

Most Common Fetal Cell Lines and Their Uses (Chronologically Ordered)

CELL LINE	YEAR	AGE	GENDER	CELL TYPE	HISTORY AND USES
WI-38	1962	12 weeks	female	fetal lung	Specimen No. 38, 32nd abortion, in Sweden. Shipped to Leonard Hayflick, Wistar Institute, Philadelphia. Used to culture RA273 for rubella and MMR vaccines and study lifetime of <i>in vitro</i> cell lines. ^{1,2}
WI-44	~1963	12 weeks	female	fetal lung	Specimen No. 44, 38th abortion, in Sweden. Shipped to Leonard Hayflick, Wistar Institute, Philadelphia. Used along with WI-26 and 38 to study lifetime of <i>in vitro</i> cell lines. ³
RA273	1964	6 weeks	unknown	fetal kidney	R=rubella, A=abortion, 27=27th baby, 3=3rd tissue. Rubella virus obtained from aborted fetus kidney used in Rubella and MMR vaccines. At least 99 abortions to create the rubella vaccine alone. ⁴
MRC-5	1966	14 weeks	male	fetal lung	Medical Research Council, abortion #5. Baby aborted for psychiatric reason, 27-year-old physically healthy woman. Used in (some) Polio, Rabies, Chickenpox, Hepatitis-A, Zostavax for shingles vaccines. ⁵
HEK-293	~1972	unknown	female?	fetal kidney	Human Embryonic Kidney, specimen #293, abortion in the Netherlands. Used for basic research. Used widely in pharmaceutical research, development, and production, especially in vaccines. ⁶
IMR-90	1975	16 weeks	female	fetal lung	Designer cell line to replace WI-38. Gestational age determined by fetal weight, shoulder to rump length of 7 cm. "... no apparent physical abnormalities." Abortion in US; Coriell Cell Repository. ^{7,8}
Lambda.hE1	~1980	second trimester	unknown	fetal liver	Abortion in US. Liver tissue from a second-trimester Caucasian fetus aborted for psychosocial indications, no obvious abnormalities. Used in Procrit, Epoetin α, Epogen, Aranesp, Darbepoetin alfa. ⁹
IMR-91	~1982	12 weeks	male	fetal lung	Designer cell line to replace MRC-5. Obtained after a abortion by hysterectomy at the time of sterilization on a 41-yr-old white female who was also a "one pack-a-day cigarette smoker." ^{10,11}
PER-C6	1985 1995	16-18 weeks	unknown	fetal retinal	Designed for the pharmaceutical industry, especially vaccines. Cells were frozen in 1985, thawed in 1995. Abortion in the Netherlands, "mother wanted to get rid of the fetus, father unknown." ¹²
WALVAX-2	2015	12 weeks	female	fetal lung	Designed to replace depleting supply of WI-38 and MRC-5. Abortion in China, 9th abortion, due to presence of a uterine scar from a previous cesarean birth by a 27-year-old healthy woman. ¹³

REFERENCES

- ¹ L. Hayflick et al., "[The Serial Cultivation of Human Diploid Cell Strains](#)," *Experimental Cell Research*, Vol 25 (1961), pp 585-621.
- ² L. Hayflick, "[The Limited In Vitro Lifetime of Human Diploid Cell Strains](#)," *Experimental Cell Research*, Vol 37 (1961), pp 614-636.
- ³ L. Hayflick, "[The Limited In Vitro Lifetime of Human Diploid Cell Strains](#)," *Experimental Cell Research*, Vol 37 (1961), pp 614-636.
- ⁴ S. Plotkin et al., "[Attenuation of RA 27/3 Rubella Virus in WI-38 Human Diploid Cells](#)," *American Journal of Diseases of Children*, Vol 118 (1969), pp 178-179.
- ⁵ J. Jacobs et al., "[Characteristics of a human diploid cell designated MRC-5](#)," *Nature*, Vol 227:5254 (1970), pp. 168-170.
- ⁶ FDA Center for Biologics Evaluation and Research (2001), [Testimony of Dr. Alex J. Van Der Eb](#), Developer of Fetal Cell Line. See p. 81.
- ⁷ W. Nichols et al., "[Characterization of a New Human Diploid Cell Strain, IMR-90](#)," *Science*, Vol 196 (1976), pp. 60-63.
- ⁸ "[Cell Collections](#)," Coriell Institute for Medical Research (2003/2004).
- ⁹ S. Liebhaber et al., "[Cloning and complete nucleotide sequence of human 5'- \$\alpha\$ -globin gene](#)," *PNAS*, Vol 77:12 (1980), pp. 7054-7058.
- ¹⁰ W. Nichols et al., "[Characterization of a new human diploid cell line: IMR-91](#)," *In Vitro* Vol 19:10 (1983), pp. 797-804. (Email for full article.)
- ¹¹ "[Resources Available for Conducting Research on Aging](#)," National Institute on Aging (1993).
- ¹² FDA Center for Biologics Evaluation and Research (2001), [Testimony of Dr. Alex J. Van Der Eb](#), Developer of Fetal Cell Line. See pp. 98-99.
- ¹³ B. Ma et al., "[Characteristics and viral propagation properties of a new human diploid cell line, walvax-2, and its suitability as a candidate cell substrate for vaccine production](#)," *Human Vaccine Immunotherapeutics*, Vol 11:4 (2015), pp 998-1009.