Embryological Development of Tissues: the Placenta, Embryo, and Fetus

Embryogenesis occurs during the second week of development, at the same time that implantation is occurring. Embryogenesis is the differentiation of the inner cell mass (Figure 15.14F in your text) into three distinct layers: the ectoderm, the mesoderm, and the endoderm.

Embryogenesis begins with formation of a gap between the inner cell mass and the underlying trophoblast cells. The inner cell mass assumes a disk-like shape, forming at first into two layers. The layer closer to the uterine wall is called the *ectoderm*, while the layer closer to the lumen of the uterus is called the *endoderm*.

The disk elongates to become oval-shaped, and a central groove, called the *primitive streak*, with two flanking ridges, forms along the long axis of the ectoderm. Further cell division and migration result in the formation of a middle layer of cells, the *mesoderm*, between the ectoderm and the endoderm. These three layers are called *germ layers*. Embryogenesis is complete by the end of the second week of development.

The three germ layers differentiate into the major tissue types, which you learned about in chapter 2. Epithelial tissue receives contributions from all three germ layers. The epidermis (the outer layer of the skin), for example, is derived from the ectoderm. The epithelial cells that line the alimentary canal are derived from the endoderm. The epithelium of the uterus is derived from the mesoderm.

Connective tissue is derived from the mesoderm. This includes bones, cartilage, and blood. All skeletal and cardiac muscle, and almost all smooth muscle, develops from cells of the mesoderm. The smooth muscles inside the eye, which regulate pupil diameter and lens shape (chapter 7), are the rare examples of muscles that develop from the ectoderm. Neural tissue, both central and peripheral, is derived from the ectoderm.