

Following fertilization, the zygote and its associated membranes, together referred to as the conceptus, continue to be projected toward the uterus by peristalsis and beating cilia. During its journey to the uterus, the zygote undergoes five or six rapid mitotic cell divisions. Although each cleavage results in more cells, it does not increase the total volume of the conceptus. Each daughter cell produced by cleavage is called a blastomere (blastos = “germ,” in the sense of a seed or sprout). Approximately 3 days after fertilization, a 16-cell conceptus reaches the uterus. The cells that had been loosely grouped are now compacted and look more like a solid mass. The name given to this structure is the morula (morula = “little mulberry”). Once inside the uterus, the conceptus floats freely for several more days. It continues to divide, creating a ball of approximately 100 cells, and consuming nutritive endometrial secretions called uterine milk while the uterine lining thickens. The ball of now tightly bound cells starts to secrete fluid and organize themselves around a fluid-filled cavity, the blastocoel. At this developmental stage, the conceptus is referred to as a blastocyst. Within this structure, a group of cells forms into an inner cell mass, which is fated to become the embryo. The cells that form the outer shell are called trophoblasts (trophe = “to feed” or “to nourish”). These cells will develop into the chorionic sac and the fetal portion of the placenta (the organ of nutrient, waste, and gas exchange between mother and the developing offspring). The inner mass of embryonic cells is totipotent during this stage, meaning that each cell has the potential to differentiate into any cell type in the human body. Totipotency lasts for only a few days before the cells’ fates are set as being the precursors to a specific lineage of cells.