

Follicle growth and differentiation -1

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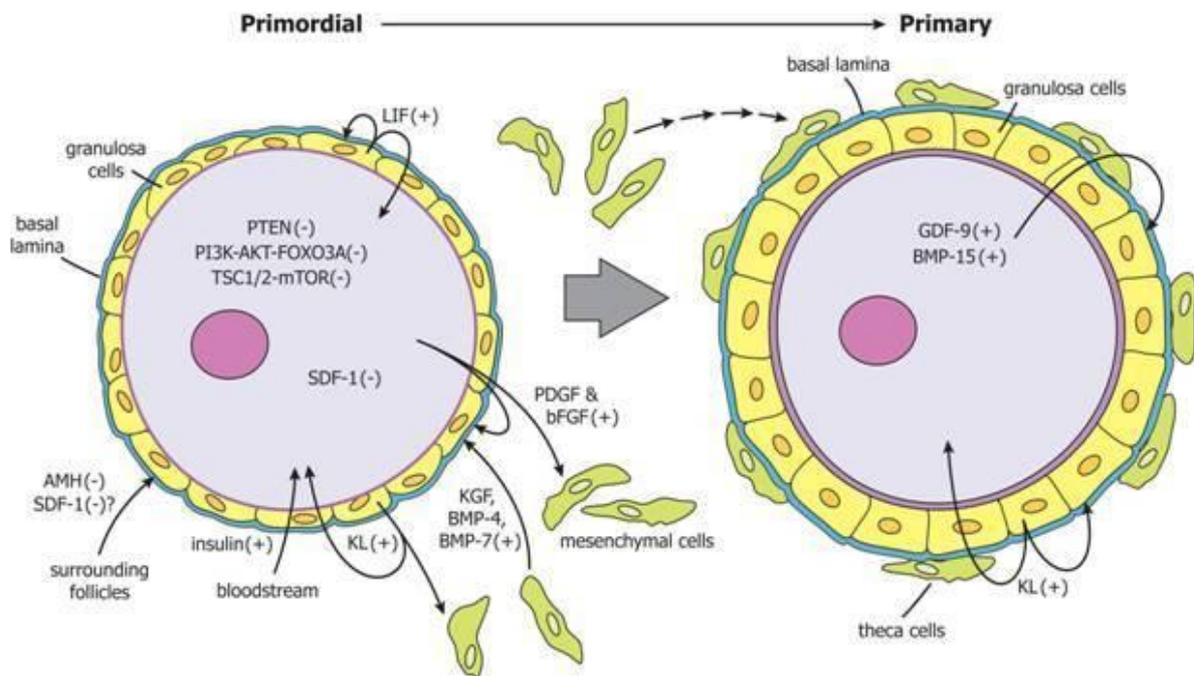
Follicle growth and differentiation begins with the recruitment of a primordial follicle into the pool of growing follicles and ends with either ovulation or death by atresia. In women, folliculogenesis is a very long process, requiring almost one year for a primordial follicle to grow and develop to the ovulatory stage. Folliculogenesis can be divided into two phases. The first phase, termed the preantral or gonadotropin-independent phase, is characterized by the growth and differentiation of the oocyte. The second, termed the antral or gonadotropin-dependent phase, is characterized by the tremendous increase of the size of the follicle itself (up to approximately 25-30 mm). The preantral phase is controlled mainly by locally produced growth factors through autocrine/paracrine mechanisms. The second phase is regulated by FSH and LH as well as by growth factors. The process of folliculogenesis occurs within the cortex of ovary. cell proliferation and cytodifferentiation includes four major developmental events: 1) primordial follicle recruitment; 2) preantral follicle development; 3) selection and growth of the antral follicle; and 4) follicle atresia of the ovary.

The Primordial-to-Primary Follicle Transition

Primordial follicles are considered the fundamental reproductive units of the ovary because they give rise to all dominant follicles, and therefore to all menstrual cycles. The entry of an arrested primordial follicle into the pool of growing follicles is termed recruitment or primordial follicle activation.

