



CONCEPTION – THE BEGINNING OF HUMAN BEING

Key points:

- the moment of conception constitutes the beginning of human life;
- defining conception as the beginning of human life is common in publications by doctors, perinatologists, geneticists, obstetricians, gynaecologists, embriologists, pediatricians, bioorganic chemists and bioethicists;
- major global medical dictionaries determine the beginning of human life as the moment of conception.

Life begins with conception. It is a biological and medical fact, and an indisputable one. The truth about beginnings of human life is widely accessible not only in professional textbooks for doctors or scientists, but also in scientific publications for the general public – as well as school handbooks. Statements by scientists and doctors presented below are examples from various publications that confirm the truth about conception as the beginning of human life.

When does human life begin?

“ The fact that a new human being is created during conception is not a matter of personal liking or opinion. Human nature of the being from the moment of conception until its old age is not a metaphysical statement to be disputed, but a common experimental fact”. (Prof. dr med. J. Lejeune, in: „Wiedza i Życie” nr. 11, 1986, p. 8.)

“ A new life – the life of your child begins in the moment of meeting of the male and female gametes. A single cell is created, that incorporates all properties passed down by the parent cells, it is the resultant of two different lineage lines and as such is a unique and unrepeatable germ of a new life. Conception, the great wonder of nature (...) is the beginning of a child’s life in its mother’s womb”. (R. Kurniewicz-Witczakowa, prof. dr hab. med. J. Kopczyńska-Sikorska (redactor), *Nasze dziecko*, Państwowy Zakład Wydawnictw Lekarskich, Warsaw, 1994, p. 31.)

“ Joining of cell nuclei of the egg and sperm is the most vital moment of conception – creation of a new organism. Development of a new human begins at the moment of the joining of the egg and sperm cell nuclei”. (Z. Bielańska-Osuchowska, *Jak zaczyna się życie człowieka*, Wydawnictwo Naukowe PWN, Warsaw, 1994, p. 34.)

“ Contemporary knowledge leaves no doubt that human life begins as a consequence of joining of two gametes, female and male, into a stem cell, a zygote that from the moment starts to live at its own pace. The moment determines individual genetic background and ingrained shape of all features of the new human being”. (Prof. dr hab. n. med. M. Rybakowa, G. L. Flanagan, *9 pierwszych miesięcy życia*, Państwowy Zakład Wydawnictw Lekarskich, Warsaw, 1973)

“ As a consequence of conception, a diploid number of chromosomes of 2n DNA is created. In this way a new somatic cell is created, a zygote that incorporates genetic information from both parents”. (Prof. dr hab. med. Tadeusz Pisarski (redactor), *Położnictwo i ginekologia. Podręcznik dla studentów*, Wydawnictwo Lekarskie PZWL, Warsaw 2002, p. 270)

“ If a new life is to emerge, there must be conception, that is joining of male and female gametes, what consequently leads to creation of a new descendant structure called zygote (...) Sex of the foetus is determined in this moment”. (Andrzej Malarewicz (editor), *Położnictwo. Podstawy opieki położniczej. Podręcznik dla studentów licencjackich i magisterskich kierunków położnictwa i ginekologii*, Wydawnictwo Uniwersytetu Humanistyczno-Przyrodniczego Jana Kochanowskiego, Kielce 2009, p. 42-43)

“ The most important result of conception is restoring of diploid chromosome number, half from the mother and half from the father. The descendant's sex is determined as well. Spermatozoon 23X is responsible for female chromosomal sex and spermatozoon 23Y for male chromosomal sex”. (B.L. Kmieć, D. Kaczmarczyk, Grzegorz H. Bręborowicz (redactor), *Położnictwo i ginekologia*, Tom I, Wydawnictwo Lekarskie PZWL, Warsaw 2007, p. 6)

“ Respect for new life from conception and considering a child a dialogue partner is of grave importance. The dialogue begins at the moment of conception” – Prof. dr hab. P. G. Fedor -Freybergh, psychologist, Stockholm („Menopause”, Book 1/2002)

