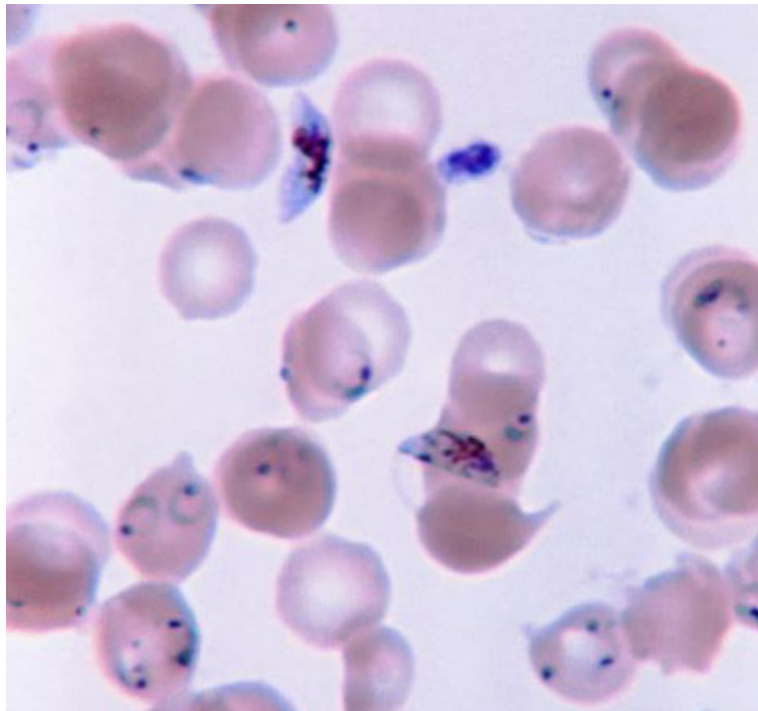


Parasite Predicament

An Introduction to Malaria and Enzyme-Linked Immunosorbent Assays

