

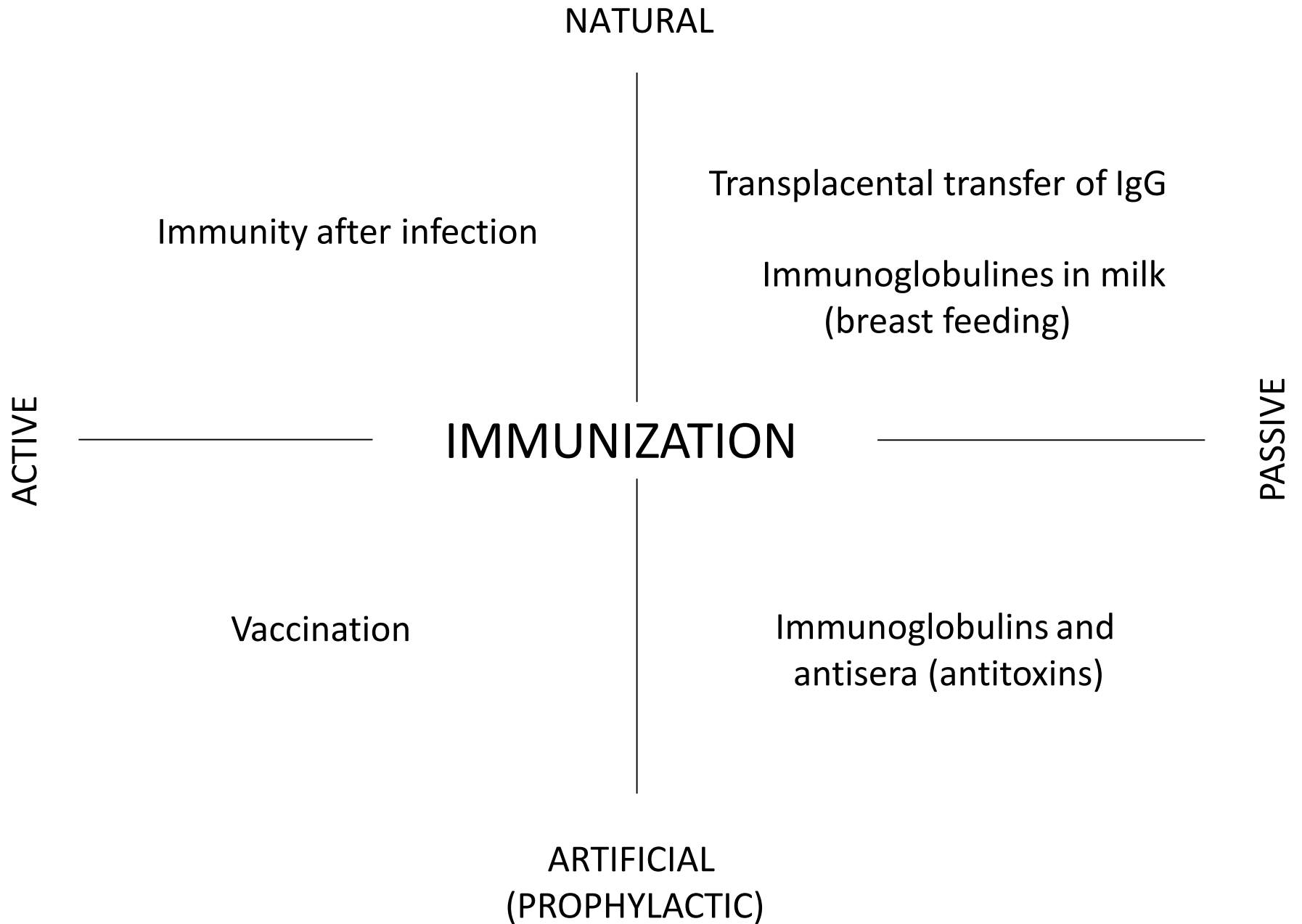


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Vaccines and sera



Active Immunization

Stimulates the host's immune system to produce specific antibodies or cellular immune responses or both which would protect against or eliminate a disease.