“ A human is human from the moment when a male spermatozoon conceives a female egg cell” – Prof. dr hab. med. E. Blechschmidt, President of the Institute of Anatomy, Göttingen University, Germany, Blechschmidt E.: *Daten der menschlichen Frühentwicklung: menschliches Leben beginnt im Augenblick der Befruchtung*, in: Hoffacker P., Steinschulte B., Fietz P.-J. ed.: „Auf Leben und Tod: Abtreibung in der Diskussion. Bergisch-Gladbach“, Bastei-Lübbe, 1991: 43)

“ An egg cell is called an embryo from the moment of conception, but there is no doubt that it is a human” – Prof. dr hab. med. B. Chazan, national expert in obstetrics and gynaecology, Warsaw (quotation after: „Służba Życiu”, nr. 2-3, 7-8, 1999)

“ Human life begins when it is conceived, that is in the moment of conception, and ends in the moment of death”. – Prof. zw. dr hab. R. Klimek, member of the Royal Society of Medicine in London (R. Klimek, F. Palowski, *Przyszłość i medycyna, czyli rozmowy o życiu*, PWN, Warsaw – Kraków 1988, p. 259)

“ Meeting of an egg cell and a spermatozoon, that is mother’s and father’s gametes, begins an individual life. As a result of conception, a human of fully developed genetic shape is formed, whose further development proceeds during its life. Thus: embryo, foetus, newborn, infant, child, adult, elder – these are just names for stages of individual biological development of always the same man”. – dr n. med. A. Marcinek, director of the Obstetric and Gynaecological Hospital of R. Czerwiakowski in Kraków (quotation from: „Służba Życiu. Zeszyty Problemowe”, nr. 1/2008).

“ From scientific point of view it is correct to state that individual human life begins in the moment of conception”. – Prof. M. Matthews-Roth, Harvard University, USA (quotation from: J. C. Willke, *Why can't we love them both?*, Hayes Publishing Company, Inc., Cincinnati 1997, p. 73)

“ Human life does not begin in the moment of birth, but of conception”. – Prof. dr hab. n. med. J. Roszkowski, member and co-founder of the International Federation of Gynecology, member of the Scientific Council of the Polish Mother and Child Institute (quotation from: „Pielęgniarka i położna”, nr. 12/1988, p. 15)

“ After conception, that is the joining of nuclei of an egg and a spermatozoon (what occurs in fallopian tube, in the ampulla), a wholly new genetic quality is created, different from genotypes of its parents – a new human being. The set of its genes in somatic cells will never change, until its death”. – Prof. dr hab. B. Suszka, biologist, researcher at the Polish Academy of Sciences, Poznań (quot.: „Służba Życiu”, nr. 2-3, 7-8, 1999)

“ Human development begins from the meeting of two cells – female gamete, that is an egg cell (oocyte) and male gamete – spermatozoon – during conception”. (Prof. dr hab. med. M. Troszyński, *Położnictwo. Ćwiczenia. Podręcznik dla studentów medycyny*, PZWL, Warsaw, 2003, p. 69)

“ Human life begins at the moment of conception. Let us call it the zero time. The conceived cell, zygote, is of size similar to a tiny pinhead (...). The drop contains immense power that shapes a human being towards the determined direction of its development... In the very first second after zero time it has been already determined that one will be a girl or a boy of 176 cm, with dark, curly hair, narrow lips, dimple chin, and a bit snub nose”. (W. Fijałkowski, *Dar rodzenia*, IW PAX, Warsaw 1985, p. 58)

“ Development of a child does not begin with its birth, but in the moment of conception”. (Prof. dr hab. med. K. Bożkova (ed.), dr med. A. Sitko (ed.), *Zdrowie rodziny*, Państwowy Zakład Wydawnictw Lekarskich, Warszwa 1983, p. 35)

“ A new life – the life of your child begins in the moment of meeting of the male and female gametes. A single cell is created that incorporates all properties passed down by the parent cells, the resultant of two different lineage lines and as such it is a unique and unrepeatable germ of a new life (...). Conception, the great wonder of nature (...) is the beginning of a child’s life in mother’s womb”. (Prof. dr hab. med. J. Kopczyńska-Sikorska (redactor), *Nasze dziecko*, Państwowy Zakład Wydawnictw Lekarskich, Warsaw, 1994, p. 31.)