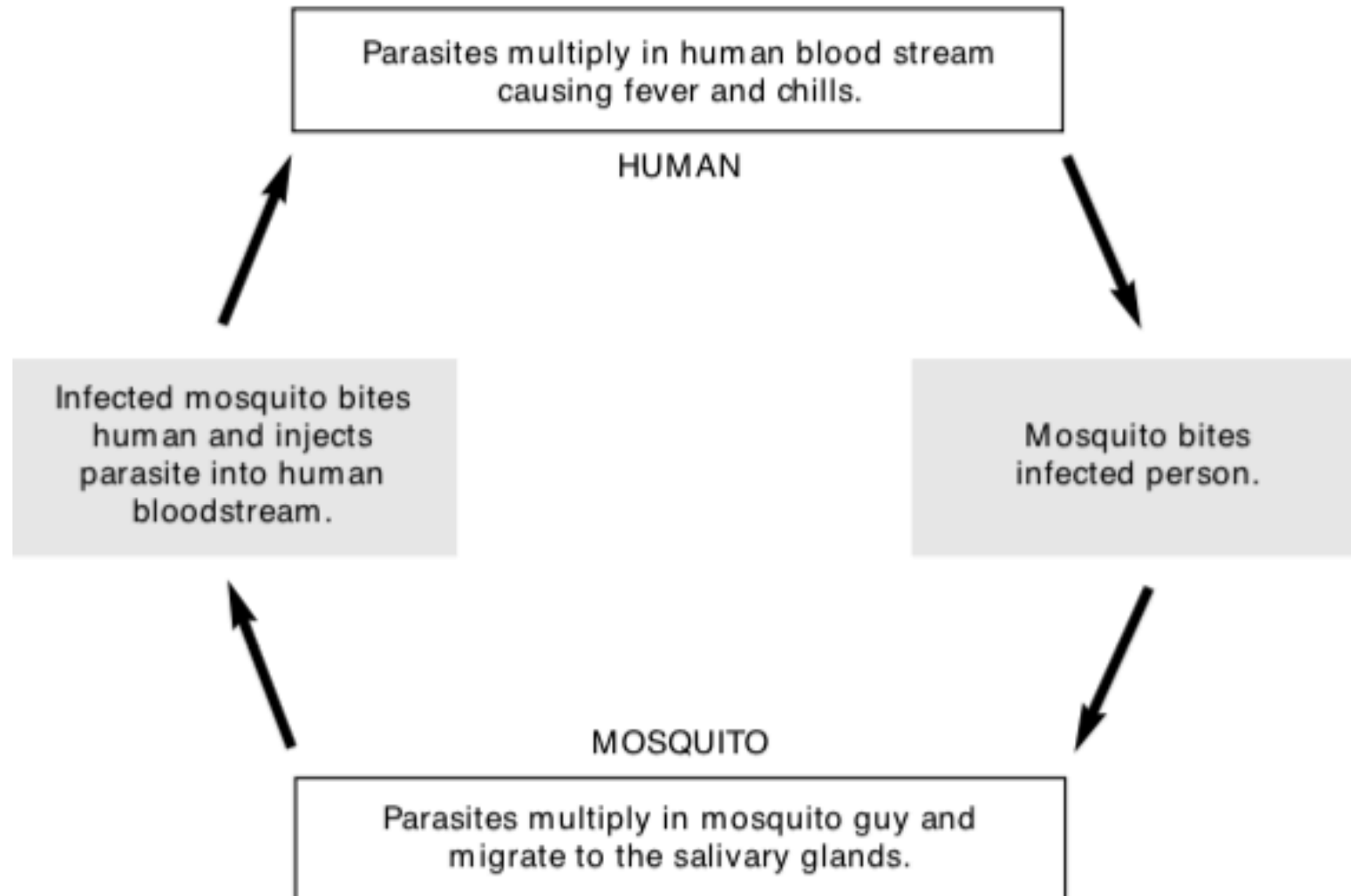
+ Malaria

- A disease caused by a *Plasmodium* parasite, transmitted by the bite of female infected *Anopheles* mosquitos