Passive Immunization

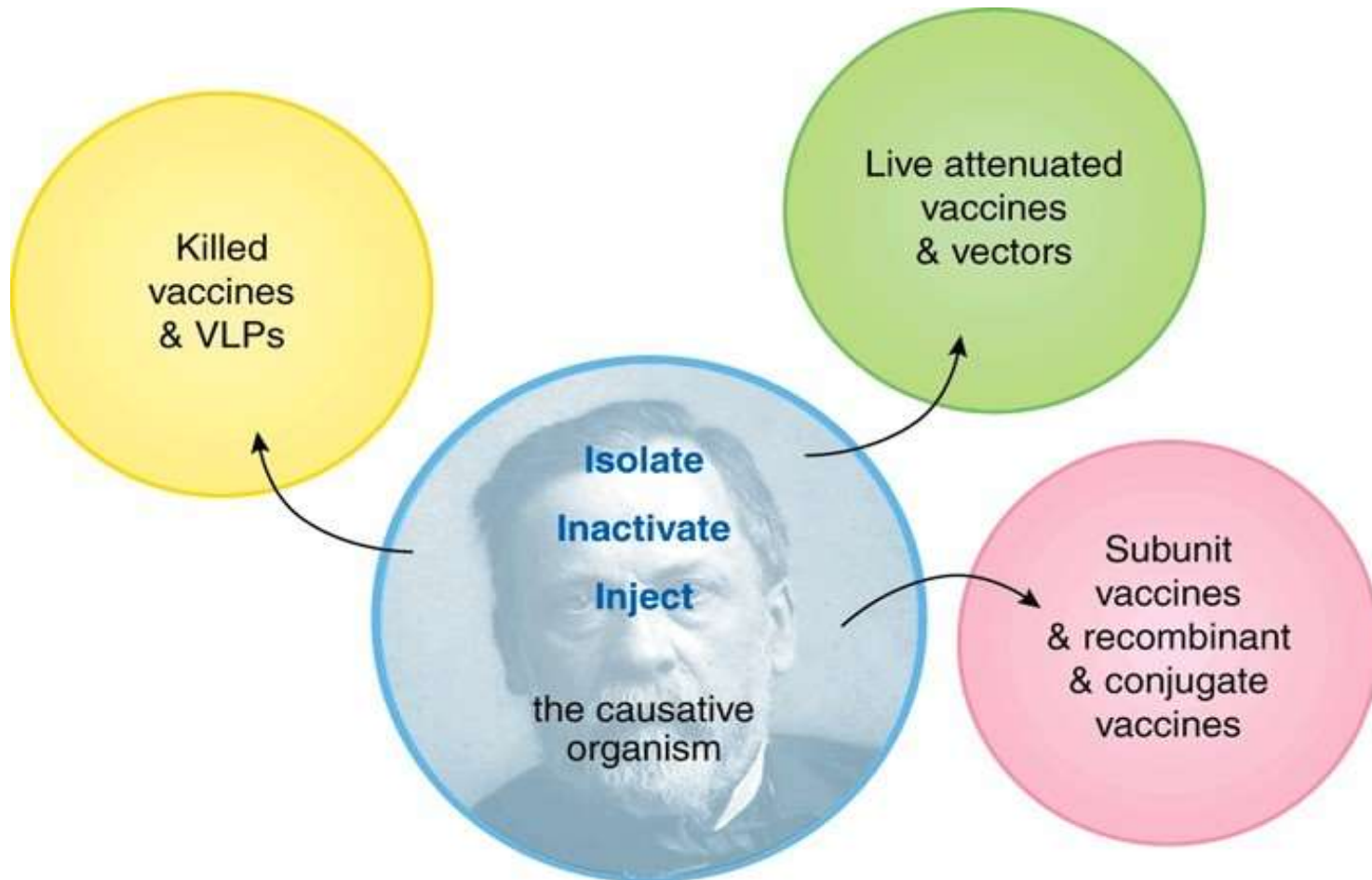
A preparation of antibodies that neutralizes a pathogen and is administered before or around the time of known or potential exposure.