“ Joining of cell nuclei of egg and sperm cells is the most vital moment of conception – creation of a new organism. (...) Development of a new human begins at the moment of the joining of cell nuclei of egg and sperm cells”. (Z. Bielańska-Osuchowska, *Jak zaczyna się życie człowieka*, Wydawnictwo Naukowe PWN, Warsaw, 1994, p. 37.)

“ Human development begins at the moment of conception – a process when male gamete (sperm) and female gamete (oocyte) merge, thus creating a zygote”. (T.W. Sadler, *Langman's Medical Embryology, 10th edition*, Philadelphia, PA: Lippincott Williams & Wilkins, 2006, p. 11)

“ Human development begins during conception – a process of fusion, when male gamete, a sperm, merges with female gamete, an oocyte (egg cell), creating a single cell called zygote. This highly specialized cell with the ability of multidirectional diversification, sets the beginning of existence of every one of us as individual persons”. (K.L. Moore, T.V.N. Persaud, M.G. Torchia, *The Developing Human: Clinically Oriented Embryology, 7th ed.*, Philadelphia, PA: Saunders, 2003, p. 16, 2)

“ Zygote is the beginning of a new human”. (K.L. Moore, T.V.N. Persaud, M.G. Torchia, *Before We Are Born: Essentials of Embryology, 8th edition*. Philadelphia, PA: Saunders, 2013, p. 327)

“ Even though human life is a continuous process, conception is a landmark moment, as a new and genetically individual human organism is formed under normal conditions”. (R. O’Rahilly, F. Müller, *Human Embryology and Teratology, 2nd edition*, New York: Wiley-Liss, 1996, p. 8)

“ It is possible to precisely define a human being. The term may be used as an equivalent to member of the Homo sapiens species. Whether a being is a member of a given species may be scientifically proven by analysis of chromosomes within living cells of organisms. This context leaves no doubt that from the very first moments of its existence an embryo conceived from human sperm and egg cell is a human being; the same sentence is true for a most and irreversibly mentally disabled human, even for a newborn born with anencephaly, literally without brain”. (P. Singer, *Practical Ethics, 2nd ed.*, Cambridge: Cambridge University Press, 1993, 85-86)

“ Child development begins in the very moment of conception. From a conceived ovum, through many complex development stages, programmed and genetically controlled, a child changes and improves its physical structure to reach full biological maturity in its final stage of ontogenetic development. The main feature that distinguishes child development and diversifies it from an adult is constant changeability of somatic, motoric and mental properties in time. A child is thus not a miniaturized model of an adult”. (Cz. Szmigiel, *Problemy domowe w chorobach wieku rozwojowego*, in: „Domowy poradnik medyczny”, ed. Kazimierz Janicki, Wydawnictwo Lekarskie PZWL, Warsaw 1998, p. 210)

“ Physical development is described as a chain of transformations that within their nature are irreversible trends towards improving morphology and functions of cells, tissues and organs, as well as the system as a whole, aimed at reaching full maturity and reproductive capacity. The chain begins with conception and ends when the body with all its internal organs reaches full size and maturity”. (J. Kopczyńska-Sikorska, R. Kurniewicz-Witczakowa, *Rozwój fizyczny – wzrastanie i dojrzewanie*, in: „Normy w pediatrii”, Jadwiga Kopczyńska-Sikorska (ed.), Biblioteka Pediatri 24, Wydawnictwo Lekarskie PZWL, Warsaw 1996, p. 11)

“ Generally speaking, life may be divided into two periods: intrauterine and extrauterine (...). During intrauterine life, basic shape and functionality of human organism is established. The course of intrauterine growth and development is crucial for further course of life of an individual. Within this period, three development phases may be distinguished: 1) initial, aka. the zygote stage – the first two weeks from conception until implantation of the ovum”. (Prof. dr hab. n. med. A. Blaim, Medical Academy in Warsaw, quot.: M. Ziemska (ed.), *Rodzina i dziecko*, PWN, Warsaw 1986, p. 77)

