

## Vaccine Excipient & Media Summary



This section begins with a summary of the excipients included in licensed vaccines in the United States, as of the revision date at the bottom of the page.

Excipients are inactive ingredients of a drug product necessary for production of a finished pharmaceutical formulation.

After the list of excipients is a list of culture media used in the manufacturing process of vaccines licensed in the United States.

Growth media are culture materials used to produce mass quantities of a microorganism anti-body, or other immunologic agent, suitable for further processing into a finished pharmaceutical product.

All reasonable efforts have been made to ensure the accuracy of this information, but manufacturers may change product contents before that information is reflected here.

**Excipients Included in US Licensed Vaccines<sup>a</sup>**

Excipient	Use	Vaccine
Albumin, egg (Ovalbumin)	Growth medium	Influenza ( <i>Fluarix</i> , <i>FluLaval</i> ), Rabies ( <i>RabAvert</i> )
Albumin, human serum	Component of growth medium, protein stabilizer	Measles ( <i>Attenuvax</i> ), MMR ( <i>MMR-II</i> ), MMRV ( <i>ProQuad</i> ), Mumps ( <i>Mumps</i> ), Rabies ( <i>Imovax</i> ), Rubella ( <i>Meruvax II</i> )
Albumin or serum, bovine	Component of growth medium, protein stabilizer	Hepatitis A ( <i>Havrix</i> , <i>Vaqta</i> ), Measles ( <i>Attenuvax</i> ), MMR ( <i>MMR-II</i> ), MMRV ( <i>ProQuad</i> ), Mumps ( <i>Mumps</i> ), Rabies ( <i>Imovax</i> , <i>RabAvert</i> ), Rotavirus ( <i>RotaTeg</i> ), Rubella ( <i>Meruvax II</i> ), Vaccinia ( <i>Dryvax</i> ), Varicella ( <i>Varivax</i> )
Aluminum hydroxide	Adjuvant	Anthrax ( <i>BioThrax</i> ), DTaP ( <i>Infanrix</i> ), DTaP-Hep B-IPV ( <i>Pediarix</i> ), Td (Massachusetts), Hepatitis A ( <i>Havrix</i> ), Hepatitis A-Hepatitis B ( <i>Twinrix</i> ), Hepatitis B ( <i>Engerix-B</i> ), Tdap ( <i>Boostrix</i> )
Aluminum hydroxyphosphate sulfate	Adjuvant	Hib ( <i>PedvaxHIB</i> ), Hib-Hepatitis B ( <i>Comvax</i> ), Hepatitis A ( <i>Vaqta</i> ), Hepatitis B ( <i>Recombivax HB</i> ), Human papillomavirus ( <i>Gardasil</i> )
Aluminum phosphate	Adjuvant	DTaP ( <i>Daptacel</i> ), Hepatitis A-Hepatitis B ( <i>Twinrix</i> ), Pneumococcal ( <i>Prevnar</i> ), Rabies ( <i>BioRab</i> ), Td ( <i>Decavac</i> ), Td (Massachusetts), Tdap ( <i>Adacel</i> )
Aluminum potassium sulfate	Adjuvant	DTaP ( <i>Daptacel</i> , <i>Tripedia</i> ), DTaP-Hib ( <i>TriHIBit</i> ), DT ( <i>Sanofi Pasteur</i> )
Amino acids	Component of growth medium	Anthrax ( <i>BioThrax</i> ), Hepatitis A ( <i>Havrix</i> ), Hepatitis A-Hepatitis B ( <i>Twinrix</i> ), Rotavirus ( <i>Rotarix</i> ), Td ( <i>Aventis Pasteur</i> ), Typhoid oral ( <i>Vivotif</i> )
Ammonium sulfate	Protein fractionation	DTaP-Hib ( <i>TriHIBit</i> ), Hib ( <i>Act-HIB</i> )
Amphotericin B	Antibacterial	Rabies ( <i>RabAvert</i> )
Ascorbic acid	Antioxidant	Typhoid oral ( <i>Vivotif</i> )

