CHROMOSOMES AT WORK IN HEREDITY

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Chromosomes develop their genetical activities working as wholes. Suppose a chromosome of **Drosophila** which has specifical genetical functions to perform in the eyes, and the wings. As well known, each cell of the developing organism receives a copy of all the chromosomes present in the egg. Experimental works carried out on Amphibian larvae have shown that any cell under a certain age, that is, before determination takes place in the embryonic area it belongs to, is capable of giving origin to any kind of specialized elements like epithel, muscle, or nerve cells, depending upon the place to which it is brought for further development. Later, when the cell becomes determined, it acquires the property of giving origin to an unique type of differentiated cells, say, only to nerve or to muscle cells.

Determination as well as differentiation affects the cells as wholes, that means, as systems, and therefore modifies all their organs. Cytoplasm and nucleus are correspondingly transformed, so that chromosomes in nerve cell are different from chromosomes in muscle cell. From such embryological evidences we conclude that, contrarily to what Genetics uses to state, chromosomes do not be **always the same** anywhere in the body. Even when the chromosomes of different cell types cannot be distinguished morphologically, they certainly are different in consequence of the peculiar process each kind of cell has passed through during determination and differentiation.

Coming back to **Drosophila** chromosomes, we wish to make the following discussion : when still in the egg a given chromosome is potentially endowed with the faculty of cooperating in the genetical characterization of for instance the eyes and the wings. Since the cells in the imaginal discs producing eyes or wings are irrevocably determined to be eye or wing cells respectively, the copy of that egg chromosome, now in the imaginal discs, determinaned by its turn to be eye chromosome or wing chromosome, develops only one of the functions it had in potentiality when still in the egg. Thus, the particular chromosome referred to above, when in the eye tissue develops, as a whole, its "eye function"; when in the wing tissue, its "wing function".

This way of thinking, if followed in the early Mendelian days, undoubtedly would avoid the elaboration of a theory, like the bead-on-string theory of the corpuscular genes, since, as we now know, the same chromosome, by means of different copies, may develop several distinct genetical activities without being divided into a corresponding number of distinct parts.