THE BASIC LIFE CYCLE OF A MALARIA INFECTION

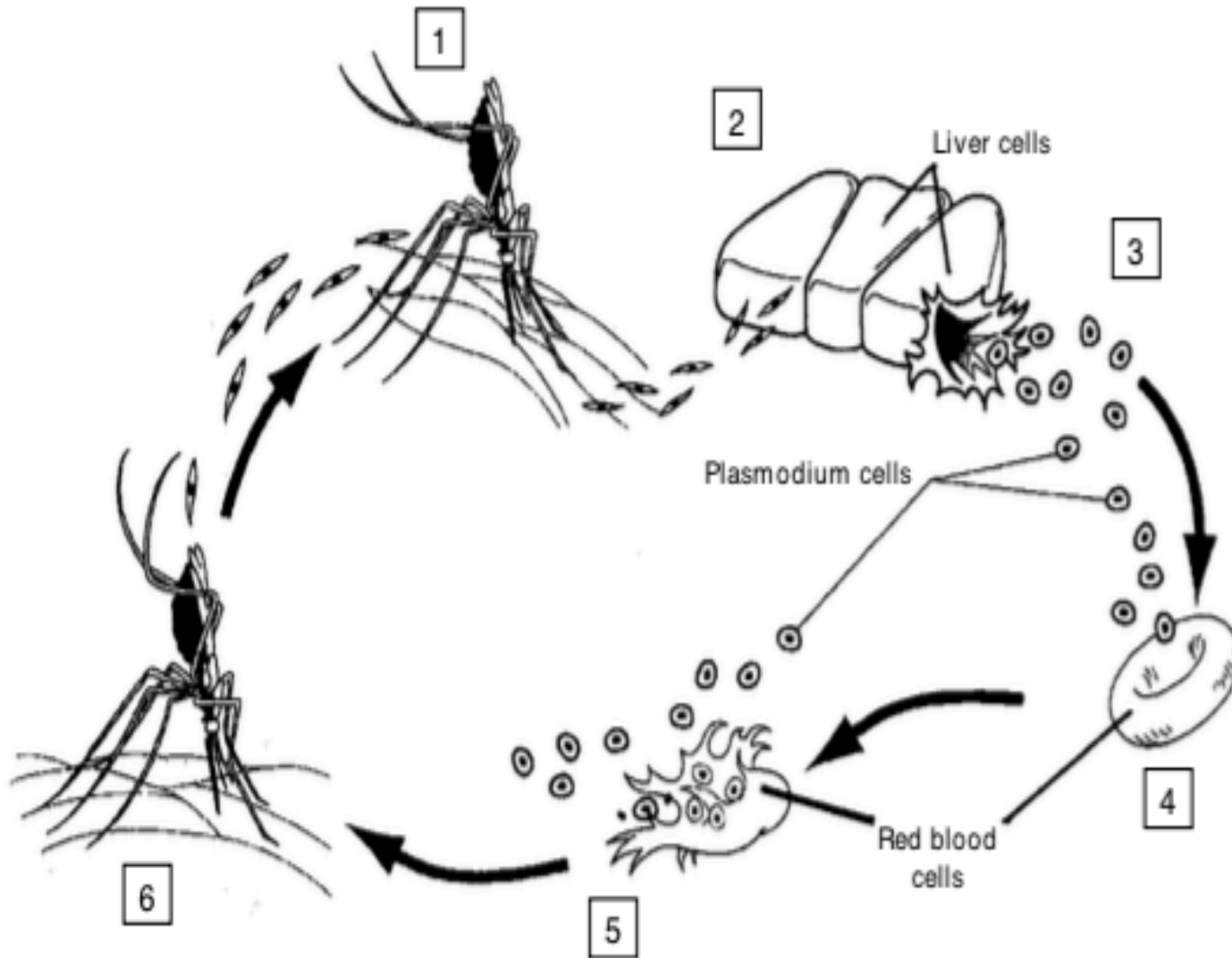


Adapted from: http://rbm.who.int/cmc_upload/0/000/015/372/RBMInfosheet_1.h

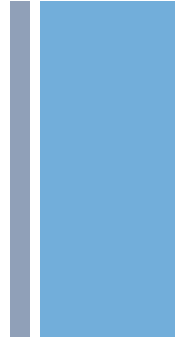


DETAILED LIFE CYCLE OF PLASMODIUM

(Diagram *Life Cycle of Plasmodium* used with permission from Addison-Wesley Biology 11,
Copyright © 2002 Pearson Education Canada Inc.)