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Excipients Included in US Licensed Vaccines <sup>a</sup>		
Excipient	Use	Vaccine
Bactopeptone	Component of growth medium	Influenza (varies seasonally)
Beta-propiolactone	Viral inactivator	Influenza ( <i>Fluvirin</i> ), Rabies ( <i>Imovax</i> , <i>RabAvert</i> )
Benzethonium chloride	Preservative	Anthrax ( <i>BioThrax</i> )
Brilliant green	Dye	Vaccinia ( <i>Dryvax-historic</i> )
Calcium carbonate	Antacid	Rotavirus ( <i>Rotarix</i> )
Calcium chloride	Medium nutrient	Rotavirus ( <i>Rotarix</i> )
Chlortetracycline	Antibacterial	Rabies ( <i>RabAvert</i> ), Vaccinia ( <i>Dryvax</i> )
Cystine	Medium nutrient	Rotavirus ( <i>Rotarix</i> )
Dextran	Medium nutrient	Rotavirus ( <i>Rotarix</i> )
DNA	Manufacturing residue	Hepatitis A ( <i>Vaqta</i> )
Dulbecco's Modified Eagle Medium (DMEM)	Growth medium	Rotavirus ( <i>Rotarix</i> )
Ethylenediamine-tetraacetic acid sodium (EDTA)	Preservative	Rabies ( <i>RabAvert</i> ), Varicella ( <i>Varivax</i> )
Egg protein	Manufacturing residue	Influenza (all brands), Yellow fever ( <i>YF-Vax</i> )
Ferric (III) nitrate	Medium nutrient	Rotavirus ( <i>Rotarix</i> )
Formaldehyde, formalin	Antimicrobial, toxin inactivator, stabilizer	Anthrax ( <i>BioThrax</i> ), DTaP (all brands), DTaP-Hep B-IPV ( <i>Pediarix</i> ), DTaP-Hib ( <i>TriHIBit</i> ), DT (all brands), Td (all brands), Hepatitis A ( <i>Havrix</i> , <i>Vaqta</i> ), Hepatitis A-Hepatitis B ( <i>Twinrix</i> ), Hib ( <i>ActHIB</i> ), Hib-Hepatitis B ( <i>Comvax</i> ), Influenza ( <i>Fluzone</i> , <i>Fluarix</i> , <i>FluLaval</i> ), Japanese encephalitis ( <i>JE-Vax</i> ), Poliovirus inactivated ( <i>Ipol</i> ), Tdap ( <i>Adacel</i> , <i>Boostrix</i> )
Gelatin	Stabilizer in freeze-drying, solvent	DTaP ( <i>Tripedia</i> ), DTaP-Hib ( <i>TriHIBit</i> ), Hepatitis B ( <i>Recombivax-HB</i> ), Human papillomavirus ( <i>Gardasil</i> ), Influenza ( <i>Fluzone</i> ), Japanese encephalitis ( <i>JE-Vax</i> ), Measles ( <i>Attenuvax</i> ), Mumps ( <i>MumpsVax</i> ), Rubella ( <i>Meruvax II</i> ), MMR ( <i>MMR-II</i> ), MMRV ( <i>ProQuad</i> ), Rabies ( <i>RabAvert</i> ), Typhoid oral ( <i>Vivotif</i> ), Varicella ( <i>Varivax</i> ), Yellow fever ( <i>YF-Vax</i> ), Zoster ( <i>Zostavax</i> )
Gentamicin	Antibacterial	Influenza ( <i>Fluarix</i> , <i>FluMist</i> )
Glucose	Medium nutrient	Rotavirus ( <i>Rotarix</i> )
Glutamine	Medium nutrient	Rotavirus ( <i>Rotarix</i> )
Glutaraldehyde	Toxin detoxifier	DTaP ( <i>Infanrix</i> ), DTaP-Hep B-IPV ( <i>Pediarix</i> ), Tdap ( <i>Boostrix</i> )
Glycerin	Solvent	Vaccinia ( <i>DryVax</i> )
Glycine	Protein stabilizer	DT (most brands), Td (most brands)
Histidine	Stabilizer	Human papillomavirus ( <i>Gardasil</i> )
Hydrochloric acid	Adjust pH	DTaP (most brands), DT (most brands)

