FEATURES

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ROS and RNS in the Cell Cycle

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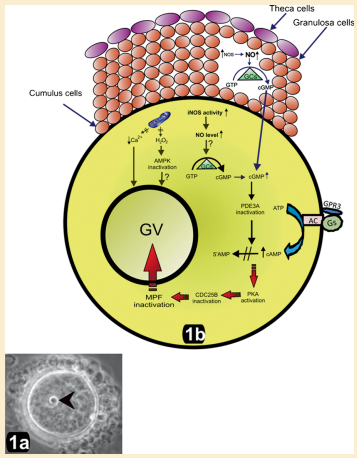
In this review article, the authors discuss the beneficial roles of ROS and RNS during meiotic resumption from diplotene-arrest in mammalian oocytes. Takami et al., (1999) reported that antioxidants reversibly inhibit meiotic resumption from diplotene arrest that led Pandey et al to hypothesize that the generation of a tonic level of ROS could be beneficial for meiotic resumption. Subsequent studies were conducted to test this hypothesis. The authors compiled the studies and updated information on follicular production of ROS and RNS and their roles on meiotic resumption from diplotene-arrest. In this review article, sources of ROS and RNS production inside the follicular microenvironment and their beneficial effect on meiotic resumption from diplotene-arrest are described. The authors propose possible mechanisms of ROS and RNS action during meiotic resumption from diplotene-arrest in mammalian oocytes. Although Pandey et al have updated the possible mechanism of meiotic resumption from diplotene arrest, further studies in this area may yield important new insights about the beneficial roles of ROS and RNS and their mechanisms regulating meiotic cell cycle in mammalian oocytes.



Embryonic Stem Cell Neurogenesis

Noélle Germain, Erin Banda, and Laura Grabel

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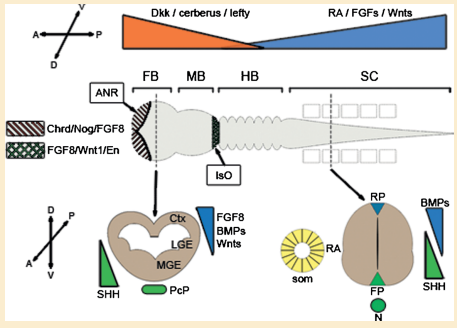
When designing protocols to promote neural differentiation of embryonic stem cells (ESCs), the mantra has been "look to the embryo". By mimicking the cell interactions and using the signaling molecules that direct neurogenesis and pattern formation in the neural tube during development, one can obtain the desired ESC-derived neural progenitors or neurons. Interestingly, differentiating ESC cultures form two- and three-dimensional structures that are reminiscent of the embryo, exhibiting similar cell interactions and undergoing patterning events and morphogenesis as in vivo. Germain et al. review these data and suggest that we can study ESC neurogenesis as a means to understanding neural specification during development, flipping around the conventional paradigm.



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