELIMINARY SURVEY OF VITAMIN A BLOOD LEVELS

Vitamin A gamma %	Bon Kud-Peng		Bon Sri-Kai		Ubol City	
	Subjects	%	Subjects	%	Subjects	%
less than 10	0	0	0	0	0	0
less than 15	6	22	6	22	0	0
less than 20	3	11	8	28	0	0
greater than 20	18	67	14	50	21	100
Total:	27	100	24	100	21	100

Table II

SUMMARY OF AGE, SEX, DISTRIBUTION OF ALL SUBJECTED TESTED

Age	Sex		Total		Total		Total
	Male	Female	Male	Female	Age	Range	
5-10	10	12					22
11-15	12	4	22	16	16		38
16-20	5	20 ¹	27	36	25		63
21-25	44 ²	5	71	41	49		112
26-30	2	4	73	45	6		118
31-35	6	1	79	46	7		125
36-40	2	5	81	51	7		132
41-45	6	5	87	56	11		143
46-50	9		96	56	9		152
51-55	4	3	100	59	7		159
56-60	4	4	104	63	8		167
61 above	6	5	110	68	11		178 ³

1. Includes 18 subjects drawn from Ubol Teachers' Training School
2. Includes 38 enlisted men from the 6th Regimental Combat Team, Royal Thai Army
3. Includes the 7 subjects from whom no blood samples were obtained

ionship between serum vitamin A level and vision as tested by the Electroretinogram. (ERG) If correlation is obtained, ERG can be used as a survey procedure for vitamin A nutrition. ERG can be used as a survey procedure for vitamin A nutrition. Of equal importance, it could be developed to determine, objectively, a person's capability of working effectively under low ambient determination.

Three villages and city of Ubol chosen for the study which included general physical examination, eye examination and fasting blood for vitamin A determination. Total of 184 subjects were studied. ERG interpretation has not been completed. No conclusion can be drawn at present.

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