

IDF PRESENTS:

# BATTLE BANDS

*of the*



**JIM  
MUNNO**  
*and* THE IMMUNOS

VS

**OOZE**  
*and* THE INVADERS

**HEAD TO HEAD AT YOUR BODY AUDITORIUM**

**BROUGHT TO YOU BY THE**



# ENHANCE YOUR EXPERIENCE

Watch a video of the epic battle at [idfcommonground.org](http://idfcommonground.org)



## Get Ready for Battle of the Bands ... in Your Body!

Just like a rock band, the major organs of your immune system have to stay in tune and in time with each other to deliver a rockin' performance.

But beware! Invaders will try to knock you off the stage and steal the show, but when your immune system is in sync, it can't be beat.

# the IMMUNOS

EACH ONE IS A KILLER SOLOIST, BUT TOGETHER...THIS BAND REALLY ROCKS! KEEPING STUDENT BODIES EVERYWHERE SAFE AND SOUND.



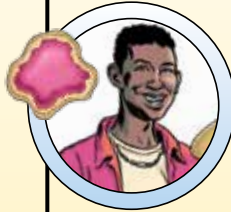
**JIM MUNNO:**  
REPRESENTING T CELLS—  
YOUR BODY'S MOST  
VERSATILE DEFENDERS



**FAYE:**  
REPRESENTING  
PHAGOCYTES—  
THEY'RE ALWAYS HUNGRY  
FOR ANOTHER HELPING  
OF INVADERS



**BRANDI:**  
REPRESENTING B CELLS—  
YOUR BODY'S  
STATE-OF-THE-ART  
SECURITY SYSTEM



**30 P:**  
REPRESENTING  
COMPLEMENT PROTEINS—  
30 FLAVORS OF  
VIRUS-COATING GLAZE  
PHAGOCYTES CAN SMELL  
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**NICKY:**  
REPRESENTING NATURAL  
KILLER CELLS—  
SPECIAL ATTACHMENT  
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**TERRY P. MUNNO:**  
REPRESENTING IMMUNE  
SYSTEM THERAPY—  
HELPING FORTIFY  
YOUR BODY'S DEFENSES

# THE INVADERS



**OOZE:**

REPRESENTING BACTERIA—  
THOSE PESKY ONE-CELLED  
ORGANISMS THAT  
MAKE US SICK



**SPORE:**

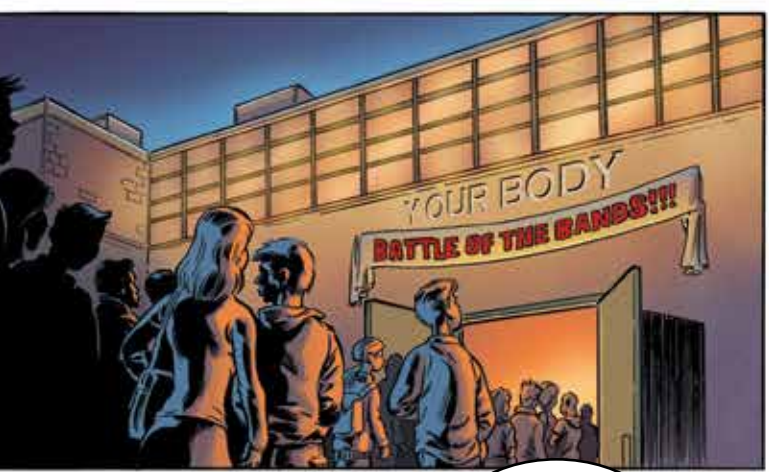
REPRESENTING FUNGI—PRIMITIVE  
MICROORGANISMS INCLUDING  
YEAST, MOLD, AND MUSHROOMS



**PEST:**

REPRESENTING VIRUSES—THE  
SECRET AGENTS OF INFECTION.  
ONCE THEY'RE IN, IT'S HARD TO  
TAKE THEM DOWN

TONIGHT!  
IT'S A BATTLE OF  
THE BANDS AT THE  
YOUR BODY AUDITORIUM.  
AN ANXIOUS CROWD  
WAITS FOR THE IMMUNOS  
TO SQUARE OFF AGAINST  
THE INVADERS! LITTLE DOES  
ANYONE KNOW, AN EVIL PLOT  
IS BEING HATCHED SOMEWHERE  
BEHIND THE CURTAIN . . .



