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**COURSE: PHYSIOLOGY**

**LEVEL: 200**

**Question**: write short note on implantation.

What happens after the egg is fertilized?

Implantation is a process in which a developing embryo, moving as a blastocyst through a uterus, makes contact with the uterine wall and remains attached to it until birth. The lining of the uterus (endometrium) prepares for the developing blastocyst to attach to it via many internal changes. Without these changes implantation will not occur, and the embryo sloughs off during menstruation. Such implantation is unique to mammals, but not all mammals exhibit it. Furthermore, of those mammals that exhibit implantation, the process differs in many respects between those mammals in which the females have estrous cycles, and those mammals in which the females have menstrual cycles. Females in different species of primates, including humans, have menstrual cycles, and those similar processes of implantation.

Before embryogenesis begins, the ovary releases an unfertilized egg cell, called an oocyte, which then travels down the fallopian tube. The egg is enveloped in an extra cellular matrix called the zona pellucida. Sperm can fertilize the egg in the zona pellucida ZP, which prevents the fertilized egg called a zygote, from adhering to the wall of fallopian tube. If the zygote implants in any area besides the uterus, the result is an ectopic pregnancy. This condition prevents the complete development of the embryo, and it can cause fatal hemorrhaging in the pregnant female.

The endometrium is one of the few uterine surfaces to which a blastocyst cannot always implant. The properties of the endometrium change, and only in a brief window can the blastocyst implant on the tissue. In humans, the window includes days 6 through 10 after ovulation just prior to ovulation, the endometrium begiuns to thicken and expand in response to the release of estrogen from the ovaries. As the embryo moves through the fallopian tubes, the endometrium proliferates, changes in shape, becomes receptive to implantation, and produces a hospitable environment for the embryo. Signaled by the release of progesterone from the ovaries, a series of changes called decidualization occurs. Furthermore, the endometrium swells as interstitial fluid accumulates in it. The endometrium, swollen with interstitial fluid, vasculator and nutrient, provides a hospitable environment for embryogenesis.

As the blastocyst moves into the uterus, it realigns itself so the inner cell mass is adjacent to the uterine wall, and the trophoblast contacts the endometrium. The position of the ICM in relation to the endometrium establishes the head to tail, or dorsal-ventral, axis of the embryo, with the dorsal side of the embryo facing the uterine wall. This is the first embryonic event that dictates the organization of the future body. Successful implantation depends on the blastocyst binding the endometrium.