Some primordial follicles are recruited to grow soon after their formation in the fetus. A change in shape from squamous to cuboidal, and the acquisition of mitotic potential in the granulosa cell. Paracrine communication between the oocyte, its associated granulosa cells, adjacent thecal/interstitial cells, and the

surrounding follicles all combine to control primordial follicle recruitment.

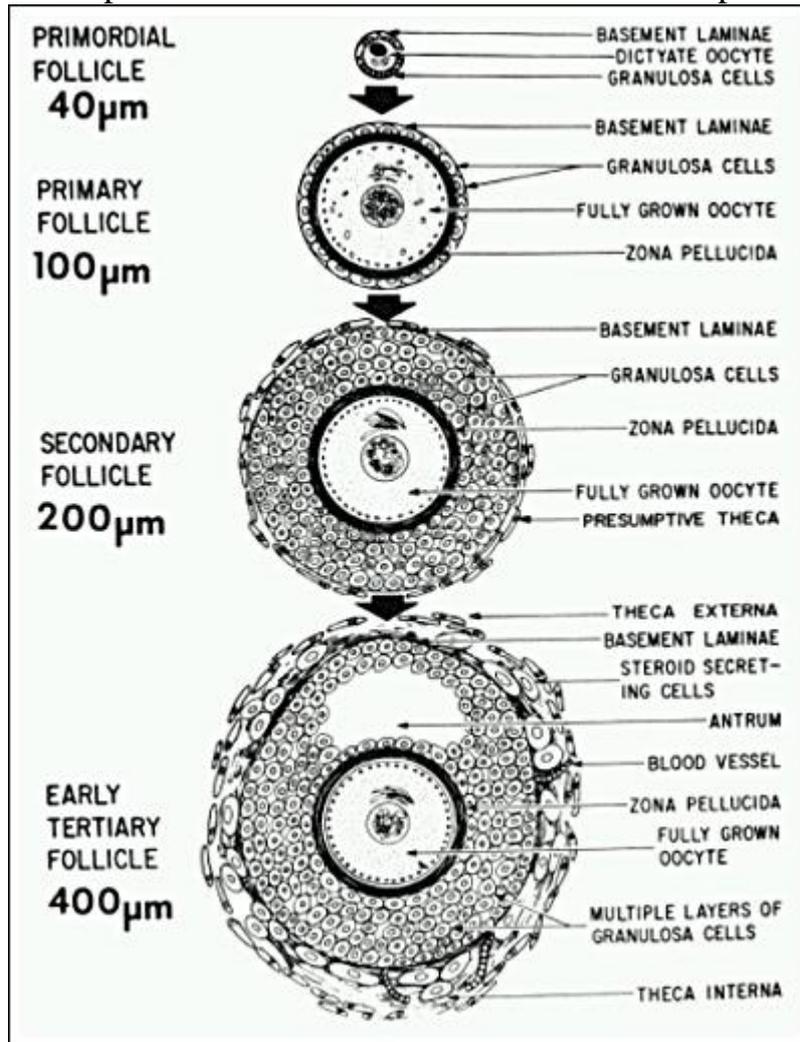


Regulation of primordial follicle activation. Primordial follicle activation is driven by the collective actions of primordial follicles themselves, surrounding mesenchymal cells, surrounding follicles, and endocrine factors. Many oocyte and granulosa cell proteins have now been identified as critical for primordial follicle survival and recruitment. Oocyte-specific proteins include spermatogenesis and oogenesis specific basic helix-loop-helix 1 (Sohlh1), Sohlh2, and FIGLA, which are helix-loop-helix transcription factors that appear to promote primordial follicle survival and activation by regulating expression of critical downstream genes. The endocrine system may also modulate primordial follicle activation.

The Primary Follicle

A primary follicle is defined by the presence of one or more cuboidal granulosa cells that are arranged in a single layer surrounding the oocyte . The major

developmental events that occur in the primary follicle include FSH



receptor.