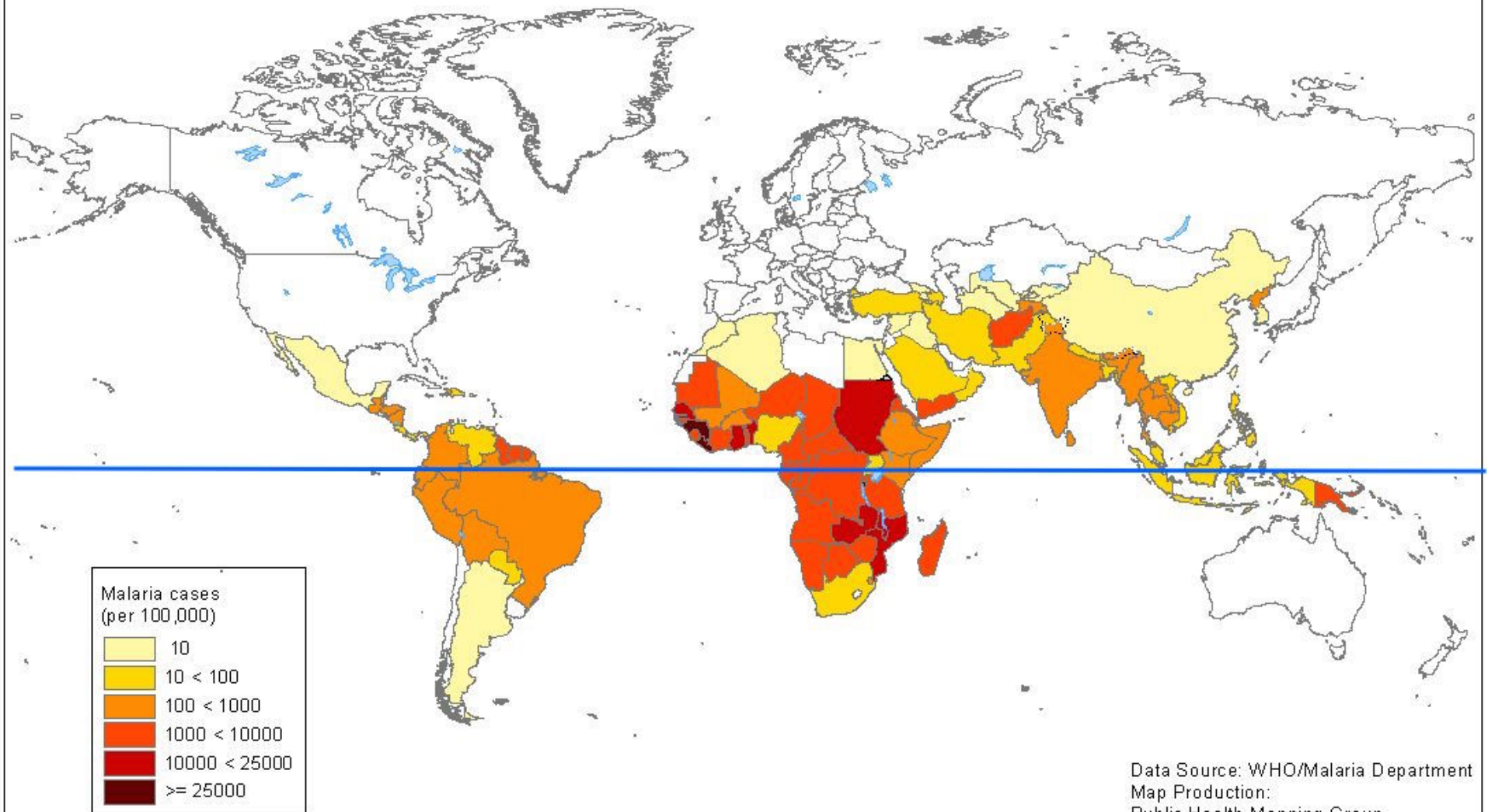


+ Geographic Prevalence



- Factors such as local rainfall patterns and location of mosquito breeding sites affect prevalence
- Some areas are malaria zones throughout the year, while others have malaria “seasons” that usually coincide with the local rainy season.

Malaria cases (per 100,000) by country, latest available data



The presentation of material on the maps contained herein does not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or areas or of its authorities, or concerning the delineation of its frontiers or boundaries.

Data Source: WHO/Malaria Department
Map Production:
Public Health Mapping Group
Communicable Diseases (CDS)
World Health Organization

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+ Symptoms and Diagnosis

Symptoms

- Include recurrent attacks of fever, chills, headaches, sweats, fatigue, and nausea

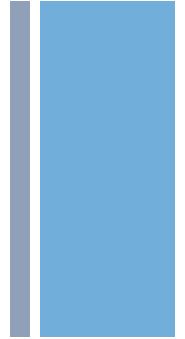
Diagnosis

- Parasites can be detected in a blood sample using microscopy
- An ELISA (enzyme-linked immunosorbent assay) can be used to diagnose malaria.

+ ELISA Overview

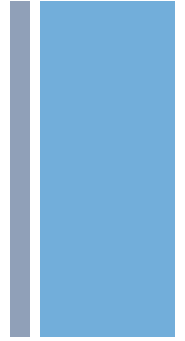
- Enzyme-linked Immunosorbent Assays (ELISA) use the antigen-antibody relationship to identify a substance

+ ELISA Uses



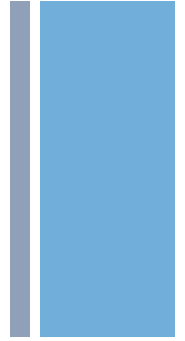
- Pregnancy tests:
 - Human chorionic gonadotropin hormone (antigen) is detected by the antibodies on the pregnancy test
- Allergens:
 - Cause an immune response elicited by an antigen that is not intrinsically harmful (i.e. pollen)

