

# Vaccine Education Module: The Immune System

Updated: March 2012



# Roles of the Immune System

## **The immune system protects the body by:**

- Recognizing the presence of infection
- Containing the infection and working to eliminate it
- Regulating itself so it does not damage the body
- Remembering pathogens to prevent diseases from recurring

# Components of the immune system



**Dynamic communication network made up of:**

- Cells
- Tissues
- Organs

# Organs of the Immune System



Tonsils

Adenoid glands

Thymus

Lymph nodes

Lymphatic vessels

Spleen

Peyer's patches

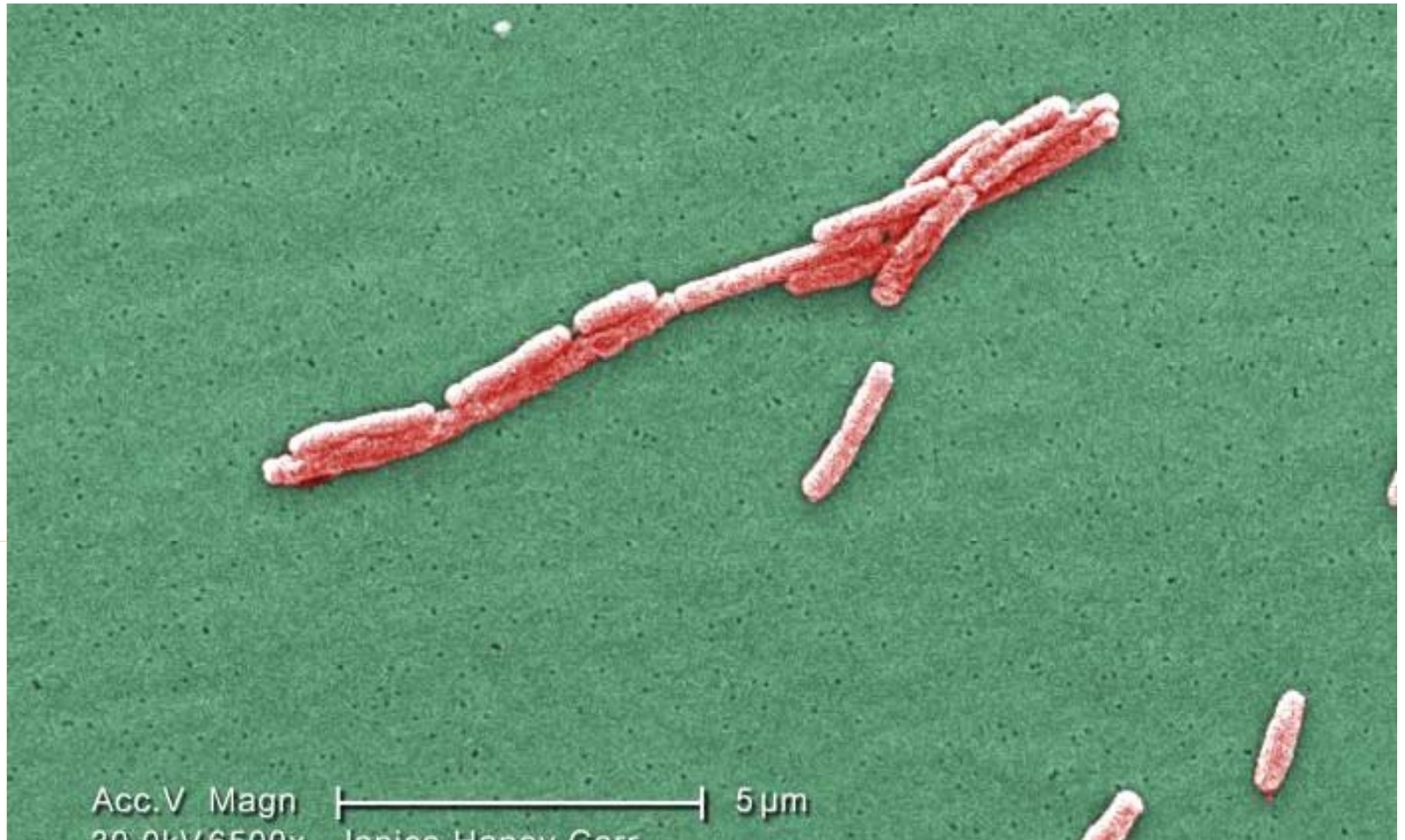
Appendix

Bone marrow

# Pathogens

## Organisms that can cause disease:

- Bacteria
- Viruses
- Parasites
- Fungi



## Example of a Type of Bacteria

Courtesy CDC, Public Health Image Library (PHIL)