Vaccines



Provide an **antigenic stimulus** that does not cause disease but can produce long lasting, protective **immunity**

Types of Vaccines and Their Characteristics



Routine immunization schedule for infants and children

At birth	BCG + OPV (first dose) + Hepatitis B (after 12–24 hours)
At 6 weeks	DPT + OPV + Hepatitis B
At 10, 14 weeks	DPT + OPV
At 6 months	Hepatitis B
At 9 months	Measles
At 15–18 months	DPT + MMR + OPV (booster dose)
At 4–5 years (School entry)	DT-DA + OPV (booster dose) Typhoid (TAB 2 doses/ Vi 1 dose/Ty 21a 3 doses) optional
At 10 years	TT + TAB/Vi/Ty 21a (optional)
At 16 years	TT
For pregnant women	
16–24 weeks	TT (1st dose)
24–34 weeks	TT (2nd dose)

How many **vaccines** will your child get?

- AT BIRTH**
 - > HepB
- ONE MONTH**
 - > HepB
- TWO MONTHS**
 - > RV
 - > DTaP - each shot has 3 vaccines
 - > Hib - each shot has 2 vaccines
 - > PCV - each shot has 8 vaccines
 - > IPV
- 4 MONTHS**
 - > RV
 - > DTaP - each shot has 3 vaccines
 - > Hib - each shot has 2 vaccines
 - > PCV - each shot has 8 vaccines
 - > IPV
- 6 MONTHS**
 - > RV
 - > DTaP - each shot has 3 vaccines
 - > Flu
 - > HepB
 - > Hib - each shot has 2 vaccines
 - > PCV - each shot has 8 vaccines
 - > IPV
- 12 MONTHS**
 - > HepA
 - > Hib - each shot has 2 vaccines
 - > PCV - each shot has 8 vaccines
 - > MMR - each shot has 3 vaccines
 - > Varicella
- 15 MONTHS**
 - > DTaP - each shot has 3 vaccines
- 18 MONTHS**
 - > Flu - annually throughout lifetime
 - > HepA
- 4-6 YEARS**
 - > DTaP - each shot has 3 vaccines
 - > IPV
 - > MMR - each shot has 3 vaccines
 - > Varicella
- 11-12 YEARS**
 - > MCV
 - > Tdap
 - > HPV - 3 doses

Too many.

Your child may receive up to **81** vaccines by six years of age.

Vaccination injects bacteria, viruses, genetic material and many other biological and toxic chemicals (mercury, aluminum, formaldehyde, acids) deep into the child's body, where they have access to internal organs (including the brain). The results are a host of illnesses that were rare or non-existent before mass vaccination. These conditions include, but are not limited to, the following:

Autism, juvenile diabetes, juvenile rheumatoid arthritis, reading problems, language difficulties, asthma, allergies, attention deficit disorder (ADD), ADHD, brain tumors, cancer, osteosarcoma, lupus erythematosus, dyslexia, abnormal behavior, deafness, hearing impairment, autoimmune diseases, hyperactivity, death, inflammatory bowel disease, irritable bowel disease, juvenile arthritis, brain inflammation, infantile spasms, seizures, epilepsy, convulsions, increased intracranial pressure, demyelinating disease, SIDS (crib death), Asperger's syndrome, pervasive developmental disorder, vision problems, otitis media (ear infection), upper respiratory tract infection, vomiting, fever, loss of I.Q. points, gastroenteritis, rash, croup, hives, eczema, colitis, choking, holding breath, thrush, pneumonia, bronchiolitis, influenza, vomiting, conjunctivitis, focal swelling, irritable child, permanent brain damage, encephalopathy (brain inflammation), sepsis, arthralgias (painful joints), nausea, headache, cardiac arrhythmias, syncope (fainting), cranial nerve paralysis, anaphylaxis, Guillain-Barré syndrome, Kawasaki disease (inflammation of heart and blood vessels), skin diseases, skin rashes, kidney disorders (including kidney failure), shingles, tuberculosis, carpal tunnel syndrome, paralytic disease, aseptic meningitis, Hodgkin's Disease and non-Hodgkin's lymphoma, atopic dermatitis, skin conditions

Note: These numbers, based on the 2009 CDC recommended schedule, are conservative as they do not include shots that are recommended for certain populations and there are currently over 200 additional vaccines in development.
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TDI • P40Pv3

Vaccines

DTaP/Tdap	Diphtheria, tetanus & pertussis
Flu	Influenza
HepA	Hepatitis A
HepB	Hepatitis B
Hib	Haemophilus influenzae type b
HPV	Human papillomavirus
IPV	Inactivated poliovirus
MCV	Meningococcal
MMR	Measles, mumps & rubella
PCV	Pneumococcal conjugate
RV	Rotavirus gastroenteritis
Varicella	Chickenpox

Make an **informed** choice.

