

What Science Says About When Life Begins

On Wednesday December 1, 2021, the U.S. Supreme Court heard [oral arguments](#) in *Dobbs v. Jackson*. This case involves a [Mississippi law](#) that limits abortion to 15 “weeks’ gestation except in medical emergency and in cases of severe fetal abnormality.”

During the hearing, Mississippi Solicitor General [Scott G. Stewart](#) defended the law by [asserting](#) that the State of Mississippi has an interest in preventing “the purposeful termination of a human life,” but Supreme Court Justice Sonia Sotomayor challenged him and [declared](#):

How is your interest anything but a religious view? The issue of when life begins has been hotly debated by philosophers since the beginning of time. It’s still debated in religions. So, when you say this is the only right that takes away from the state the ability to protect a life, that’s a religious view.

Contrary to Sotomayor and regardless of what any philosopher or religious leader may think, the facts of science are clear that each human life begins at fertilization. As documented below, these facts are from credible science publications that don’t argue for or against abortion. In other words, they are not polemics from people with science degrees but facts from neutral scientific authorities.

The [American Heritage Dictionary of Science](#)—which was written by nine highly credentialed scientists under a “precise editorial review” to maintain “a standard of excellence”—defines “life” as:

the form of existence that organisms like animals and plants have and that inorganic objects or organic dead bodies lack;

animate existence, characterized by growth, reproduction, metabolism, and response to stimuli.

Those four defining characteristics of life are all present during or soon after [fertilization](#), which occurs when a sperm and egg unite to form a [zygote](#), or the earliest stage of a human embryo:

1. **Growth:** Per the textbook [Essentials of Human Development: A Life-Span View](#), “Fertilization begins the period of the zygote,” and “the zygote grows rapidly through cell division.”
2. **Reproduction:** Per a paper in the [Biochemical Journal](#), “Sexual reproduction in mammals results in the formation of a zygote, a single cell which contains all the necessary information to produce an entire organism comprised of billions of cells grouped into multitudinous cell types.”
3. **Metabolism:** Per the medical text [Human Gametes and Preimplantation Embryos: Assessment and Diagnosis](#), “At the zygote stage,” the human embryo metabolizes “carboxylic acids pyruvate and lactate as its preferred energy substrates.”
4. **Response to stimuli:** The [Oxford Dictionary of Biochemistry and Molecular Biology](#) defines a “stimulus” as “any event or phenomenon, such as radiation, electrical potential, or addition of molecules that leads to excitation of a tissue or cell.” Experiments have found that human zygotes respond to such stimulants. For example, a paper in the journal [Human Reproduction Update](#) documents that a compound called platelet-activating factor “acts upon the zygote” by stimulating “metabolism,” “cell-cycle progression,” and “viability.”

Nor is a zygote just a form of human life like a skin cell. It is an actual human life. As explained in [Van Nostrand's Scientific Encyclopedia](#), "At the moment the sperm cell of the human male meets the ovum of the female and the union results in a fertilized ovum (zygote), a new life has begun."

In keeping with the facts above, clinical literature is explicit that each new human life begins at fertilization:

- The [Encyclopedia & Dictionary of Medicine, Nursing & Allied Health](#) states that "human reproduction" is "the process by which the male's sperm unites with the female's oocyte, creating a new life."
- The embryology textbook [Before We Are Born: Essentials of Embryology and Birth Defects](#) states that "the zygote and early embryo are living human organisms."
- The medical textbook [The Developing Human: Clinically Oriented Embryology](#) states that "fertilization" creates "a new combination of chromosomes that is different from that in the cells of either of the parents," and this "is the beginning of a new human being."
- The clinical book [An Atlas of the Human Embryo and Fetus: A Photographic Review of Human Prenatal Development](#) states, "A human being originates from two living cells: the oocyte (female germ cell) and the spermatozoon (male germ cell), transmitting the torch of life to the next generation."

Although controversial from a political perspective, the scientific facts of embryology, genetics, and molecular biology leave no doubt as to when each human life begins—fertilization.

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