

direct influence of environment, or through the principle of "Use and Disuse". Here he endeavored to show that variations originate in the body cells, and are transferred to the germ cells. For instance, he showed that the development of certain organs resulted in their enlarged growth, as well as in their increased vigor, while failure to use them was followed by degeneration with their probable final disappearance. Throughout the influence of the body plasm or somatoplasm upon the germinal substance, new characters were transmitted and variations resulted. Darwin, who in 1859, published his "Origin of Species" took into consideration these numerous variations, but made little or no attempt to account for them, and hence attributed numbers of them to "chance". He accepted the theory of Lamarck in a great many details.

Weismann, in 1893, affirmed that variation was a matter determined in the germinal material itself, in his theory known as the "Continuity of the Germplasm." He stated that the germinal substance is distinct from the body plasm, and hence is not subject to extrinsic influence. It is the one immortal thing in Nature, and the body plasm serves only as a natural protection or shield. The body plasm is a derivative of the germplasm, hence the continuous germinal substance produces not only a new organism but also the subsequent germinal material. To account for adaptive variations he formulated two hypotheses: (1) for the origin of inherited variation similar to that which environment produces in the body he invented the hypothesis of parallel modification of germplasm and somatoplasm; (2) for the "apparent" inheritance of use and disuse, the hypothesis of germinal selection. By this, he meant that the various determiners which compose the germplasm are competing with each other in a struggle for nourishment. Sometimes one determiner prevails, sometimes another. The determiners which are supplied with the most food grow largest, and give rise to characters of a corresponding sort upon the development of the body. Thus there are perpetual variations in the organs and tissues in the body, and thru natural selection an *apparent* inheritance of use and disuse results.