“ Development is a continuous process lasting from conception of a child until its maturity”. (Prof. dr hab. n. med. R. Michałowicz, dr n. hum. J. Ślenzak, quot.: R. Michałowicz, J. Ślenzak, *Choroby układu nerwowego dzieci i młodzieży*, Państwowe Wydawnictwo Naukowe, Warsaw 1985, p. 21)

“ Human development is divided into two phases in accordance with the environment where the development takes place (...):

The first phase, foetal, lasts from the moment of conception until birth. It occurs within environment provided by the mother's organism (...).

The second phase of an organism's life begins after it leaves the environment of the mother's body and lasts until its death”. (Prof. dr hab. n. med. T. Pisarski, President of the Polish Gynaecological Society, quot.: *Położnictwo i ginekologia*, red. T. Pisarski, Państwowy Zakład Wydawnictw Lekarskich, Warsaw 1987, p. 79)

The discussion below took place during a scientific conference of the Polish Academy of Sciences in Poznań, when scientists from various branches of science discussed the issue: “When does a human begin?” Professors of genetics have unanimously admitted that human life begins from the very moment of merging of a spermatozoon and an egg cell.

Professor Andrzej Legocki (Institute of Bioorganic Chemistry, Polish Academy of Sciences) said: “An embryo is a human; should it not, what is it then? It is not merely human tissue, but if so, who does it belong to?”

Professor Marek Świtoński (University of Life Sciences in Poznań, Vice President of the Polish Academy of Sciences in Poznań): “When we dispute the beginning of life, there is no doubt that life begins when an egg cell is fertilized. The fertilized cell has the potential to develop into an entire organism, a human one among others”.

Rev. professor Andrzej Muszala (director of the Institute of Bioethics, University of John Paul II in Kraków): “We speak of a human from the moment when its life begins, that is from the moment of conception. We treat a zygote as a human”. (Scientific conference of the Polish Academy of Sciences: “When does a human begin?”; <http://www.pan.poznan.pl/archiwum/2012.htm>)

“ Conception defined as fertilization of an egg by a spermatozoon is the beginning of human development”. (C.D. Lynch, L.W. Jackson, G.M. Buck Louis, *Estimation of the day-specific probabilities of conception: current state of the knowledge and the relevance for epidemiological research*, in: “Pediatric and Perinatal Epidemiology”, Vol. 20 (Suppl. 1), 2006, p. 3-12)

“ Just after conception, for about half an hour, human is a single cell. (...) From the moment of conception until the eighth week of gestation, a developing child is called an embryo” – as can be read in the catalogue of the world-famous “Human Body Exhibition”.

“ Fertilization is the process by which male and female haploid gametes (sperm and egg) unite to produce a genetically distinct individual. In mammals, fertilization involves a number of sequential steps, including sperm migration through the female genital tract, sperm penetration through the cumulus mass, sperm adhesion and binding to the zona pellucida, acrosome exocytosis, sperm penetration through the zona and fusion of the sperm and egg plasma membranes”. (J. Signorelli, E.S. Diaz, P. Morales, *Kinases, phosphatases and proteases during sperm capacitation*, in: „Cell and Tissue Research”, Vol. 349, Nr. 3, 2012, p. 765-82)

“ The life cycle of mammals begins when a sperm enters an egg”. (Y. Okada, K. Yamagata, K. Hong, T. Wakayama, Y. Zhang, *A role for the elongator complex in zygotic paternal genome demethylation*, in: „Nature”, Vol. 463, Nr. 7280, 2010, p. 554-8)

“ Fertilization – the fusion of gametes to produce a new organism – is the culmination of a multitude of intricately regulated cellular processes”. (M.R. Marcello, G. Singaravelu, A. Singson, *Germ Cell Development in C. elegans*, in: „Advances in Experimental Medicine and Biology”, Vol. 757, 2013, p. 321-350)

“ The oviduct or Fallopian tube is the anatomical region where every new life begins in mammalian species”. (P. Coy, F.A. García-Vásquez, P. Visconti, M. Avilés, *Roles of the oviduct in mammalian fertilization*, in: „Reproduction”, Vol. 144, Nr. 6, 2012, p. 649-60)

