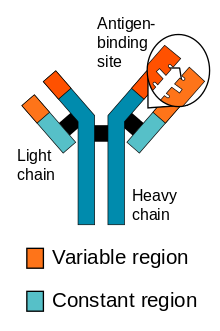
**Antibody (Ab):**

also known as an **immunoglobulin** (Ig), is a large Y-shape [protein](http://en.wikipedia.org/wiki/Protein) produced by [plasma cells](http://en.wikipedia.org/wiki/Plasma_cell) that is used by the [immune system](http://en.wikipedia.org/wiki/Immune_system) to identify and neutralize foreign objects such as [bacteria](http://en.wikipedia.org/wiki/Bacterium) and [viruses](http://en.wikipedia.org/wiki/Virus). The antibody recognizes a unique part of the foreign target, called an [antigen](http://en.wikipedia.org/wiki/Antigen). Each tip of the "Y" of an antibody contains **a**[**paratope**](http://en.wikipedia.org/wiki/Paratope) (a structure analogous to a lock) that is specific for one particular [**epitope**](http://en.wikipedia.org/wiki/Epitope) (similarly analogous to a key) on an antigen, allowing these two structures to bind together with precision. Using this binding mechanism, an antibody can tag a [microbe](http://en.wikipedia.org/wiki/Microbe) or an infected cell for attack by other parts of the immune system.

The production of antibodies is the main function of **the**[**humoral immune system**](http://en.wikipedia.org/wiki/Humoral_immune_system)



**Antibodies and description:**

|  |  |  |
| --- | --- | --- |
| **Name** | **Description** | **Antibody Complexes** |
| [IgA](http://en.wikipedia.org/wiki/IgA) | Found in [mucosal](http://en.wikipedia.org/wiki/Mucosal) areas, such as the [gut](http://en.wikipedia.org/wiki/Gut_(zoology)), [respiratory tract](http://en.wikipedia.org/wiki/Respiratory_tract) and [urogenital tract](http://en.wikipedia.org/wiki/Urogenital_tract), and prevents  colonization by [pathogens](http://en.wikipedia.org/wiki/Pathogen). Also found in saliva, tears, and breast milk. | [Some antibodies form complexes that bind to multiple antigen molecules.](http://en.wikipedia.org/wiki/File:Mono-und-Polymere.svg) |
| [IgD](http://en.wikipedia.org/wiki/IgD) | Functions mainly as an [antigen](http://en.wikipedia.org/wiki/Antigen) receptor on B cells that have not been exposed to antigens. |
| [IgE](http://en.wikipedia.org/wiki/IgE) | Binds to [allergens](http://en.wikipedia.org/wiki/Allergens) and triggers [histamine](http://en.wikipedia.org/wiki/Histamine) release from [mast cells](http://en.wikipedia.org/wiki/Mast_cells) and [basophils](http://en.wikipedia.org/wiki/Basophil), and is involved in  [allergy](http://en.wikipedia.org/wiki/Allergy). Also protects against [parasitic worms](http://en.wikipedia.org/wiki/Parasitic_worm). |
| [IgG](http://en.wikipedia.org/wiki/IgG) | provides the majority of antibody-based immunity against invading pathogens.  The only antibody capable of crossing the [**placenta**](http://en.wikipedia.org/wiki/Placenta)to give **passive immunity** to the [fetus](http://en.wikipedia.org/wiki/Fetus). |
| [IgM](http://en.wikipedia.org/wiki/IgM) | Eliminates pathogens in the early stages of B cell-mediated (humoral) immunity before sufficient  IgG. |

**Immunization:** **Vaccination**.

[Immunizations](http://www.medicinenet.com/immunizations/article.htm) work by stimulating the immune system, the natural disease-fighting system of the body. The most important elements of the immune system that are improved by immunization are the [**T cells**](http://en.wikipedia.org/wiki/T_cell)**,**[**B cells**](http://en.wikipedia.org/wiki/B_cell), and the [**antibodies**](http://en.wikipedia.org/wiki/Antibody)**B** cells produce. [**Memory B cells**](http://en.wikipedia.org/wiki/Memory_B_cell) and [**memory T cells**](http://en.wikipedia.org/wiki/Memory_T_cell) are responsible for a swift response to a second encounter with a foreign molecule.