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Excipients Included in US Licensed Vaccines <sup>a</sup>		
Excipient	Use	Vaccine
Hydrocortisone	Component of growth medium	Influenza ( <i>Fluarix</i> )
Lactose	Stabilizer in freeze-drying, filling	BCG ( <i>Tice</i> ), Hib (some packages), Meningococcal ( <i>Menomune</i> ), Typhoid oral ( <i>Vivotif</i> )
Magnesium stearate	Lubricant for capsule filling	Typhoid oral ( <i>Vivotif</i> )
Magnesium sulfate	Medium nutrient	Rotavirus ( <i>Rotarix</i> )
Monosodium glutamate	Stabilizer	Influenza ( <i>FluMist</i> ), MMRV ( <i>ProQuad</i> ), Varicella ( <i>Varivax</i> ), Zoster ( <i>Zostavax</i> )
Mouse serum protein	Manufacturing residue	Japanese encephalitis ( <i>JE-Vax</i> )
MRC-5 cellular protein	Manufacturing residue	Hepatitis A ( <i>Havrix</i> , <i>Vaqta</i> ), Hepatitis A-Hepatitis B ( <i>Twinrix</i> ), MMRV ( <i>ProQuad</i> ), Rabies ( <i>Imovax</i> ), Poliovirus inactivated ( <i>Poliovax</i> ), Varicella ( <i>Varivax</i> )
Neomycin	Antibacterial	DTaP-Hep B-IPV ( <i>Pediarix</i> ), Hepatitis A-Hepatitis B ( <i>Twinrix</i> ), Influenza ( <i>Fluvirin</i> ), Measles ( <i>Attenuvax</i> ), Mumps ( <i>MumpsVax</i> ), Rubella ( <i>Meruvax II</i> ), MMR ( <i>MMR-II</i> ), MMRV ( <i>ProQuad</i> ), Poliovirus inactivated ( <i>Ipol</i> ), Rabies ( <i>Imovax</i> , <i>RabAvert</i> ), Vaccinia ( <i>DryVax</i> ), Varicella ( <i>Varivax</i> ), Zoster ( <i>Zostavax</i> )
Phenol	Preservative, antibacterial	Pneumococcal ( <i>Pneumovax-23</i> ), Typhoid inactivated ( <i>Typhim Vi</i> ), Vaccinia ( <i>Dryvax</i> )
Phenol red (phenolsulfonphthalein)	pH indicator, dye	Rabies ( <i>Imovax</i> ), Rotavirus ( <i>Rotarix</i> )
2-Phenoxyethanol	Preservative, stabilizer	DTaP ( <i>Infanrix</i> , <i>Daptacel</i> ), DTaP-Hep B-IPV ( <i>Pediarix</i> ), Hepatitis A ( <i>Havrix</i> ), Hepatitis A-Hepatitis B ( <i>Twinrix</i> ), Poliovirus inactivated ( <i>Ipol</i> ), Td (Sanofi Pasteur)
Phosphate buffers (eg, disodium, monosodium, potassium, sodium dihydrogenphosphate)	Adjust pH	DTaP (most brands), DT (most brands), Hib ( <i>Act-Hib</i> ), Hepatitis A ( <i>Havrix</i> ), Hepatitis A-Hepatitis B ( <i>Twinrix</i> ), Hepatitis B ( <i>Engerix-B</i> ), Influenza ( <i>Fluarix</i> , <i>FluMist</i> , <i>FluLaval</i> ), Measles ( <i>Attenuvax</i> ), Meningococcal ( <i>Menactra</i> ), Mumps ( <i>MumpsVax</i> ), Poliovirus inactivated ( <i>Ipol</i> ), Rabies ( <i>BioRab</i> ), Rubella ( <i>Meruvax II</i> ), MMR ( <i>MMR-II</i> ), MMRV ( <i>ProQuad</i> ), Rotavirus ( <i>RotaTeg</i> ), Typhoid inactivated ( <i>Typhim Vi</i> ), Varicella ( <i>Varivax</i> ), Zoster ( <i>Zostavax</i> )
Polydimethylsiloxane	Antifoaming agent	Typhoid inactivated ( <i>Typhim Vi</i> )
Polymyxin B	Antibacterial	DTaP-Hep B-IPV ( <i>Pediarix</i> ), Influenza ( <i>Fluvirin</i> ), Poliovirus inactivated ( <i>Ipol</i> ), Vaccinia ( <i>Dryvax</i> )

