IDF PRESENTS: BATTLE OF THE BANDS

HEAD TO HEAD AT YOUR BODY AUDITORIUM

BROUGHT TO YOU BY THE

IMMUNE DEFICIENCY FOUNDATION
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

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
FROM A MILE AWAY

NICKY:
REPRESENTING NATURAL
KILLER CELLS—
SPECIAL ATTACHMENT
TO VIRUSES

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

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

PEST (AKA, VIRUS):
INFECTION BEATS
SICKENING PERSONALITY

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

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

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

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

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

ALL OURS!
Those dirty Invaders tricked us! I should've known that e-mail postponing the show was a fake! The battle's tonight!

Jim (T cells) Munno: Anchors the Band
Leader of the Immune Response

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?

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...
Thanks. I hope we're here in time!

Brandi (B) Cells:
Killer voice
Show-stopping antibodies

30 P (aka, The Complement):
Infection protection
Only his drum solos are more brilliant

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

Shhh!
Sorry, Jim, what is it?

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

He didn't get just cheese, did he?

Sshh!
Sorry, Jim, what is it?

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

We can't stay here. That crowd needs us. FAST!

Are we ready, Terry?

Everything's packed. Let's go!

The Munnos' basement...

Faye (aka, Phagocytes):
Fights hard against invaders
Riffs even harder on bass guitar
All walk, no talk

Nicky (aka, NK Cells):
Natural on the ivories
Ruthless on viruses

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 . . .

Thanks, I hope we're here in time!

Nice driving, Faye!

The crowd's looking weak. We can't wait for Jim.

Let's get on stage, now!

We're here for you . . . beating invaders is what we do!

Making you ill! It's a thrill!
Jim's joined those pesky Immunos!

let's turn it up a notch!!

What are they doing here?!!

The Immunos?

Disease and illness aren't nice.
We'll take them out before you blink twice.

Hey, Bro! You've looked better.

Thanks. I'd hug you, but cough, cough...

Are we set?

They'll need a full band to... beat the invaders. I've... got to get up there.

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!
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.

AAAARGHH

HISSSSS

WHAT'S HAPPENING?!!

AAARRGH

MY DRUMSSSSS!
MY BEAUTIFUL DRUMSSSSSS!!

BOOM!

MUNNOOOO!
A Healthy Victory Over Illness Once Again!

We rock the body!

We stand for health!

We're Jim Munno and the Immunos!

Thank you!
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.
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!

**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.

**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.

**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.
A Closer Look at Your Immune System and its Enemies

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.

Terry P. Munno:
Representing Immune System Therapy—Helping Fortify Your Body’s Defenses

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.

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.

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.
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).

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.
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.

**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.
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