## Passive and Active immunization:

**Passive** **immunization:**

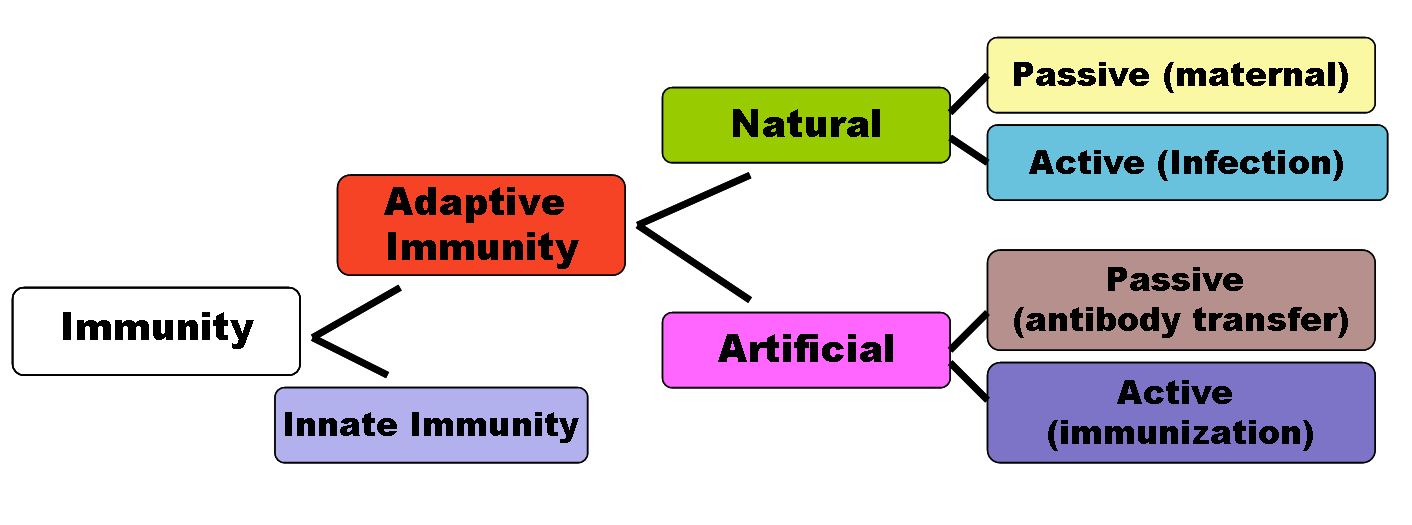
**naturally** : when maternal antibodies are transferred to the fetus through the placenta

**Artificial**: When administered by [i**njection**](http://en.wikipedia.org/wiki/Injection_(medicine)) and is used if there has been a recent outbreak of a particular disease or as an emergency treatment for toxicity, as in for [**tetanus**](http://en.wikipedia.org/wiki/Tetanus). The antibodies can be produced in animals, called "serum therapy," although there is a high chance of [**anaphylactic shock**](http://en.wikipedia.org/wiki/Anaphylactic_shock)because of immunity against animal serum itself. Thus, [**humanized antibodies**](http://en.wikipedia.org/wiki/Humanized_antibodies) produced [**in vitro**](http://en.wikipedia.org/wiki/In_vitro) by [**cell culture**](http://en.wikipedia.org/wiki/Cell_culture) are used instead if available

### Active immunization:

**naturally** : Active immunization can occur **naturally** when a person comes in contact with, for example, a microbe. The immune system will eventually create antibodies and other defenses against the microbe

**Artificial**: active immunization is where the microbe, or parts of it, are injected into the person before they are able to take it in naturally.



**There are four types of traditional**[**vaccines**](http://en.wikipedia.org/wiki/Vaccine):

* **Inactivated vaccines** :

are composed of micro-organisms that have been killed with chemicals and/or heat and are no longer infectious. Examples are vaccines against [flu](http://en.wikipedia.org/wiki/Influenza_vaccine), [cholera](http://en.wikipedia.org/wiki/Cholera), [plague](http://en.wikipedia.org/w/index.php?title=Plague_immunization&action=edit&redlink=1), and [hepatitis A](http://en.wikipedia.org/wiki/Hepatitis_A). Most vaccines of this type are likely to require booster shots.

* **Live,**[**attenuated**](http://en.wikipedia.org/wiki/Attenuator_(genetics))**vaccines**

are composed of micro-organisms that have been cultivated under conditions which disable their ability to induce disease. These responses are more durable and do not generally require booster shots. Examples include [yellow fever](http://en.wikipedia.org/wiki/Yellow_fever), [measles](http://en.wikipedia.org/wiki/Measles),[rubella](http://en.wikipedia.org/wiki/Rubella), and [mumps](http://en.wikipedia.org/wiki/Mumps).

* [**Toxoids**](http://en.wikipedia.org/wiki/Toxoid) :

are inactivated toxic compounds from micro-organisms in cases where these (rather than the micro-organism itself) cause illness, used prior to an encounter with the toxin of the micro-organism. Examples of toxoid-based vaccines include [tetanus](http://en.wikipedia.org/wiki/Tetanus) and [diphtheria](http://en.wikipedia.org/wiki/Diphtheria).

* [**Subunit vaccines**](http://en.wikipedia.org/wiki/Subunit_vaccine)**:**

are composed of small fragments of disease causing organisms. A characteristic example is the subunit vaccine against [Hepatitis B virus](http://en.wikipedia.org/wiki/Hepatitis_B_virus).

Most vaccines are given by [hypodermic](http://en.wikipedia.org/wiki/Hypodermic) or [intramuscular](http://en.wikipedia.org/wiki/Intramuscular) injection as they are not absorbed reliably through the gut. Live attenuated [polio](http://en.wikipedia.org/wiki/Polio) and some [typhoid](http://en.wikipedia.org/wiki/Typhoid) and [cholera](http://en.wikipedia.org/wiki/Cholera) vaccines are given [orally](http://en.wikipedia.org/wiki/Mouth) in order to produce immunity based in the [bowel](http://en.wikipedia.org/wiki/Bowel).