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Developmental Genetics of Red Cell Indices During Puberty: A Longitudinal Twin Study

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KEY WORDS Haemoglobin; red cell count; mean corpuscular volume; twins; genetics.

ABSTRACT Red cell number and size increase during puberty, particularly in males. The aim of the present study was to determine whether expression of genes affecting red cell indices varied with age and sex. Haemoglobin, red cell count, and mean cellular volume were measured longitudinally on 578 pairs of twins at twelve, fourteen and sixteen years of age. Data were analysed using a structural equation modeling approach, in which a variety of univariate and longitudinal simplex models were fitted to the data. Significant heritability was demonstrated for all variables across all ages. The genes involved did not differ between the sexes, although there was evidence for sex limitation in the case of haemoglobin at age twelve. Longitudinal analyses indicated that new genes affecting red cell indices were expressed at different stages of puberty. Some of these genes affected the different red cell indices pleiotropically, while others had effects specific to one variable only.

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