Nomenclature of abnormal hemoglobins

In the course of the VIIIth International Congress of Hematology, September 1960, in Tokyo, Japan, 44 members met to discuss the nomenclature of the human hemoglobins. This field is expanding so rapidly that it is not possible even at an International Congress to obtain a full representation of all disciplines and groups of workers. The absence of several distinguished investigators in this field was acutely felt. Nevertheless the VIIIth International Congress of Hematology was considered the best possible occasion for such a gathering. The following recommendations are being sent to appropriate journals so that any of the distinguished investigators not present will be able to criticize them in public.

1. The recommendations on nomenclature made at the Symposium on Abnormal Hemoglobins in Istanbul, 1958, and published in 1959 (1), are endorsed and the letters A-N (with the exception of B), and S are recognized as naming hemoglobins as there defined. The description of the variants of hemoglobin M as M\(\alpha\), M\(\xi\), M\(\gamma\) (from Boston, Milwaukee and Saskatoon respectively) is accepted (2, 3), and it is suggested that new hemoglobins M are described with fully subscripted names until they have been shown to differ from these three when they should be given subscript initials (M\(\iota\)wate\(\alpha\) possibly later Mi).

The letters 0, P and Q are being allotted to the hemoglobins described under these letters (4, 5, 6).

Until the next meeting of the International Congress the letters R-Z (excepting S) should not be allotted to new abnormal hemoglobins but these should be given names of localities. It should be left to the individual workers to choose the most meaningful name from the origin of the propositus, or the laboratory, hospital, town or district where the hemoglobin was found. A new name should not be allotted in this way unless it has been ascertained that the hemoglobin to be named is different from all those adequately described in the literature.

Of the two designations of the hemoglobin A2 variant: A2 and B2 (7), the first is found more acceptable. If a third variant should be found it should be named A2 and not C2.

The names of the three known peptide chains of human hemoglobin are \(\alpha\), \(\beta\), and \(\gamma\) (8), and it is suggested that the normal chains should be designated in that way (i.e. not \(\alpha\) or \(\alpha', \beta'\) and \(\gamma'\)). The genetic superscript for the normal gene product + (\(\alpha, \beta, \gamma\)) will not be used as it implies to the chemist a positive charge.

The expressions \(\beta_i\) for H and \(\gamma_4\) for Bart’s may be used when their identity is fully accepted. However, until the next meeting of the International Congress the traditional names should be mentioned at least once in each publication.

The present custom to describe an abnormal chain by adding the name of the appropriate abnormal hemoglobin in superscript should be maintained (\(S = c/\alpha'\) Hopkins-2 = \(\alpha_2\) Hopkins-282).

A polypeptide chain should not be designated with a new small Greek letter (such as \(\delta\), \(\epsilon\), etc.) until chemical evidence for complete separate identity from the \(\alpha\), \(\beta\) and \(\gamma\) chains (such as exists between these chains themselves) has been established, genetic differences notwithstanding.
10. It is expected that the analysis of the aminoacid sequences in the globin molecule will eventually be followed by a precise chemical nomenclature. Meanwhile if a hemoglobin has been identified by the usual methods of electrophoresis, chromatography, spectroscopy, alkali denaturation, cold denaturation, and solubility tests, it should be described by the accepted capital letter as hitherto: (S, C, D, G, E, etc.) as recommended by the Working Party meeting at the VIth International Congress, Boston, 1956 (9). If comparison has been made on the same lines and with the same completeness with a hemoglobin carrying the name of a locality that name should be applied. If the abnormal chain is identified this should be indicated by a subscript; (for example: Dα, D/j) and until the full identity by examining the aminoacid sequences has been established this subscript should be followed by a declaration of origin (Oß Los Angeles* Gez Ibadan)- This implies that Oy will have to be renamed Oß Punjab- If two or more of such hemoglobins are then found identical by analysis of the aminoacid sequences, only the name of the hemoglobin which was first discovered and fully defined by the conventional methods should be retained. For example if G-albadan and GaAzuakoli are found to be identical regardless of which the aminoacid sequence has been fully examined first Galbadan should be the remaining name. However, until the next meeting of the International Congress the alternative names should be mentioned at least once in each publication.

No generally acceptable name was agreed upon for the familial condition in which hemoglobin F persists into adult age without morphological changes of the red cells and without anemia. The term non-microcythemic thalassemia was considered not specific enough as it might equally apply to the familial condition where hemoglobin A2 is raised without associated morphological changes. If the expression “high F gene” is used this should be done with reservation and only provisionally until further knowledge allows better terminology.

If several hemoglobins are present the phenotype should be designated by listing the hemoglobins in order of decreasing concentration regardless of genetical considerations (sickle-cell trait = AS, sickle-cell anemia = SF, sickle-cell thalassemia = SAF, or SFA, etc.)

REFERENCES