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Excipients Included in US Licensed Vaccines*		
Excipient	Use	Vaccine
Polyoxyethylene-10 nonyl phenol (Triton N-101, octoxynol 9)	Nonionic surfactant (viral inactivation)	Influenza ( <i>Fluvirin</i> )
Polyoxyethylated octyl phenol (also called ethylene glycol octyl phenyl ether, octoxynol-10, octyl-phenoxy polyethoxyethanol, p-isooctylphenyl ether, Triton X-100)	Nonionic surfactant (viral inactivation)	Influenza ( <i>Fluarix</i> , <i>Fluzone</i> )
Polysorbate 20	Surfactant	Hepatitis A ( <i>Havrix</i> ), Hepatitis A-Hepatitis B ( <i>Twinrix</i> )
Polysorbate 80	Surfactant	DTaP ( <i>Infanrix</i> , <i>Tripedia</i> ), DTaP-Heb B-IPV ( <i>Pediarix</i> ), DTaP-Hib ( <i>TriHIBit</i> ), Human papillomavirus ( <i>Gardasil</i> ), Influenza ( <i>Fluarix</i> ), Rotavirus ( <i>RotaTeg</i> ), Tdap ( <i>Adacel</i> , <i>Boostrix</i> )
Potassium chloride	Adjust pH, tonicity, medium nutrient	MMRV ( <i>ProQuad</i> ), Rotavirus ( <i>Rotarix</i> ), Zoster ( <i>Zostavax</i> )
Potassium glutamate	Stabilizer	Rabies ( <i>RabAvert</i> )
Serum, bovine calf	Component of growth medium	Zoster ( <i>Zostavax</i> )
Sodium acetate	Adjust pH	DT (some brands), Td (some brands)
Sodium bicarbonate	Adjust pH	MMRV ( <i>ProQuad</i> )
Sodium borate	Adjust pH	Hepatitis A ( <i>Vaqta</i> ), Hib-Hepatitis B ( <i>Comvax</i> ), Human papillomavirus ( <i>Gardasil</i> )
Sodium chloride	Adjust tonicity	Most vaccines, including Anthrax, BCG, Human papillomavirus ( <i>Gardasil</i> ), Influenza ( <i>Fluarix</i> ), Measles, Meningococcal ( <i>Menactra</i> ), Mumps, MMR, MMRV, Pneumococcal, Polio inactivated, Rabies, Rotavirus ( <i>Rotarix</i> ), Rubella, Typhoid inactivated, Varicella, Yellow fever, Tdap ( <i>Boostrix</i> ), Zoster ( <i>Zostavax</i> )
Sodium citrate	Adjust pH	Rotavirus ( <i>RotaTeg</i> )
Sodium deoxycholate	Anionic surfactant (viral inactivation)	Influenza ( <i>Fluarix</i> , <i>FluLaval</i> )
Sodium hydrogenocarbonate	Medium nutrient	Rotavirus ( <i>Rotarix</i> )
Sodium hydroxide	Adjust pH	DT (most brands), Rotavirus ( <i>RotaTeg</i> ), Td (most brands)
Sodium phosphate	Medium nutrient	Rotavirus ( <i>Rotarix</i> )
Sodium pyruvate	Medium nutrient	Rotavirus ( <i>Rotarix</i> )
Sorbitol	Stabilizer, solvent	Measles ( <i>Attenuvax</i> ), Mumps ( <i>Mumps</i> ), Rotavirus ( <i>Rotarix</i> ), Rubella ( <i>Meruvax II</i> ), MMR ( <i>MMR-II</i> ), MMRV ( <i>ProQuad</i> ), Yellow fever ( <i>YF-Vax</i> )
Streptomycin	Antibacterial	Poliovirus inactivated ( <i>Ipol</i> ), Vaccinia ( <i>Dryvax</i> )



