THE INHERITANCE OF ALLERGIC DISEASE*

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Preliminary Report

There seems to be no unanimity of opinion as to the mode of transmission of allergic disease. According to Cooke and Vander Veer (1) and Spain and Cooke (2), allergy is transmitted as a simple Mendelian dominant. In direct contrast, Adkinson (3) maintains that her findings favor a recessive mechanism. Furthermore, Richards and Balyeat (4) suggest that the condition is inherited as a "partial dominant."

An analysis of our own (5, 6) family studies (66 complete families with 250 children), as well as data already published, failed to support either the simple dominant or recessive theory. The dominant theory does not explain why in more than half of the pedigrees both parents are normal. The recessive theory is refuted by the existence of pedigrees in which both parents are affected, yet some of the children are normal.

The author presents for consideration a new theory of heredity of allergic disease. Under this theory, allergic disease is transmitted by means of a single pair of allelomorphic genes, *H* and *h*, where *h* determines allergy, and *H* is the contrasting normal gene. Three different genotypes are possible.

(1) Genotype *HH*—pure normal.

(2) Genotype *hh*—pure allergic. In individuals of this genotype, symptoms of allergic disease appear before the age of ten years.

(3) Genotype *Hh*—The majority of these individuals remain apparently normal throughout life, though they transmit the abnormal gene *h*. Depending upon environmental conditions, a certain proportion will develop allergic disease, but the symptoms do not appear until after puberty.

The existence of two sorts of allergic individuals is supported by their bimodal distribution when classified according to age of onset. Moreover, statistical analysis of the authors' own findings (5) in family studies and data previously published

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lends additional support to the theory. One finding that remains to be explained is the excess of males over females among those developing allergic disease before puberty.

In 55 of the families studied by the author, the simultaneous heredity of the allergic disease, the blood groups, MN-types, and eye color were presented. Statistical analysis failed to reveal any evidence of linkage among the genes determining these traits (6).

LITERATURE CITED

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