**BACKSTAGE...**

**YESSSS!**  
IT LOOKED LIKE  
IT CAME DIRECTLY  
FROM THE PRINCIPAL.

**HAHA!** THOSE  
IMMUNOS WILL  
FALL FOR THAT  
FAKE E-MAIL FOR  
SURE, BOSS.

**PEST (AKA, VIRUS):**  
INFECTIOUS BEATS  
SICKENING PERSONALITY

**SPORE  
(AKA, FUNGI):**  
ALWAYS LURKING  
SOMEWHERE NEAR  
NEVER A FUN GUY

**HAHA!**

THAT'S THE IDEA. WITH  
THE IMMUNOS DISPOSED  
OF, THE STUDENT BODY  
WILL BE OURS!

**ALL OURS!**

**OOZE (AKA, BACTERIA):**  
MORE EVIL GENIUS  
THAN MUSICAL GENIUS



AH, PIZZA AND AN  
EXTRA NIGHT OF  
REHEARSAL

JUST WHAT WE  
NEED TO BEAT THOSE  
EVIL INVADERS  
TOMORROW NIGHT.

WAIT A MINUTE!  
DO I HEAR  
MUSIC?

**JIM (T CELLS) MUNNO:**  
ANCHORS THE BAND  
LEADER OF THE IMMUNE  
RESPONSE

THOSE DIRTY INVADERS  
TRICKED US! I SHOULD'VE KNOWN  
THAT E-MAIL POSTPONING THE  
SHOW WAS A FAKE!  
**THE BATTLE'S TONIGHT!**

**HOLY  
MICROPHONES!**

COME ON IMMUNOS,  
PICK UP! WE DON'T  
HAVE MUCH TIME . . .

**BRRRING...  
BRRRING...  
BRRRING...**



**THE MUNNOS' BASEMENT...**

HE DIDN'T GET JUST CHEESE, DID HE?

**SSHH!**  
SORRY. JIM,  
WHAT IS IT?

-- **WHAT? WAIT!**  
WE'RE PLAYING THE  
INVADERS TONIGHT!?

WE SHOULD'VE  
KNOWN... THE INVADERS  
TRIED TO TRICK US! THEY  
PULLED A FAST ONE!

**30 P (AKA, THE COMPLEMENT):**  
INFECTION PROTECTION  
ONLY HIS DRUM SOLOS ARE MORE BRILLIANT

**BRANDI (B) CELLS:**  
KILLER VOICE  
SHOW-STOPPING ANTIBODIES

WE CAN'T STAY  
HERE. THAT CROWD  
NEEDS US. **FAST!**

ARE WE READY,  
TERRY?

EVERYTHING'S  
PACKED.  
LET'S GO!

**NICKY (AKA, NK CELLS):**  
NATURAL ON THE IVORIES  
RUTHLESS ON VIRUSES

**FAYE  
(AKA, PHAGOCYTES):**  
FIGHTS HARD AGAINST INVADERS  
RIFFS EVEN HARDER ON BASS GUITAR  
ALL WALK, NO TALK

**TERRY P. MUNNO  
(AKA, THERAPY):**  
FINE-TUNES THE INSTRUMENTS  
JIM'S LITTLE BROTHER  
LOVES PEPPERONI

THIS CROWD IS REALLY HURTING, AND I'M NOT DOING MUCH BETTER. COME ON! HURRY, IMMUNOS . . .



THE CROWD'S LOOKING WEAK. WE CAN'T WAIT FOR JIM.

NICE DRIVING, FAYE

LET'S GET ON STAGE. NOW!

THANKS. I HOPE WE'RE HERE IN TIME!



WE'RE HERE FOR YOU . . . BEATING INVADERS IS WHAT WE DO!

MAKING YOU ILL! IT'S A

**THRILL!**





THE IMMUNOS?

WHAT ARE THEY DOING HERE?!!

**DRAT**



THEY'RE HERE!

THEY'LL NEED A FULL BAND TO . . . BEAT THE INVADERS. I'VE . . . GOT TO GET UP THERE.



THANKS. I'D HUG YOU, BUT COUGH, COUGH . . .

ARE WE SET?

HEY, BRO! YOU'VE LOOKED BETTER.

**YES. ROCK IT!**

DISEASE AND ILLNESS AREN'T NICE

WE'LL TAKE THEM OUT BEFORE YOU BLINK TWICE.



JIM'S JOINED THOSE PESKY IMMUNOS! LET'S TURN IT UP A NOTCH!!

**BLAST!**





OH NO!  
IT'S TOO MUCH!

**HISSESS**

MY DRUMSSSS!  
MY BEAUTIFUL  
DRUMSSSSSSSS!!

**AAAAARGH**

WHAT'S HAPPENING?!!

**BOOM!**

**AAAAARGH**

WE LOST THIS BATTLE,  
BUT THERE'LL ALWAYS  
BE ANOTHER BODY  
FOR US TO INFECT.

