# Film Screenings
## *Stanley Plotkin: Pioneering the use of fetal cells to make rubella vaccine*
## Frequently Asked Questions (FAQ)

### Are there other infections that can cause miscarriage or birth defects the way rubella and Zika can if contracted during pregnancy?

Unfortunately, yes. Several pathogens have the potential to harm a developing fetus or cause pregnancy loss. Examples include the *Toxoplasma gondii* protozoan, the *Listeria monocytogenes* bacterium and varicella-zoster virus (chickenpox), however there are several additional pathogens that can cause harm during pregnancy. Visit the page, "Which Infections Increase the Risk of Birth Defects?" from the Society for Birth Defects Research and Prevention website to learn more.

### How were women infected with rubella able to obtain abortions in 1965 before abortion was legal in the U.S.?

In light of the miscarriages and severe birth defects caused by rubella, medical authorities endorsed therapeutic abortions to allow for a safe, legal option to terminate a pregnancy affected by rubella. However, access was often limited to those with the financial means to bring their case to court and gain access to a hospital abortion. An alternative option was to get proof from a physician that the abortion was necessary for the mother's health. The attention rubella brought to the topic of abortion was one of the catalysts for the legal abortion reforms that took place in the U.S. in the 20th Century.

### What is the difference between diploid cells and fetal cells?

Diploid cells are any cell that contains two complete sets of chromosomes - one from the mother and one from the father. Almost every cell in a human body is a diploid cell, except human gametes (egg and sperm cells), which are haploid cells with only one set of chromosomes. Fetal cells are any cells derived from a fetus. They contain two sets of chromosomes, so they are diploid cells.

### What other vaccines are made with fetal cells? Do these vaccines contain parts of fetuses or fetal cells?

In addition to the rubella vaccine, other vaccines made using fetal cells to grow the vaccine virus include those for varicella (chickenpox), hepatitis A, rabies (one version), and the Johnson & Johnson/Janssen COVID-19 (no longer available in the U.S.). Once the vaccine viruses are grown in cell culture in the lab, the viruses are purified to use as the vaccine. As such, the vaccines contain only miniscule fragments of any fetal cell debris that remain after purification. The vaccines do not contain parts of fetuses. Visit this page on the VEC at CHOP website to learn more about fetal cells and vaccines.

### Do any major religions object to the use of fetal cells for the rubella vaccine?

No. The stance from the leaders from major religions, including Catholicism, is that there is no immoral act if an individual chooses to accept a vaccine created in this manner. Find out more about religious stances related to vaccines in this paper by John Grabenstein, hosted on the Immunize.org website.

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### How do scientists culture human cells for vaccines and how do they last so long?

Scientists culture human cells by putting them in a nutrient-rich, temperature-controlled environment. In this environment, cells divide to produce more of that cell type. The cells will generally reproduce for about 50 divisions. After this, the cells tend to be less healthy and grow less efficiently. This limited number of divisions is known as the "Hayflick limit" after a colleague of Dr. Plotkin's who discovered this limitation of cells.

To overcome this obstacle, scientists use a process known as cell passage. A cell culture is allowed to grow until it uses up the space and nutrients provided, then scientists take a small portion of that culture and split it into several new containers. This is considered the first passage. Once the cells in those new containers use the space and nutrients, they, too, can be split into more containers, resulting in the second passage. Sometimes, instead of putting the cells in an incubator and having them grow, they are put in small vials and frozen in liquid nitrogen freezers. Because the cells are not replicating, they do not increase in passage number, so when they are later thawed and put in a growth environment, the passage number picks up where it left off prior to being frozen. In this way, scientists can produce near-limitless amounts of cells from just one batch of cells. Visit this page to learn more about how cell passage works.

### What else did Dr. Plotkin work on during his career?

While working at the Wistar Institute, Dr. Plotkin helped to develop a human rabies vaccine. Other vaccine development programs Dr. Plotkin has been associated with include anthrax, polio, rotavirus, varicella, and cytomegalovirus. Since his retirement, Dr. Plotkin continues to share his expertise related to vaccines, such as in this series of videos he participated in for the Vaccine Education Center. In addition to his prolific work in the lab, Dr. Plotkin's book, *Vaccines,* (first published in 1988) is widely considered the seminal textbook on vaccinology. In deference to his role in creating this text, the primer has been renamed *Plotkin's Vaccines*.

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