**Excipients Included in US Licensed Vaccines<sup>a</sup>**

Excipient	Use	Vaccine
Sucrose	Stabilizer	DTaP-Hib ( <i>TriHIBit</i> ), Hib ( <i>Act-HIB</i> ), Influenza ( <i>FluMist</i> ), Measles ( <i>Attenuvax</i> ), Mumps ( <i>MumpsVax</i> ), MMR ( <i>MMR-II</i> ), MMRV ( <i>ProQuad</i> ), Rotavirus ( <i>RotaTeq</i> ), Typhoid oral ( <i>Vivotif</i> ), Varicella ( <i>Varivax</i> ), Zoster ( <i>Zostavax</i> )
Sucrose	Medium nutrient	Rotavirus ( <i>Rotarix</i> )
Thimerosal	Preservative in some multi-dose containers (see package labeling for precise content)	DTaP (some multidose containers), DTaP-Hib ( <i>TriHIBit</i> ), DT (some multidose containers), Td (some multidose containers), Hib (some multidose containers), Influenza (some multidose containers), Japanese encephalitis ( <i>JE-Vax</i> ), Meningococcal ( <i>Menomune</i> ), Rabies ( <i>BioRab</i> ). Some single-dose containers contain trace amounts of thimerosal from the production process, but substantially lower concentrations than if used as a preservative. Consult product monographs and labeling for details.
Tocopheryl hydrogen succinate	Component of growth medium	Influenza ( <i>Fluarix</i> )
Tyrosine	Medium nutrient	Rotavirus ( <i>Rotarix</i> )
Urea	Stabilizer	Varicella vaccine ( <i>Varivax</i> , refrigerator stable)
Vitamins unspecified	Component of growth medium	Anthrax ( <i>BioThrax</i> ), Rabies ( <i>Imovax</i> ), Rotavirus ( <i>Rotarix</i> ), Td (Sanofi Pasteur)
Xanthan	Thickening agent	Rotavirus ( <i>Rotarix</i> )
Yeast protein	Component of growth medium	DTaP-Heb B-IPV ( <i>Pediarix</i> ), Hepatitis A-Hepatitis B ( <i>Twinrix</i> ), Hepatitis B ( <i>Engerix-B</i> , <i>Recombivax-HB</i> ), Hib ( <i>HibTiter</i> ), Hib-Hepatitis B ( <i>Comvax</i> )

<sup>a</sup> Proprietary names appear in italics.

