

He further maintained that these granules could come only by division of pre-existing granules. He parodied Virchow's famous phrase *omnis cellula e cellula* into *omne granulum e granulo*.

The fibrillar theory presupposes net-work or clusters of fibrils known as "spongio-plasm" (sponge plasm) in contra-distinction to clear or structureless matter filling in the meshes of the net to which the name "hyaloplasm (glass plasm) has been given.

In the Alveolar Theory of Butschli the author regards the so-called granules as products manufactured by the hyaline protoplasm and stored up as spherules so that the protoplasm between the droplets form an alveolar partition—hence the name of the theory.

Discussing the question as to the fluidity of protoplasm Starling regards it as "essentially fluid in character, the form and rigidity which are acquired by most cells being due to chemical and physical differentiation occurring in its fluids."

The cell consists of cytoplasm and nucleus. Cytoplasm (cell plasm) is a term formulated by Kolliker in 1863. Though not so applied when first used, it has come to mean the living substance of the cell body other than the nucleus. Cytoplasm contains, for the most part, substances apparently foreign to the cell proper. In the cytoplasm of plant cells, for example, are stored up starches and oils. Most nerve cells contain various shaped bodies which, it is alleged, represent stored up energy. The passive bodies in the cytoplasm are supposed to represent some form of latent energy upon which the cell may draw. In the cells of any green leaf are to be found spherical masses which play a most important role in the lives of not only plants but of animals as well. By the action of the sun's rays a chemical change takes place in these bodies known to botanists as chloroplasts by which carbondioxide and water are broken down, decomposed and immediately synthetized into a different substance—carbohydrate, starch, which will respond to the well known iodine test for starch. Carbohydrate is one of the food principles. Fats are also made and stored in the form of oils. In spite of the fact that the atmospheric air surrounding the plant contains an abundance of free nitrogen. The plant cells are unable to make use of it. Nitrogen must be first combined as a nitrate, become dissolved in the soil and taken up by the roots of the plants, or in the case of water plants, by special cells, before the green matter in the leaf can be transformed into protein. The plant, therefore, has power to make foods out of the chemical elements of air and water when these elements are properly combined. This is the only source of food of both plant and animal and it is the result of cellular activity.

The Nucleus: The nucleus has been recognized as a most essential part of the cell. It not only takes part in the complex process of cell division but dominates the rest of the cell. It is not my purpose to enter upon a discussion of the morphology and physiology of the animal and vegetable cell, further than it is necessary to trace the various stages of the history of its revelation from its earliest recognition to the present. The reader is referred to the numerous excellent text books on the subject.