Live (attenuated) vaccines

Principle

Immunization with attenuated (**weakened**) pathogen

Examples

Several viral vaccines (against polio (oral-Sabin), mumps, measles, rubella, varicella) and some bacterial (BCG for tuberculosis)...

Advantages

Induction of **both** humoral (Abs) and cellular response (CTLs)

Long-lasting immunity (administered in one or two doses)

Limitations

Risk in immunocompromised persons

Instability (thermolabile)

BCG (limited efficacy)

Inactivated (killed) vaccines

Principle

Immunization with **killed (inactivated)** whole infective agents

Examples

Vaccines against **pertussis**, typhoid, **polio (Salk)**, influenza...

Advantages

Greater stability

Safety (no risk of infection)

Limitations

Low immunogenicity (only Ab induced, adjuvant required)

Shorter immunity (multiple, booster administration required)

Subunit (antigenic) vaccines

Principle

Immunization with **structural antigens** (protein or polysaccharide) of pathogens or their products (e.g. toxoid)

Examples

Vaccine against pertussis (acellular), **tetanus and diphtheria (toxoid)**, influenza (Hemagglutinin and Neuraminidase), **hepatitis B (HBsAg)** and human papilloma virus (L1 protein) – so-called *virus-like particles* (VLP), pneumococcal and meningococcal polysaccharide vaccines...

Advantages

Same as for inactivated vaccines (greater safety)

Limitations

Same as for inactivated vaccines (lower immunogenicity)

- **Toxoids**, which are inactivated toxins, are vaccines directed at the toxins produced by a pathogen. The tetanus and diphtheria toxoids have long been part of the standard childhood immunization series. They require a series of injections for full immunity, followed by boosters every 10 years.

Combination vaccines

Examples

DT,
DPT/Hib, etc.
MMR, MMRV

Advantages:

only one needle at a visit
may reduce number of visits
reduces costs of administration
geographic tailoring

Disadvantages:

loss of immunogenicity due to competition

Immunotherapy – preformed Ab

Immune serum globulin – (gamma-globulin) contains immunoglobulin extracted from the pooled blood of at least 1,000 human donors

- Treatment of choice for preventing measles, hepatitis A and replacing Ab in the immune deficient
- Lasts 2-3 months

Sources of Passive Immunity

- Almost all blood or blood products
- Homologous pooled human antibody (immune globulin)
- Homologous human hyperimmune globulin
- Heterologous hyperimmune serum (antitoxin)

Classification the serum preparations

- **homogeneous serum**: serum obtained from blood donor volunteers, have been immunized.
- **heterogeneous serum**: serum obtained from blood of animals(horse) hyperimmunized.

Antisera from horse

- Tetanus antitoxin
- Gas gangrene antitoxin
- Diphtheria antitoxin
- Anti rabies serum
- Anti-snake venom polyvalent (cobra, 2 vipers, krait)

Immune globulins (human)

- Normal human gamma globulin
- Anti-D immune globulin
- Tetanus immune globulin
- Rabies immune globulin
- Hepatitis-B immune globulin

Hypersensitivity reactions

by injection of the heterogeneous serum

- **Anaphylactic shock**

Type I, or anaphylactic, reactions often occur within 2 to 30 minutes after a person sensitized to an antigen is reexposed to that antigen. Anaphylaxis means "opposite of protected," from the prefix ana-, meaning against, and the Greek phylaxis, meaning protection. Anaphylaxis is an inclusive term for the reactions caused when certain antigens combine with IgE antibodies.

Anaphylactic responses can be systemic reactions, which produce shock and breathing difficulties and are sometimes fatal, or localized reactions, which include common allergic conditions such as hay fever, asthma, and hives (slightly raised, often itchy and reddened areas of the skin).

- **Serum Sickness**

This is a systemic form of hypersensitivity of immediate reaction. It appears 7 to 12 days following single injection of high concentration of foreign serum