# Vaccine Excipient & Media Summary

Vaccine-Production Media <sup>a</sup>	
Vaccine Culture Media	Vaccine(s)
Bovine protein	DTaP-Hep B-IPV (poliovirus component, <i>Pediarix</i> ), Pneumococcal ( <i>Pneumovax-23</i> ), Typhoid oral ( <i>Vivotif</i> )
Calf skin	Vaccinia ( <i>Dryvax</i> )
Chick embryo fibroblast tissue culture	Measles ( <i>Attenuvax</i> ), Mumps ( <i>Mumpsavax</i> ), combination vaccines containing them, MMRV ( <i>ProQuad</i> ), Rabies ( <i>RabAvert</i> )
Chick kidney cells	Influenza (master viruses for <i>FluMist</i> )
Chicken embryo (fertilized egg)	Influenza (all brands), Yellow fever ( <i>YF-Vax</i> )
Cohen-Wheeler, modified (pertussis components)	DTaP (alternate is Stainer-Scholte media)
Fenton media containing bovine casein	Tdap ( <i>Boostrix</i> )
Human diploid tissue culture, MRC-5	Hepatitis A ( <i>Havrix</i> , <i>Vaqta</i> ), Hepatitis A-Hepatitis B ( <i>Twinrix</i> ), MMRV ( <i>ProQuad</i> ), Poliovirus inactivated ( <i>Poliovax</i> ), Rabies ( <i>Imovax</i> ), Varicella ( <i>Varivax</i> ), Zoster ( <i>Zostavax</i> )
Human diploid tissue culture, WI-38	Rubella ( <i>Meruvax II</i> ), combination vaccines containing it, MMRV ( <i>ProQuad</i> ), Varicella ( <i>Varivax</i> ), Zoster ( <i>Zostavax</i> )
Lathan medium derived from bovine casein	DTaP ( <i>Infanrix</i> , tetanus component), DTaP-Hep B-IPV ( <i>Pediarix</i> ), Tdap ( <i>Boostrix</i> )
Lingoud-Fenton medium containing bovine extract	DTaP ( <i>Infanrix</i> diphtheria component), DTaP-Hep B-IPV ( <i>Pediarix</i> ), Tdap ( <i>Boostrix</i> )
Medium 199 (including amino acids, vitamins, sucrose, phosphate, glutamate, human albumin, fetal bovine serum)	Measles ( <i>Attenuvax</i> ), Mumps ( <i>Mumpsavax</i> ), combination vaccines containing them
Minimum essential medium (including amino acids, vitamins, fetal bovine serum, human albumin)	Rubella ( <i>Meruvax II</i> ), combination vaccines containing it
Monkey kidney tissue culture, Vero (Vervet or African green monkeys)	DTaP-Hep B-IPV (poliovirus component, <i>Pediarix</i> ), Poliovirus inactivated ( <i>Ipol</i> ), Rotavirus ( <i>RotaTeg</i> )
Mouse brain culture	Japanese encephalitis ( <i>JE-Vax</i> )
Mueller-Hinton agar medium	Meningococcal conjugate ( <i>Menactra</i> )
Mueller-Miller medium	Diphtheria and tetanus vaccines (most brands), meningococcal conjugate ( <i>Menactra</i> )
Puziss-Wright medium 1095	Anthrax ( <i>BioThrax</i> )
Rhesus fetal lung tissue culture	Rabies ( <i>BioRab</i> )
Stainer-Scholte medium	DTaP ( <i>Daptacel</i> , <i>Infanrix</i> , pertussis component), DTaP-Hep B-IPV ( <i>Pediarix</i> ), Tdap ( <i>Boostrix</i> )
Soy peptone broth	Pneumococcal ( <i>Pneumovax</i> )
Synthetic/semi-synthetic	Anthrax ( <i>BioThrax</i> ), BCG ( <i>Tice</i> ), DT (all brands), Td (all brands), Hib (all brands), Meningococcal ( <i>Menomune</i> ), Pneumococcal ( <i>Pneumovax-23</i> ), Typhoid inactivated ( <i>Typhim Vi</i> )
Watson-Scherp medium	Meningococcal conjugate ( <i>Menactra</i> )
Yeast or yeast extract (typically <i>Saccharomyces cerevisiae</i> )	Hepatitis A-Hepatitis B ( <i>Twinrix</i> ), Hepatitis B ( <i>Engerix-B</i> , <i>Recombivax-HB</i> ), Hib ( <i>HibTiter</i> , <i>PedvaxHIB</i> ), Hib-Hepatitis B ( <i>Comvax</i> ), Human papillomavirus ( <i>Gardasil</i> ), Medium for growing <i>Corynebacterium diphtheriae</i> strain C7 (b197) to obtain CRM <sub>197</sub> protein for conjugation to polysaccharides ( <i>HibTiter</i> , <i>Pneumovax</i> ).

<sup>a</sup> Proprietary names appear in italics.

- References:** Canadian National Advisory Committee on Immunization. Statement on thimerosal. *Can Comm Dis Rep*. 2003;29(ACS-1):1-10.
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