

Embryonic Development on Neonatal Fetus

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PERSPECTIVE

A fetus or foetus is the unborn offspring of an animal that develops from an embryo. Following embryonic development the fetal stage of development takes place. In human prenatal development, fetal development begins from the ninth week after fertilisation (or 11th week gestational age) and continues until birth. Prenatal development is a continuum, with no clear defining feature distinguishing an embryo from a fetus. However, a fetus is characterized by the presence of all the major body organs, though they will not yet be fully developed and functional and some not yet situated in their final anatomical location.

The predominant British, Irish, and Commonwealth spelling is foetus, which has been in use since at least 1594. The spelling with -oe- arose in Late Latin, in which the distinction between the vowel sounds -oe- and -e- had been lost. This spelling is the most common in most Commonwealth nations, except in the medical literature, where fetus is used. The more classical spelling fetus is used in Canada and the United States (U.S). In addition, fetus is now the standard English spelling throughout the world in medical journals. The spelling faetus was also used historically.

Weeks 9 to 16 (2 to 3.6 months)

A human fetus, attached to placenta, at three months gestational age. In humans, the foetal stage starts nine weeks after fertilization. At the start of the fetal stage, the fetus is typically about 30 millimetres (1.2 in) in length from crown-rump, and weighs about 8 grams. The head makes up nearly half of the size of the fetus. Breathing-like movements of the fetus are necessary for the stimulation of lung development, rather than for obtaining oxygen. The heart, hands, feet, brain and other organs are present, but are only at the beginning of development and have minimal operation. The genitalia of the fetus starts to form and placenta becomes fully functional during week 9. At this point in development, uncontrolled movements and twitches occur as muscles, the brain, and pathways begin to develop.

Weeks 17 to 25 (3.6 to 6.6 months)

A woman pregnant for the first time (nulliparous) typically feels fetal movements at about 21 weeks, whereas a woman who has

given birth before will typically feel movements by 20 weeks. By the end of the 5th month, the foetus is about 20 cm (8 inches) long.

Weeks 26 to 38 (6.6 to 8.6 months)

Artist's depiction of fetus at 40 weeks gestational age, about 51 cm (20 in) from head to toe the amount of body fat rapidly increases. Lungs are not fully mature. Thalamic brain connections, which mediate sensory input, form. Bones are fully developed, but are still soft and pliable. Iron, calcium, and phosphorus become more abundant. Fingernails reach the end of the fingertips. The lanugo, or fine hair, begins to disappear, until it is gone except on the upper arms and shoulders. Small breast buds are present on both sexes. Head hair becomes coarse and thicker. Birth is imminent and occurs around the 38th week after fertilization. The fetus is considered full-term between weeks 36 and 40, when it is sufficiently developed for life outside the uterus. It may be 48 to 53 cm (19 to 21 inches) in length, when born. Control of movement is limited at birth, and purposeful voluntary movements develop all the way until puberty.

Variation in growth

Further information: Birth weight and Environmental toxicants and foetal development there is much variation in the growth of the human fetus. When fetal size is less than expected, the condition is known as Intrauterine Growth Restriction (IUGR) also called Foetal Growth Restriction (FGR); factors affecting foetal growth can be maternal, placental, or fetal.

Maternal factors include maternal weight, body mass index, nutritional state, emotional stress, toxin exposure (including tobacco, alcohol, heroin, and other drugs which can also harm the fetus in other ways), and uterine blood flow. Placental factors include size, microstructure (densities and architecture), umbilical blood flow, transporters and binding proteins, nutrient utilization and nutrient production.

Fetal factors include the fetus genome, nutrient production, and hormone output. Also, female foetuses tend to weigh less than males, at full term. Foetal growth is often classified as follows: Small for Gestational Age (SGA), Appropriate for Gestational Age

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(AGA) and Large for Gestational Age (LGA). SGA can result in low birth weight, although premature birth can also result in low birth weight. Low birth weight increases risk for perinatal mortality (death shortly after birth), asphyxia, hypothermia, polycythemia, hypocalcemia, immune dysfunction, neurologic abnormalities, and other long-term health problems. SGA may be associated with growth delay, or it may instead be associated with absolute stunting of growth. The placenta functions as a maternal-fetal barrier against

the transmission of microbes. When this is insufficient, mother-to-child transmission of infectious diseases can occur.

Immunity

Maternal IgG antibodies cross the placenta, giving the fetus passive immunity against those diseases for which the mother has antibodies. This transfer of antibodies in humans begins as early as the 5th month (gestational age) and certainly by the 6th month.