LET'S  
GET OUTTA HERE,  
INVADERS.  
WE'LL GET YOU  
NEXT TIME

**MINNNOOOOO!**

THANK YOU!

WE'RE  
JIM MUNNO AND  
THE IMMUNOS!

WE ROCK  
THE BODY!

A HEALTHY VICTORY OVER  
ILLNESS ONCE AGAIN!

WE STAND  
FOR HEALTH!



# THE IMMUNOS SAVED THE DAY

The crowd was saved that day at the Your Body Auditorium thanks to the incredible musical talent of Jim Munno and the Immunos. They still practice every day to keep their skills in tune to beat the Invaders or any other evil band that comes their way. Oh yeah, and Terry P. always keeps their instruments in tune—whenever he isn't too busy eating pepperoni pizza.



# A CLOSER LOOK AT YOUR IMMUNE SYSTEM AND ITS ENEMIES

## the IMMUNOS

Your immune system is a lot like a rock band, but instead of musicians, it's made up of a complex group of organs, tissues, cells, and proteins that protect you from germs, infections, and disease. When the immune system is out of sync or missing some key parts, it doesn't perform very well. But when it's in tune, like a tight band, the immune system is nearly unbeatable!



### JIM MUNNO:

REPRESENTING T CELLS—YOUR BODY'S MOST VERSATILE DEFENDERS

**T cells (aka, T lymphocytes)** develop in a special organ, the thymus, from stem cells that travel to the thymus from the bone marrow. There are three kinds of T cells with different jobs to do. **Killer T cells** destroy invaders. **Helper T cells** help B cells make antibodies and help killer T cells attack invaders. **Regulatory T cells** turn the immune response off once an infection has been cured so that the immune system doesn't destroy any healthy cells by mistake.

### BRANDI:

REPRESENTING B CELLS—YOUR BODY'S STATE-OF-THE-ART SECURITY SYSTEM

**B cells (aka, B lymphocytes)** develop from stem cells in the bone marrow. Eventually, B cells turn into plasma cells and make antibodies called Immunoglobulin G, A, and M. Antibodies travel around the body searching for foreign invaders and attach themselves to any they find. This starts a complex chain reaction, telling other parts of the immune system that they need to destroy the invaders.



**Immunoglobulin G, or IgG**—Long-lasting and made in large quantities.  
**Immunoglobulin A, or IgA**—Found near secretions such as tears, mucus, and saliva. Helps protect respiratory tract and digestive systems.  
**Immunoglobulin M, or IgM**—Important in the early days of an infection because they are the first antibodies to show up on the scene.



### NICKY

REPRESENTING NATURAL KILLER CELLS—SPECIAL ATTACHMENT TO VIRUSES

**Natural killer cells (NK cells)** develop in the bone marrow and seek out and destroy viruses. NK cells are born killers and don't need the thymus to develop. They get their job done by injecting a killer chemical mixture into virus-infected cells.

## THE INVADERS

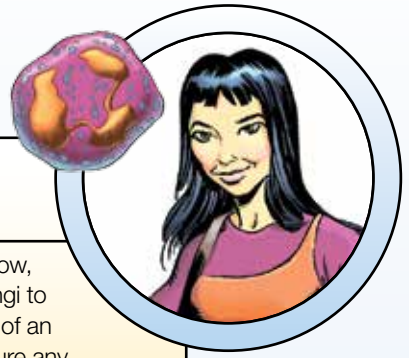


### OOZE:

REPRESENTING BACTERIA—THOSE PESKY ONE-CELLED ORGANISMS THAT MAKE US SICK



**Bacteria** are the most abundant group of organisms on the planet. Not all bacteria can cause problems, but some are pathogenic bacteria that cause disease. When the body's skin or mucous membranes are broken due to disease, inflammation, or injury, bacteria can enter the body. Your immune system usually limits the impact bacteria can have on your health. If the number of bacteria is overwhelming and the immune system is damaged, you can get recurrent bacterial infections.



**FAYE:**

REPRESENTING PHAGOCYTES—THEY'RE ALWAYS HUNGRY FOR ANOTHER HELPING OF INVADERS

**Phagocytes** are cells that develop from stem cells in the bone marrow, and once mature, they search the body for invading bacteria and fungi to eat. Of the different kinds of phagocytes, neutrophils race to the site of an infection in minutes. Monocytes circulate in the bloodstream to capture any invaders they find in the blood. When monocytes leave the bloodstream and enter tissues, they become macrophages. Macrophages ingest invading microorganisms and destroy infected cells.



