

What Chromosomes Do

Genetics

EDGAR ALTENBERG in *How We Inherit* (Holt):

Belief in the inheritance of acquired characters rests on an old conception of heredity in accordance with which the reproductive cells were the products of particles that came from the various parts of the body and that were transmitted through the blood stream. It was supposed that there were particles of a particular kind each from the muscles, nerves, etc. The reproductive cells were conceived of as a sort of little house of representatives. If for example the muscles of a person had been well developed by exercise the muscle particles would on this view be well represented in the reproductive cells and the offspring would be born with better muscular development than if the parent had not developed his muscles. In brief, the material from which the next generation developed, the germ plasm, was regarded as a product of the body (the soma).

According to the more modern view of heredity, the chromosomes and the genes contained within them are the material basis of inheritance and constitute the germ plasm. The chromosomes are contained within all cells of the body including the reproductive organs. They originate in just one way: by the growth and division of pre-existing chromosomes, a process which takes place when a cell divides and forms new cells. All the chromosomes of the body are descended in this way from those of the fertilized egg, the cell with which the

individual begins his development. The chromosomes of the fertilized egg, in turn, are derived from the reproductive cells that produced it, the egg of the mother, and the sperm cell of the father.

The fact that the chromosomes are the material basis of heredity makes an inheritance of acquired characters practically impossible. The hereditary particles (the genes) are not built up in each generation by the body and sent to the reproductive cells, as the older concept had it, but they are continuous with each other from one generation to the next through the processes of heredity and reproduction. By heredity, they are transmitted to us from our parents; by growth and reproduction they increase in numbers and populate all the cells of our body as we develop. The most peculiar thing about a gene is that it can reproduce. It can make two genes, each exactly like itself, through the process of growth and division. It does not as a rule change from one generation to the next.

"But," you may object, "surely the genes are not little gods, totally unmindful of their surroundings and free from all outside influences." Your objection is well taken, but it by no means follows that the character of the genes is constantly changing in direct response to bodily changes. A gene is dependent upon the body for just one thing: for its nourishment and other conditions necessary for its growth. If these conditions are not right the gene simply

dies as a rule; it rarely changes its nature. When it does, we have a mutation.

Unless there were something which maintained its identity from one generation to the next, there could be no human race nor any other distinctive form of life. We resemble our parents because we have the same kind of genes as they. We come to have them through inheritance.

There is another matter that must be considered in this connection, concerning what it is that we inherit. We do not really inherit from our parents their blue eyes, their skin color, or any other body characteristics. None of these things are contained in the fertilized egg. What we really inherit are genes. *We do not inherit traits; they develop.* Under a given set of outside conditions, the traits which develop are determined by the genes. Change the environment and you change possibly the course of development and so produce an acquired trait as when you go to the tropics and get a tanned skin. But you do not necessarily change the nature of the genes themselves. With a return to normal conditions development is again of the usual type because the genes have maintained their identity during the interval. In brief, traits are an offshoot, so to speak, of the germ plasm in each generation. They do not make the germ plasm. Acquired traits in particular are not inherited, because traits in general are not.

Science News-Letter, June 16, 1928

Medical Meeting—Continued

children's diseases that has been increasingly prevalent during the last decade, the use of this serum may save many lives and much misery.

Liver Fad May Harm Well

The fad of liver eating which has sent the price of this poor man's beefsteak up to eighty cents a pound may do harm to healthy individuals and deprive those pernicious anemia sufferers of this life-saving meat which they really need, the association was warned in a program devoted to the latest reports upon the conquest of this hitherto hopeless disease. Dr. William S. Middleton, of Madison, Wis., reported that other types of

anemia do not respond to the specific element in liver, although the Minot-Murphy diet, which includes liver, has been generally successful in treating secondary anemia.

Additional proof of the efficacy of liver in the treatment of pernicious anemia was presented in a paper by Dr. James H. Means and Dr. Wyman Richardson, of Boston. In reviewing the treatment of this disease, Dr. Means made a suggestion as to its nature. It may be the result of a diet deficiency rather than a poison or infection. The fact that many people live on insufficient diets without serious trouble, and the discovery of a successful cure of pernicious

anemia by means of predigested foods indicate that the primary cause may be a gastric defect.

3,000,000 Children Deaf

Three million school children are deaf and in need of systematic treatment, Dr. E. P. Fowler and Dr. H. Fletcher, of New York, declared. Tests of 1,171 children, covering a period of two years, revealed that 4.9 per cent. were seriously deafened.

The tests were made with an audiometer and five receiver holders, making it possible to test forty children at one time. All children who were found to be below standard were retested at least once.

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