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# Understanding the Immune System

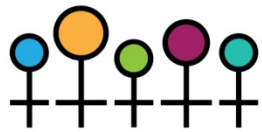
*Last updated: September 10, 2021*

*Together, we can change the course of the HIV epidemic...one woman at a time.*

#onewomanatatime

[www.thewellproject.org](http://www.thewellproject.org)

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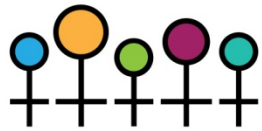


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# Understanding the Immune System

## *Your immune system is your body's defense system*

- Made up of **cells and organs** that protect your body from outside invaders that can cause infection and disease
- Gets rid of abnormal pre-cancerous cells and cancerous cells that are growing out of control
- When it's working, it fights off infection and keeps you healthy
- When it isn't, germs and other abnormal cells in the body can more easily cause disease



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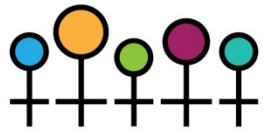
# Key Organs of the Immune System

## **Skin:**

- Single largest organ of the body
- First line of defense against germs – provides a physical barrier that keeps bacteria and viruses from entering the body

## **Bone Marrow:**

- Makes white blood cells that protect the body from invaders and possibly dangerous abnormal cells
- From the bone marrow, white blood cells travel to **lymph organs**



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# Key Organs of the Immune System

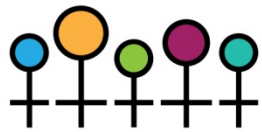
## Lymph Organs:

- **Lymph Nodes**

- Located in the neck, armpits, abdomen, and groin
- Contain cells ready to fight invaders

- **Spleen**

- About the size of a fist; located in the upper left of the abdomen
- Filters blood; identifies and gets rid of worn-out white blood cells

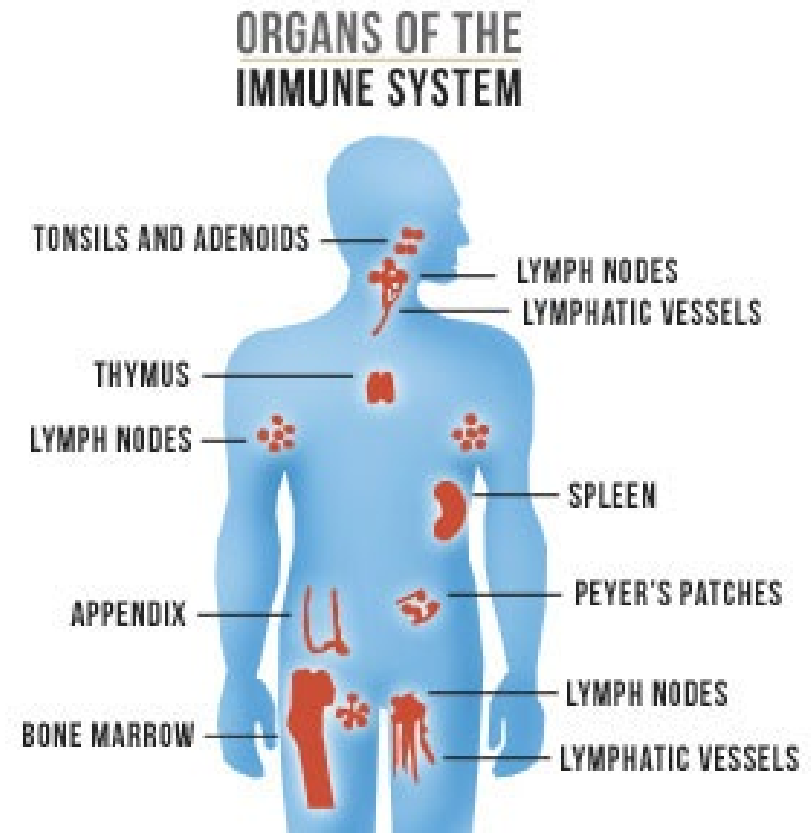


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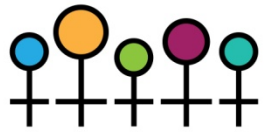
# Key Organs of the Immune System

## Other Lymph Organs:

- Peyer's patches
  - Clumps of tissue in the small intestine
- Thymus
- Appendix
- Tonsils and adenoids



*Credit: AIDS.gov*



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# Key Cells of the Immune System



## Key immune system cells include:

- Dendritic cells and macrophages
- T cells
- B cells

Credit: NobelPrize.org

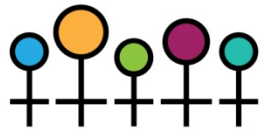


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# HIV and the Immune System

Your immune system recognizes and produces antibodies to HIV, but **antibodies alone are not enough to get rid of HIV**

- HIV changes (mutates) faster than the immune system can respond
- The HIV antibodies your body creates do not protect you against HIV or help you clear HIV from your body
- This is why having antibodies to HIV does not mean you are protected from HIV



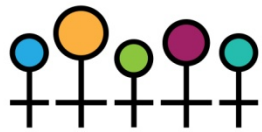
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# HIV and the Immune System

HIV turns CD4 T cells into **factories for making more copies of itself**

- As HIV reproduces, it damages or kills CD4 cells
- Without CD4 cells organizing the immune system to respond, immune cells do not know which invaders to remove from the body
  - Therefore at risk for opportunistic infections (OIs) and cancers that usually do not harm people with healthy immune systems



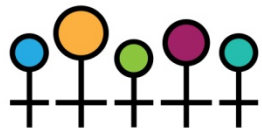


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# HIV Reservoirs

- Collections of inactive, “resting,” or latent HIV-infected cells
- Known reservoirs include immune cells in gut, lymphoid tissue, blood, brain, genital tract, bone marrow
- Completely eliminating HIV from the body will require emptying the reservoirs/preventing latent cells from multiplying

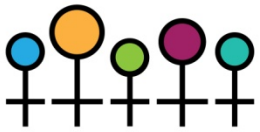
**Early treatment with a combination of HIV drugs can minimize the size of the reservoir**



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# HIV and the Immune System

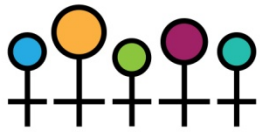
- Newer HIV drugs are more effective at stopping HIV from multiplying and infecting more CD4 cells
- Since CD4 cells are key to a healthy immune response, this can give your immune system a chance to replenish its supply of CD4 cells and to defend itself (you!) against opportunistic infections



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# Nutrition for a Strong Immune System

- Eating well is an important part of staying in good health
- Immune system of a person living with HIV is always activated or "turned on" – can produce inflammation
  - Related to heart disease, cancer, other conditions
- Several foods can help reduce inflammation (green leafy vegetables; broccoli; certain fish, fruits, nuts, oils, seeds, or spices; tomatoes; others)
- Nutritionist or registered dietician can help you figure out what kind of diet is best for you



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## Learn More!

- To learn more about this topic, please read the full fact sheet on this topic:
  - Fact sheet: [Understanding the Immune System](#)
- For more fact sheets and to connect to our community of women living with HIV, visit:
  - [www.thewellproject.org](http://www.thewellproject.org)
  - [www.facebook.com/thewellproject](https://www.facebook.com/thewellproject)
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