**30 P:**

REPRESENTING COMPLEMENT PROTEINS—30 FLAVORS OF VIRUS-COATING GLAZE PHAGOCYTES CAN SMELL FROM A MILE AWAY

The body uses 30 different **complement proteins** that work together to defend against infection and cause inflammation. Most of these proteins are produced in the liver. When antibodies bind to an invading microorganism, complement proteins become activated. Once active, they coat invaders and make them easier for the phagocytes to ingest. Then they send out signals to attract more phagocytes to the site of infection. Complement proteins can also punch holes in the outer membranes of some cells and bacteria, causing them to burst.

**TERRY P. MUNNO:**

REPRESENTING IMMUNE SYSTEM THERAPY—HELPING FORTIFY YOUR BODY'S DEFENSES

Invading germs can become a big problem if the immune system is not working correctly or is missing some key parts. Thankfully, **therapy** is available to help make the immune system as close to normal as possible. Antibody replacement, antibiotics, interleukins, PEG-ADA, gamma interferon, bone marrow transplantation, and gene therapy are all methods of therapy that can boost the immune system. Always consult your attending physician before picking a therapy option that is right for you.



**SPORE:**

REPRESENTING FUNGI—PRIMITIVE MICROORGANISMS INCLUDING YEAST, MOLD, AND MUSHROOMS

**Fungi**, like yeast and mold, are usually found in the form of spores in the air and in the soil. Fungi are microorganisms that are usually controlled by your immune system, so fungal infections are rarely serious. However, for someone with primary immunodeficiency, fungal infections can sometimes become problematic.



**PEST:**

REPRESENTING VIRUSES—THE SECRET AGENTS OF INFECTION. ONCE THEY'RE IN, IT'S HARD TO TAKE THEM DOWN

Unlike bacteria, **viruses** can only survive and multiply within living cells of your body. When a cell is infected by a virus, the cell releases chemical signals calling other cells to help fight off the virus and prevent other cells from becoming infected.



# Check Out the Major Players of the Immune System

## **Bone Marrow:** *Where the beat begins*

All cells of your immune system begin their development in the bone marrow, like kids beginning their first music lessons.



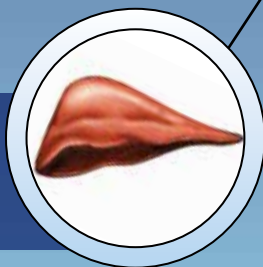
## **The Tonsils:** *The bouncers*

Located in the throat, your tonsils guard the entryway to the respiratory and digestive systems, getting rid of unruly bacteria.



## **The Liver:** *Where mad beats and bass lines are born*

The liver synthesizes proteins of the complement system and contains phagocytic cells that devour bad bacteria.



The Immune Deficiency Foundation (IDF), founded in 1980, is the national patient organization dedicated to improving the diagnosis, treatment and quality of life of persons with primary immunodeficiency diseases through advocacy, education and research.

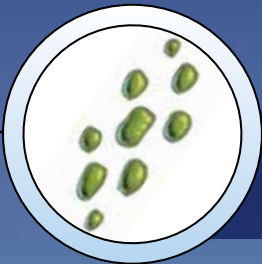
Visit [www.primaryimmune.org](http://www.primaryimmune.org).





**Thymus:**  
*Tuning talent*

Mere amateur musicians, lymphocytes leave the bone marrow for the thymus so they can become talented, professional rockers known as T lymphocytes (T cells).



**Lymph Nodes:**  
*Creating the set list*

B lymphocytes (B cells) and T cells congregate in lymph nodes to communicate with each other, creating their set list for Battle of the Bands.



**The Spleen:**  
*The concert stage*

The spleen contains a collection of T cells, B cells, and monocytes. It filters the blood and provides a stage for organisms and cells to rock.



**Blood:**  
*The tour bus on the highway*

As the tour bus, blood carries cells and proteins from one part of the body to another.

On behalf of those with primary immunodeficiency diseases, IDF provides educational programs and materials that offer medical information, guidance about health insurance issues, important life management and patient care resources, and support for patients and family members. IDF supports advocacy to promote healthcare legislation and policies that positively affect the primary immunodeficiency community, and research and medical programs that improve diagnosis and treatment.



It's on your wavelength

# IDF Teen PROGRAM

Created exclusively for teens diagnosed with a primary immunodeficiency disease (PIDD), the IDF Teen Program promotes friendship, provides education and peer support, builds leadership skills, and encourages teens with a PIDD to live life to the fullest.

**SIGN UP TODAY**

at [www.idfcommonground.org](http://www.idfcommonground.org)

## THE IDF COMMON GROUND TALK SHOW

Get in on the conversation with a talk show and website just for you!



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