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Hemoglobin J_{Korat} in Thais

Abstract. *Hemoglobin J_{Korat}, a "fast" hemoglobin with an anomaly in its beta chain different from the anomalies previously reported, was the major hemoglobin component in the blood of nine subjects among 1923 Thais from northeastern Thailand. After hemoglobin E, J_{Korat} is the second most frequent of the anomalous hemoglobins among Thais.*

A survey was made in 1962 among a group of normal Thai adults from northeastern Thailand to determine the distribution of haptoglobin types (*1*) and to compare it with the distribution of anomalous hemoglobins in the same population (*2*). Among 676 subjects tested, one individual had, in addition to the normal hemoglobin A, another exhibiting the increased anodal mobility characteristic of hemoglobin J (*3, 4*).

Subsequent studies among members of the individual's family who were living near Nakhornratchsima (Korat), in Korat province, northeastern Thailand, revealed an interesting group of individuals with the following combinations of hemoglobins: E, A+E, A+J, and J+E (*5*). Pending completion of our analytical studies, which should establish the exact nature of the structural anomaly, the "fast" hemoglobin from this family has been identified provisionally as J_{Korat} (*2, 5*).

A survey currently is in progress to determine the relative frequency of occurrence of J_{Korat} in northeastern Thailand. Preliminary results of the study suggest that heterozygotes for hemoglobin J_{Korat} are by no means rare.

Blood samples have been analyzed (*6*) from 1923 Thai adults; almost all the individuals originated from northeastern Thailand, and most of them are residents of Korat province. Hemolysates made from the blood clots (*7*) were analyzed electrophoretically by the vertical starch-gel method of Smithies (*8*); the tris-EDTA-borate buffer, pH 9, of Aronsson and Grönwall (*9*), at the lower concentrations described by Goldberg (*10*), was used in the analysis.

In contrast to the first survey, in which just one individual among 676 exhibited A+J hemoglobins, nine individuals, or 0.47 percent of the 1923 were heterozygous for hemoglobin J. Among these nine subjects, six had A+J hemoglobins, two had J+E, and one had J along with an unidentified "slow" hemoglobin with a mobility slightly faster than E and approximately equal to that of D. For all nine subjects, visual inspection of the starch gels indicated that the J component comprised more than 50 percent of the hemoglobin present. Blood samples from an additional 36 subjects among the 1923 studied showed evidence of a fast component apparently identical with J; however, we think additional blood samples from these subjects should be examined before a final decision is made concerning its identity.

The subjects do not represent a random population sample chosen specifically for a survey of abnormal hemoglobin incidence, nevertheless, they do provide a small sampling from northeastern Thailand. In almost all instances only one member of a family group is included. The size of the sample precludes reliable estimates concerning the incidence of J_{Korat} in various parts of northeastern Thailand; however, its occurrence in approximately 0.5 percent of the entire sample is noteworthy. Our results suggest that the incidence of hemoglobin J_{Korat} may be shown in future detailed studies to be appreciable in some portions of Thailand. It appears quite likely that, next to hemoglobin E, J_{Korat} is the most frequent anomalous hemoglobin among normal Thais. It also appears possible that considerable heterogeneity will be found within the Thai people with respect to the incidence of J_{Korat}.

The occurrence of particular anomalous hemoglobins in several ethnic groups may prove to be of some ethnological importance. Therefore it is of interest to compare the structural relationship of hemoglobin J_{Korat} with that of the J-type hemoglobins reported previously. Following Thorup's initial report of hemoglobin J in an American Negro (*3*), other reports have appeared concerning hemoglobin J in Negroes (*11–13*), European Caucasians (*14–16*), Algerians (*17*), Gujerati Indians (*18*), tribesmen from northwestern Pakistan (*19*), Indonesians (*20*), Chinese (*21*), and others of obviously mixed ancestry (*22*). Clearly, not all of the hemoglobins J are identical; some are alpha-chain anomalies and others are beta-chain anomalies (*11–16; 23*); two of them, $J_{Baltimore}$ and J_{Oxford}, have established structures. The structure for hemoglobin $J_{Baltimore}$, found in an American Negro family by Weatherall (*13*) and in an English Caucasian family by Holman *et al.* (*15*), was found by Baglioni and Weatherall (*12*) to be $\alpha_2{}^A\beta_2{}^{16Asp}$. The same structure was found independently by Holman *et al.* (*15*) in their English family. Hemoglobin $N_{New\ Haven\text{-}2}$, from a French Caucasian family (*24*), also has a structure identical with that of $J_{Baltimore}$. Liddell *et al.* (*16*) found that J_{Oxford} has an analogous replacement of glycine by aspartic acid at position 15 of the alpha chain: $\alpha_2{}^{15\ Asp}\beta_2{}^A$; the same structure was reported (*25*) for hemoglobin $I_{Interlaken}$.

Although its precise structural anomaly has not been established, hemoglobin J_{Korat} is different from both $J_{Baltimore}$ and J_{Oxford}; our preliminary work (*26*) indicates that the anomaly in J_{Korat} resides in the sequence encompassing positions 41 to 59 of the beta chain (tryptic peptide βTS_5), where an aspartic acid replaces either phenylalanine or glycine. The same region of the beta chain is also affected (*26*) in hemoglobin $J_{Meinung}$, a J hemoglobin found in a Hakkanese Chinese family in Taiwan (*27*).

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