+ Antibody

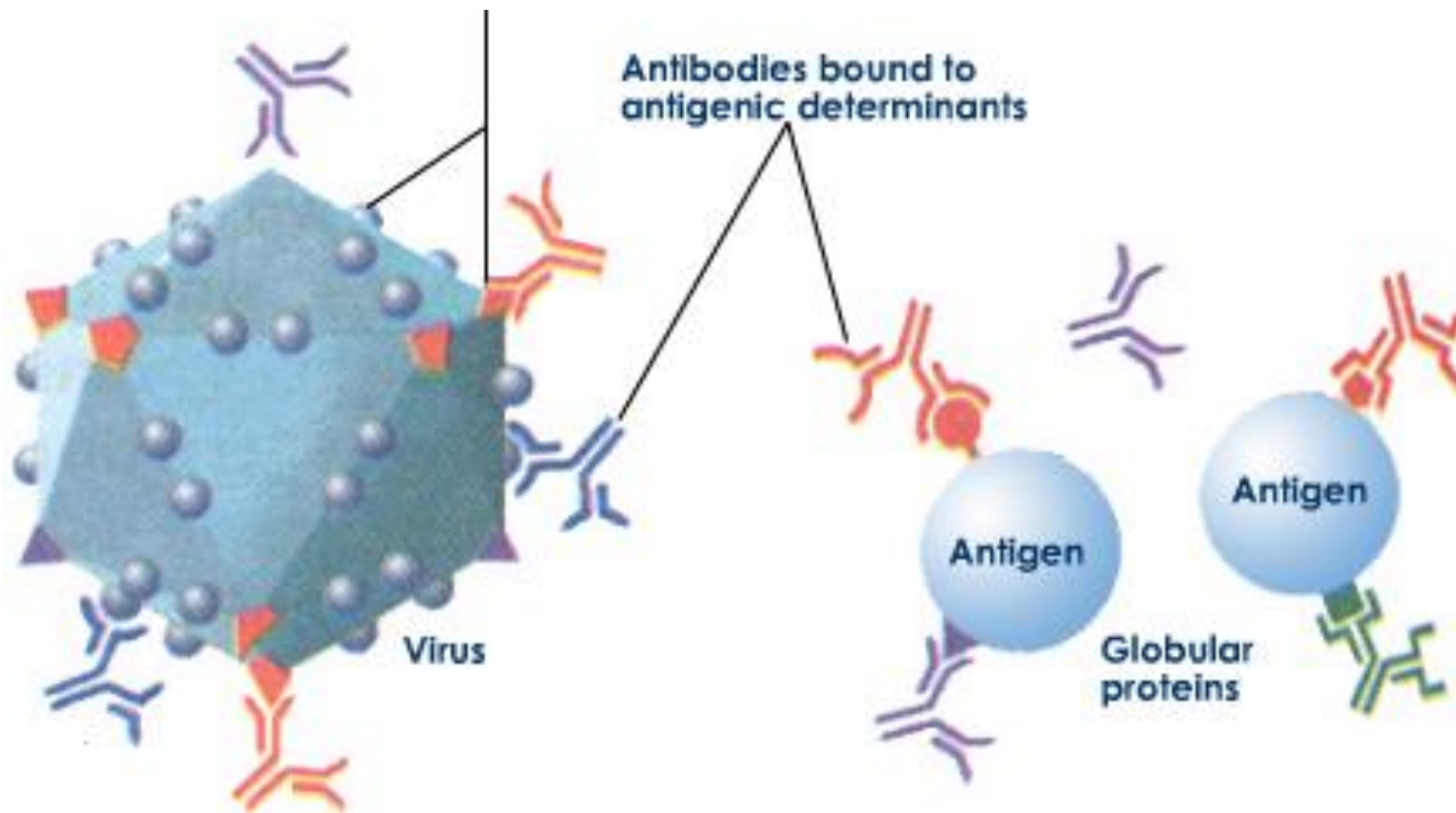


- A large Y-shaped protein that is used by the immune system to identify and neutralize pathogens
- The general structure of all antibodies are the same, except for the antigen-binding site, which is specific to a particular pathogen.
- This diversity allows the body to recognize and fight a wide variety of antigens

