

3. Title: Evaluation of Iron Stores in RBC G-6-PD Deficiency.

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Objective - Iron loading has been described in a variety of hemolytic diseases including one case in a Caucasian male with complete absence of Red Blood Cell Glucose-6-Phosphate Dehydrogenase (G-6-PD). This study was undertaken to determine if iron loading was present in Thai subjects who similarly had complete absence of G-6-PD but who did not have hemolytic disease.

Description - Initially 98 students underwent blood testing to determine Hb., Hct., G-6-PD activity serum Fe and TIBC. In addition 10 male subjects who had previously been identified as having absent G-6-PD activity underwent serum Fe determinations.

In an attempt to quantitate iron stores in this group, 3 subjects with G-6-PD deficiency and 5 normal subjects from the same socio-economic group (Kasetsart University students) underwent more detailed studies. Bone marrow examination for stainable iron was performed in all and liver biopsy for stainable iron was performed in 6 subjects all of whom then underwent repeated phlebotomy until evidence of Fe deficiency was obtained. The iron removed by blood-letting was calculated and this combined with residual Fe as hemoglobin Fe as an estimate of total body Fe. Iron<sup>59</sup> absorption studies were then performed and Fe stores finally repeated.

Results: The results of the initial portion of the study can be seen in Table I:

	<u>Normal</u>		<u>Deficient</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
Hb. (gm/100ml)	14.5 ± .9(61)	12.8 ± .8(28)	14.5(14)	12.8(4)
G-6-PD (OD/gm) Hb/min	8.3 ± 2.3(58)	7.6 ± 2.3(28)	0(14)	2.2(4)
Fe (ug/100ml)	120 ± 20(62)	89 ± 17(28)	139 ± 33(14)	147(4)
TIBC (ug/100 ml)	353 ± 32(61)	357 ± 25(28)	—	—

The initial status of iron stores as evaluated by routine methods in the eight students who underwent repeated phlebotomy can be seen in Table II.

Subj.	RBC G-6-PD	Hb gm/100ml	Serum Fe ug/100ml	Liver biopsy iron	Bone marrow iron
Sum.	—	15.1	74	0	min
Sunt.	+	15.5	64	min	mod.
Suw.	+	13.7	137	*	mod.
Cha.	+	14.9	166	*	min-mod.
Kas.	+	13.5	62	min	mod. abund
Sunch.	+	15.5	188	0	mod.
Taw.	—	15.3	83	0	abund.
Pach.	—	13.1	147	0	min.

\* liver biopsy not performed.

The results of repeat phlebotomies are shown in Table III.

Subj.	Iron	Hb	Final	
	Removed (mg.)	Iron (mg.)	Total (mg.)	Serum Fe (ug/100ml)
Sum.	1123	1346	2469	22
Sunt.	1408	1928	3336	32
Suw.	1285	1354	2639	30
Cha.	1277	1576	2853	28
Kas.	1305	1646	2951	30
Sunch.	1335	1428	2763	26
Taw.	1054	1776	2830	82
Pach.	1035	1695	2730	37

At the conclusion of blood letting all patients showed hypochromic anemia on peripheral blood smear, hemoglobins had stabilized at 11-13 gms/100ml and reticulocytes were minimal for a period of one month. Iron absorption studies showed over 90% absorption of the tracer dose in all cases.

Discussion: No evidence of increased iron storage could be demonstrated in RBC G-6-PD deficient subjects when compared to control subjects.

Of interest, however was the finding of normal iron studies by Western standards in this group of Thai University students. A previous country-wide anemia survey had shown a marked prevalence of anemia and some reviewers had suggested that Western standards for anemia were not applicable to Thais. The present work shows, however that Hb, serum Fe and finally total body iron, when corrected for body mass, are equivalent to Western standards in this socio economic group.