“ Embryonic life commences with fertilization”. (R. O’Rahilly, F. Müller, G. Linius-Streeter, *Developmental stages in human embryos: including a revision of Streeter’s ‘Horizons’ and a survey of the Carnegie Collection*, Carnegie; Carnegie Institution of Washington, 1987 – 306, p. 9)

“ The development of a human begins with fertilization, a process by which the *spermatozoon* from the male and the *oocyte* from the female unite to give rise to a new organism, the *zygote*”. (T.W. Sadler, *Langman’s Medical Embryology*, edition 7, Baltimore: Williams & Wilkins, 1995, p. 3)

“ The chromosomes of the oocyte and sperm are (...) respectively enclosed within *female* and *male pronuclei*. These pronuclei fuse with each other to produce the single, diploid, 2N nucleus of the fertilized *zygote*. This moment of zygote formation may be taken as the beginning or zero time point of embryonic development”. (Larsen, J. William, *Human Embryology*, 2nd edition, New York: Churchill Livingstone, 1997, p. 17)

“ Development of the embryo begins at Stage 1 when a sperm fertilizes an oocyte and together they form a zygote”. (England, A. Marjorie, *A Life Before Birth*, 2nd edition, England: Mosby-Wolfe, 1996, p. 31)

“ Embryo: the developing human organism from the time of fertilization until significant differentiation has occurred, when the organism becomes known as a fetus”. (*Cloning Human Beings*, Report and Recommendations of the National Bioethics Advisory Commission, Rockville, MD: GPO, 1997, Appendix 2)

Definitions of conception in medical dictionaries

“ Embryo – in humans, the developing organism from conception until the end of the eighth week”. (Saunders, *Dorland’s Medical Dictionary for Health Consumers*, 2007)

“ Embryo – in humans, the stage of prenatal development from the time of fertilization of the ovum (conception) until the end of the eighth week. The period is characterized by rapid growth, differentiation of the major organ systems, and development of the main external features”. (*Mosby’s Medical Dictionary*, edition 8, 2009)

“ Embryo – an early stage of a developing organism, which follows fertilization of an egg including implantation and very early pregnancy – i.e., from conception to the 8th wk of pregnancy”. (*McGraw-Hill Concise Dictionary of Modern Medicine*, 2002, the McGraw-Hill Companies)

“ Embryo: 1. An organism in the early stages of development. 2. In humans, the developing organism from conception until the end of the eighth week; developmental stages from this time to birth are commonly designated as fetal”. (T.L. Stedman, *Medical Dictionary for the Health Professions and Nursing*, Farlex 2012)

“ Embryo: In humans, developing organism from conception until the end of the eighth week; developmental stages from this time to birth are commonly designated as fetal”. (*Medical Dictionary for the Dental Professions*, Farlex 2012)

“ Embryo – the developing child from conception until 8 weeks in utero, after which it is considered as a fetus”. (J. Mooney, *Illustrated Dictionary of Podiatry and Foot Science*, 2009)

“ Conception – the formation of a viable zygote by the union of a spermatozoon and an ovum; fertilization”. (*The American Heritage Medical Dictionary*, Houghton Mifflin Company, 2007)

“ Conception – the union of egg and sperm to form a fetus”. (*Gale Encyclopedia of Medicine*, The Gale Group, 2008)

“ Conception – the beginning of pregnancy, usually taken to be the instant that a spermatozoon enters an ovum and forms a viable zygote”. (*Mosby’s Medical Dictionary*, Farlex, 2012)

“ Conception – fertilisation; the union of semen and ovum, usually during intercourse; impregnation”. (*Segen’s Medical Dictionary*, 2012, Farlex)

“ The fusion of sperm and egg membranes initiates the life of a sexually reproducing organism”. (H.R Marsden, I. Tomaatsu, A. Kros, *Model systems for membrane fusion*, in: „Chemical Society Reviews”, Vol. 40, Nr. 3, 2011, p. 1572-85)



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