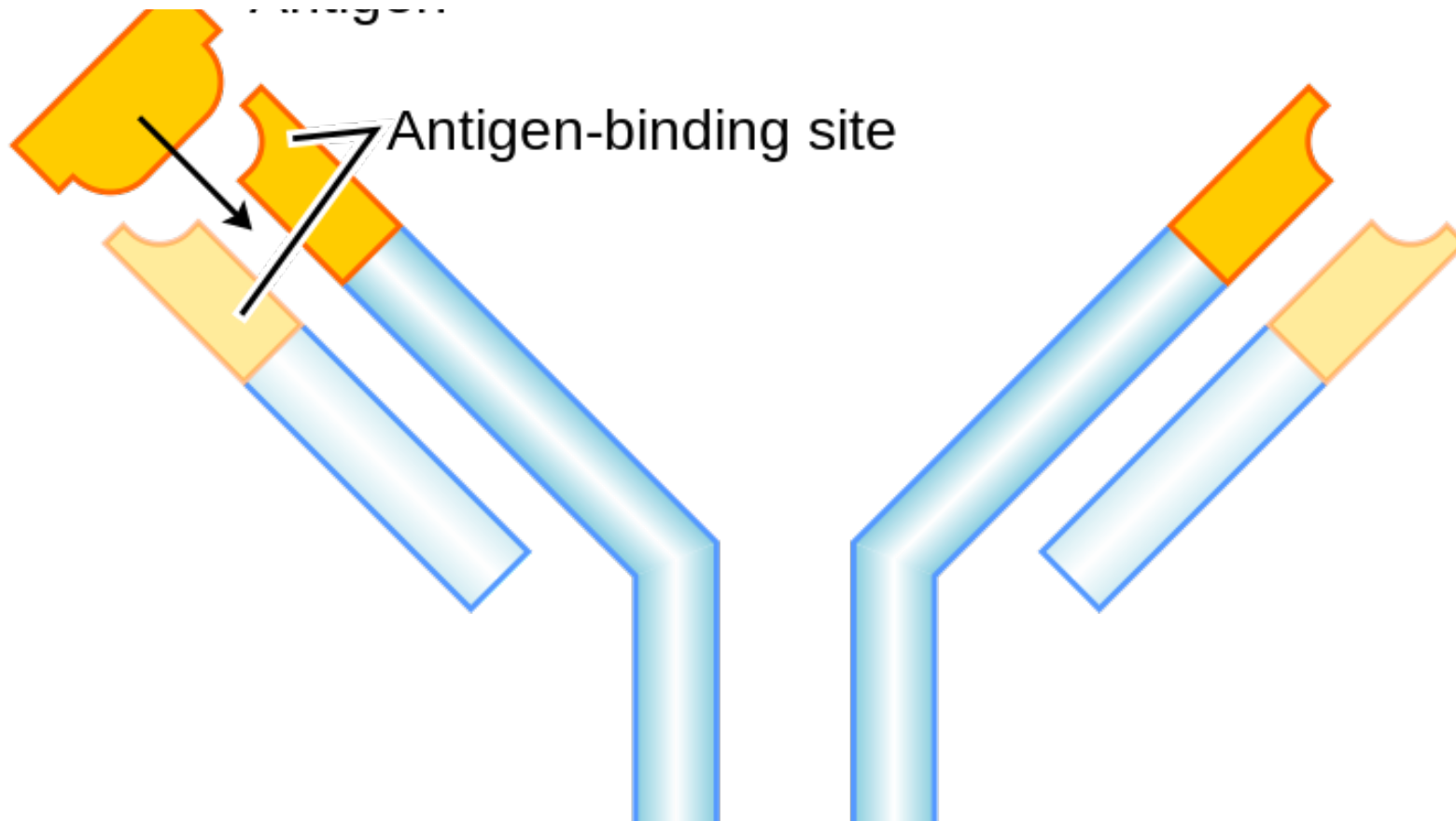
+ Antigen



- A protein found on the surface of a pathogen. Antigens are unique to the pathogen
- *Endogenous antigens* are generated within the body
 - Examples: tumors, examples for this are hard and confusing (bone autografts, skin autografts, autologous blood donations)
- *Exogenous antigens* enter the body from outside
 - Example: allergens, **parasites**, and bacteria.



+ Antigen-Antibody Complex



+ ELISA Results

- ELISAs utilize the specificity of the antigen-antibody relationship
- Color change (catalyzed by an enzyme) indicates the presence of the particular antigen or antibody of interest

