Two questions, four categories

These categories describe acquired immunity. Active or passive identifies the source of protection; natural or artificial identifies how it is acquired.

1. WHO PRODUCES THE ANTIBODIES?

Active: the person's own immune system responds to antigen. Passive: ready-made antibodies are received from another source. Both can give antigen-specific protection.

2. HOW WAS PROTECTION ACQUIRED?

NATURAL ACTIVE

Following infection

The person responds to pathogen antigens and develops their own immune response.

ARTIFICIAL ACTIVE

Following vaccination

A vaccine stimulates the recipient's own immune response to antigen.

NATURAL PASSIVE

Maternal antibody transfer

Antibodies pass from mother to fetus through the placenta, or reach a baby through breast milk.

ARTIFICIAL PASSIVE

Given antibody preparations

Ready-made antibodies are administered, for example an immune globulin preparation.

Natural means without deliberate medical administration in this classification. It does not mean innate immunity, safer immunity or stronger immunity.

Four categories and maternal transfer: OpenStax, Microbiology 18.5.
Active and passive mechanisms: CDC, Immunity Types.

Scope: Cambridge Biology 9700 syllabus, section 11.2, outcome 4, p. 31.

Make antibodies or receive them?

The source of antibody explains the differences in onset, duration and immune memory. Do not classify a response by whether the person feels ill.

1. THE KEY COMPARISON

Feature	Active	Passive
Antibody source	Own immune system	Another source
Initial protection	Takes time to develop	Rapid once available
Duration	Often long-lasting	Temporary
Memory generated	Usually develops	Not produced
Recall to antigen	Can be faster	No recall from transfer

2. WHY ACTIVE IMMUNITY TAKES TIME

Matching lymphocytes must be activated, multiply and differentiate. Plasma cells then secrete antibodies. Memory cells can remain after the response, supporting a quicker response on re-exposure.

3. WHY PASSIVE IMMUNITY FADES

The transferred antibodies can act without waiting for the recipient to make them. They are gradually broken down. The transfer itself does not generate antigen-specific memory cells in the recipient, so protection is not renewed by recall.

Long-lasting does not guarantee lifelong protection. The duration of active immunity varies with the antigen and immune response.

Onset, duration and immune memory: CDC, Principles of Vaccination.
Antibody transfer versus own response: CDC, Immunity Types.

Scope: Cambridge Biology 9700 syllabus, section 11.2, outcome 4, p. 31.

Classify the mechanism

First decide whether antibodies are made by the recipient or transferred to them. Then decide whether the route is natural or medically administered.

1. INFECTION: NATURAL ACTIVE

After an infection stimulates a person's own lymphocytes, any resulting antigen-specific immunity is naturally acquired and active. Infection does not guarantee complete or permanent protection, and it is not a recommended way to acquire immunity.

2. VACCINATION: ARTIFICIAL ACTIVE

A vaccine provides antigen, or instructions for making antigen, that stimulates the recipient's own immune response. It is not classified as passive just because something enters the body from outside.

3. MOTHER TO BABY: NATURAL PASSIVE

Maternal antibodies crossing the placenta protect the recipient baby without being made by the baby. Antibodies in breast milk provide protection mainly at mucosal surfaces. This protection is classified by antibody transfer, not by the baby making immune memory.

4. ANTIBODY ADMINISTRATION: ARTIFICIAL PASSIVE

An injection of prepared antibodies supplies immediate, temporary protection. It differs from a vaccine injection: the decisive distinction is antibody transfer versus stimulation by antigen, not the use of a needle.

Reliable shortcut: antigen stimulates an active response; transferred antibody supplies passive protection. Natural/artificial is a separate label.

Infection, vaccination and antibody administration: CDC, Explaining How Vaccines Work.
Natural and artificial categories, including maternal transfer: OpenStax, Microbiology 18.5.

Scope: Cambridge Biology 9700 syllabus, section 11.2, outcome 4, p. 31.