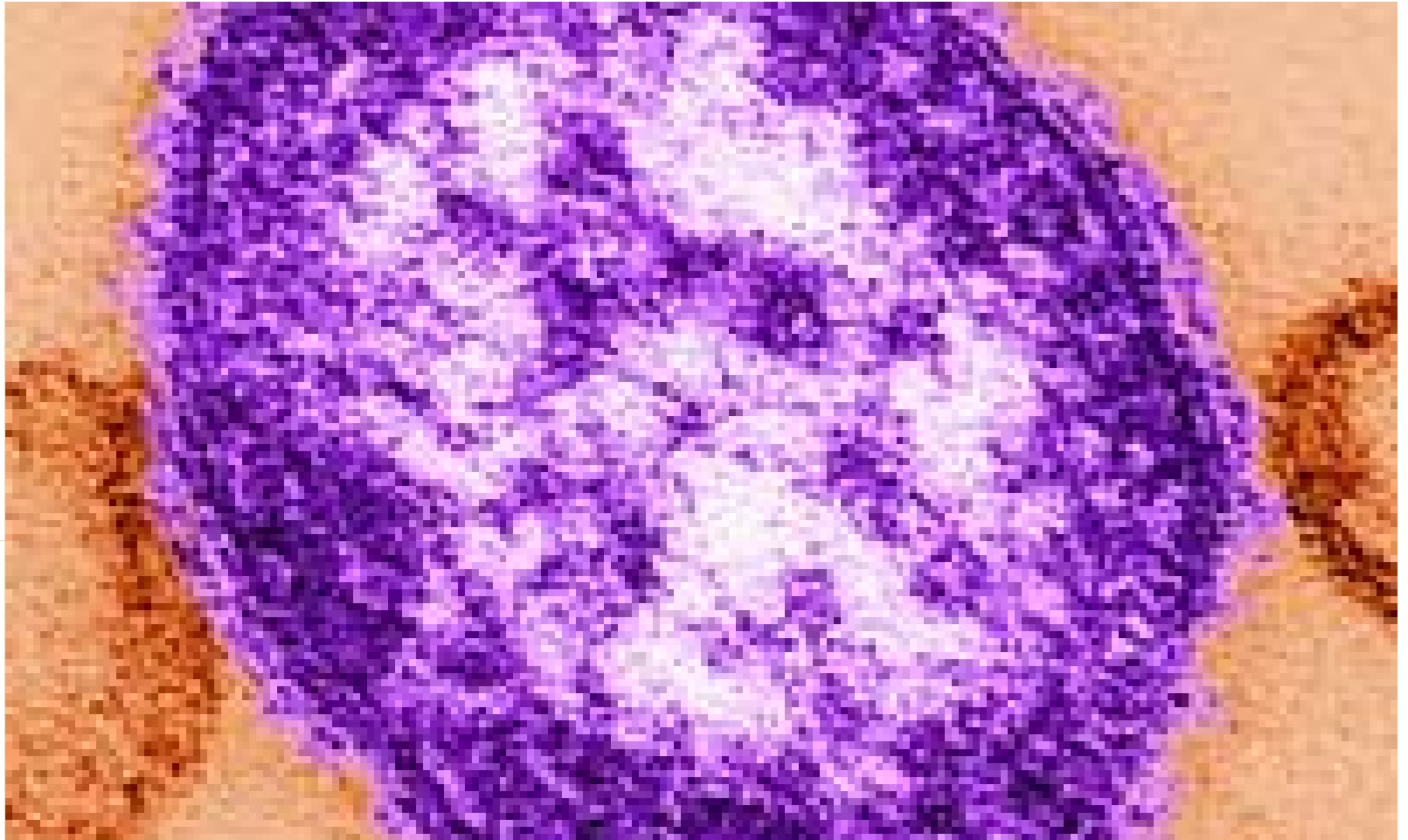
## Example of a Type of Bacteria

Courtesy CDC



## Influenza Virus

Photo Credit: Cynthia Goldsmith, CDC

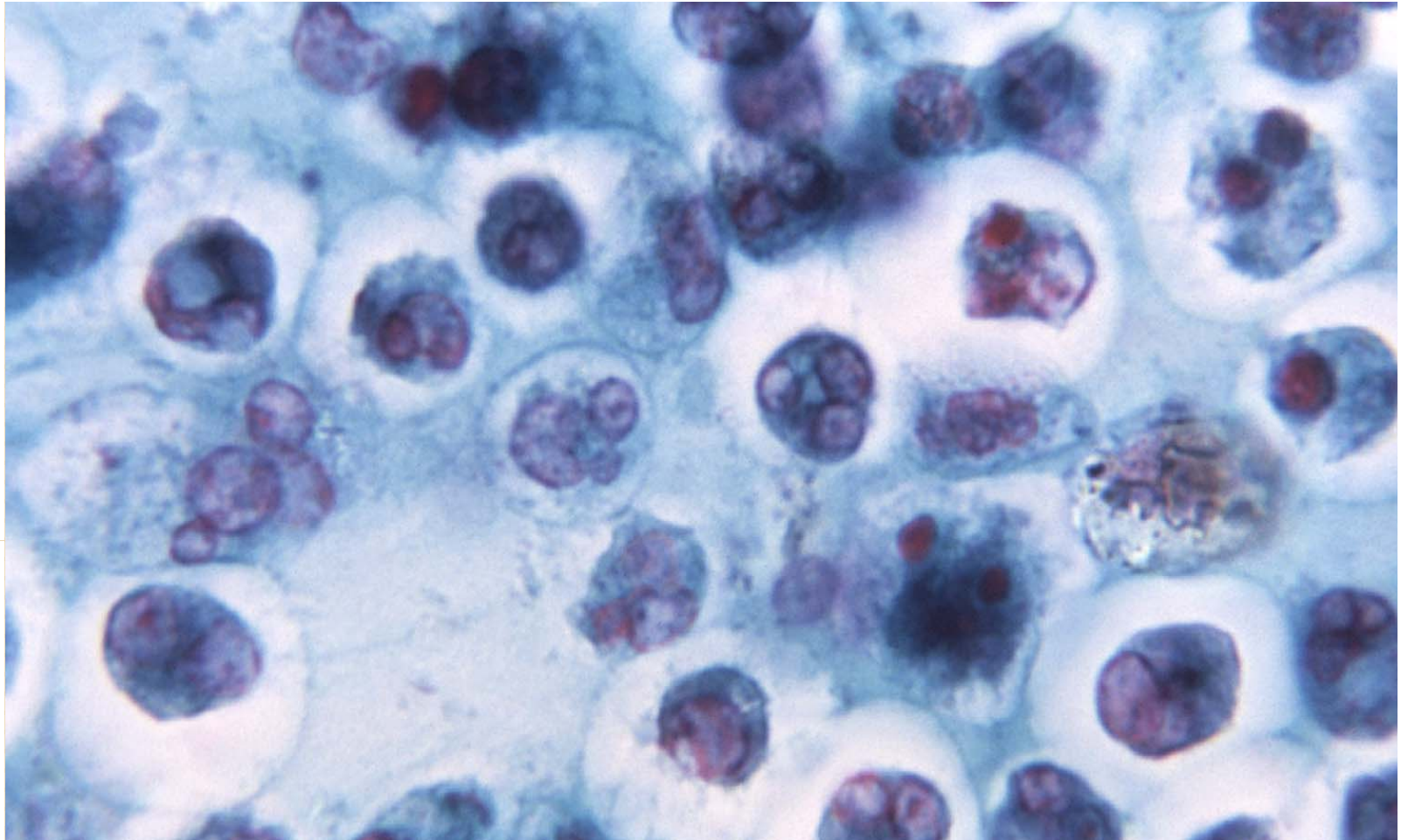


## Measles Virus

Photo Credit: Cynthia Goldsmith, CDC

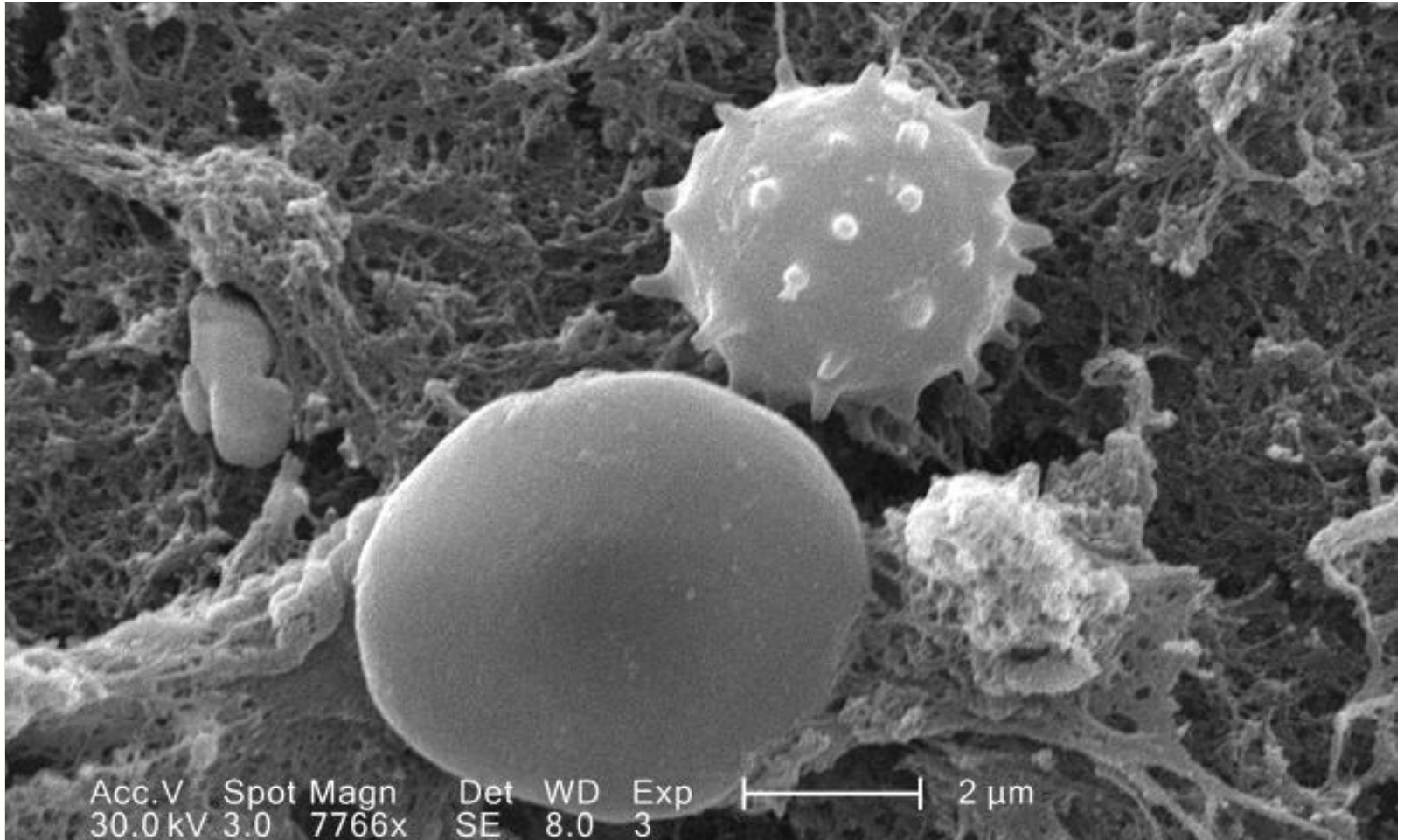
# Five Types of White Blood Cells

- Neutrophils: Phagocytose bacteria and fungi
- Eosinophils: Kill parasites, destroy cancer cells and are involved in allergic reactions
- Basophils: Release histamine and act in blood clotting
- Monocytes: Become macrophages; digest dead or damaged cells and pathogens
- Lymphocytes: Two major classes of these white blood cells
  - T cells
  - B cells



## White Blood Cells

Courtesy CDC, PHIL



## White Blood Cell

Courtesy CDC, PHIL

# T Cells



- Activate B cells to produce antibodies
- Activate macrophages to destroy antigens that have been tagged by antibodies
- Kill our own cells that are infected with viruses

# B Cells



- Produced in the bone marrow
- Primary role is to produce antibodies

# Antibodies



Y-shaped molecules with two distinct regions

- Constant region
- Variable region allows different antibodies to recognize different antigens

# Antibodies

- Proteins that neutralize antigens and prepare them for destruction by phagocytes
- Programmed to recognize and bind to the antigen so that it can be destroyed
- Activate a group of proteins called complement, which assist in killing pathogens