The non-deletion type of α thalassaemia/mental retardation: a recognisable dysmorphic syndrome with X linked inheritance

The association of α thalassaemia and mental retardation (ATR), originally described in 1981, was further analysed in two papers published last year. Of 13 subjects ascertained because of their haematological abnormality, eight had deletions involving the tip of chromosome 16p, where the α globin genes lie ('deletion' cases); in the remaining five, the α globin genes appeared intact ('non-deletion' cases). Whereas the clinical features of the deletion cases were rather variable, the non-deletion cases showed a strikingly uniform phenotype comprising severe mental handicap, characteristic dysmorphic facies, genital abnormalities, and an unusual, mild form of haemoglobin H (Hb H) disease (a manifestation of α thalassaemia). It was proposed that the non-deletion cases represented a distinct syndrome that probably mapped to the X chromosome; however, in the absence of pedigrees containing multiple affected cases, the evidence for this was circumstantial. Two recent papers in this Journal lend support to the conclusions of Wilkie et al and extend the delineation of the non-deletion ATR syndrome.

Harvey et al described a severely retarded 21 year old male with similar haematological and dysmorphic features to the previous cases and a normal α globin genotype. A male sib who was severely retarded and said to have had a similar physical appearance had died some years previously. As pointed out by the authors, this was the first description of two affected males in a sibship and is compatible with X linked inheritance.

Nearly simultaneous with the publication of Wilkie et al, Porteous and Burn described a 6 year old boy with an unknown retardation syndrome comprising dysmorphic facies, microcephaly, hypotonia, and small genitalia; his dead maternal uncle had shown similar clinical features, leading the authors to propose that this syndrome might be X linked. The striking similarity of their case to the non-deletion ATR syndrome prompted further haematological and molecular evaluation of the proband at the age of 7 years 3 months. The results were: haemoglobin (Hb) 10.3 g/dl, red cell count 4.55 × 10^12/l, mean cell volume 73 fl, mean cell haemoglobin 23 pg, Hb electrophoresis, 2.7% Hb H; 14% of red cells contained Hb H inclusions after incubation with 1% brilliant cresyl blue, and the α globin genotype was αα/αα. These results prove that this boy has the non-deletion ATR syndrome; his uncle had been anaemic throughout life and had been treated with iron supplements, so it seems likely that he had the same condition. The boy's parents had normal haematological features.

Porteous and Burn suggested that their case resembled two brothers previously thought to have an atypical form of the Coffin-Lowry syndrome and illustrated in Smith's recognizable patterns of human malformation. Haematological evaluation of the surviving brother shows that he too has non-deletion ATR; a male cousin (his mother's sister's son), also mentally retarded, has the same condition. A fuller description of this family will appear in the next issue of the Journal.

This recent work lends weight to the conclusions of Wilkie et al in two respects. First, the non-deletion ATR syndrome shows a pattern of dysmorphic facial features and associated clinical abnormalities that is sufficiently characteristic to identify potential new cases; the diagnosis is then best confirmed by showing the presence of Hb H inclusions in the red cells. Second, the absence of male-to-male transmission in the three new pedigrees (comprising seven affected cases, all male) greatly strengthens the evidence that the non-deletion ATR syndrome is X linked. Accordingly, we propose that this syndrome is henceforth termed 'X linked α thalassaemia/mental retardation' (ATR-X), to distinguish it from the separate syndrome associated with deletion of the α globin complex on chromosome 16 (ATR-16).

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