

2. **Vegetative Activity.**—Cells in the process of active growth present certain well-marked characters. The nuclei are large, round or oval, staining deeply; paraplastic granules are not prominent; the cell body is round or oval. Cells of this character are prone to reproductive activity and have been called **embryonic** cells. The name is not a good one, because such cells occur at all life periods, and a better term for them is **vegetative** cells.

3. **Functional Activity.**—Cells in functional activity show signs of differentiation according to their specific function; in muscle or nerve cells the cytoplasm is highly elaborated; in gland cells, there are paraplastic deposits, in the form of granules or globules; the nuclei are not large, and their staining differs according to the stage of cell activity.

4. **Hyperactivity within the Limits of the Reserve Force of the Cell.**—When increased stimulation is accompanied by adequate nutrition, the functional activity of the cell is, to a certain extent, accompanied by growth, and this constitutes **hypertrophy**.

5. **Excessive Functional Activity.**—When the cell work is extreme, the energy used up exceeds the supply from the food, the paraplastic material disappears, the protoplasm is dissociated, and if the stimulus be continued the cell is exhausted; the nucleus stains poorly; the cytoplasm in the case of cells like those of the kidney tubules may be disintegrated and partly discharged; or there may be abnormal deposits in the meshes of the cytoplasm; or the cytoplasm may become oedematous and vacuolated.

## CELL MULTIPLICATION

Increase in size of the individual is brought about in two ways: by enlargement of the individual cells, and by intercalation of new cells. We speak of increase in size of the individual as growth, whether it arise from one or the other of these processes, but it is necessary to remember that cell multiplication and cell growth are not synonymous terms. Cell multiplication is of two main types—direct, or **amitotic** and indirect, **mitotic** or **karyokinetic**.

**Direct Division; Amitosis.**—This is the rarer form of the two, and may be said to occur not at all in the *development* of the mammalian *body*, but in fully developed adult tissues it does occur, and is particularly frequent in cells that are multinucleate. In leukocytes and endothelial cells it occurs, and is the rule in the syncytium of the mammalian embryo, and in the rapidly growing envelopes of the embryo. In the last named, it will be noted that the tissue is but a temporary one. There seems to be a certain amount of truth in the statement that cells which exhibit amitosis are on the way to degeneration. As far as the leukocytes are concerned, in lymph nodes where cells are being continually produced mitosis is seen, and it is only in the blood