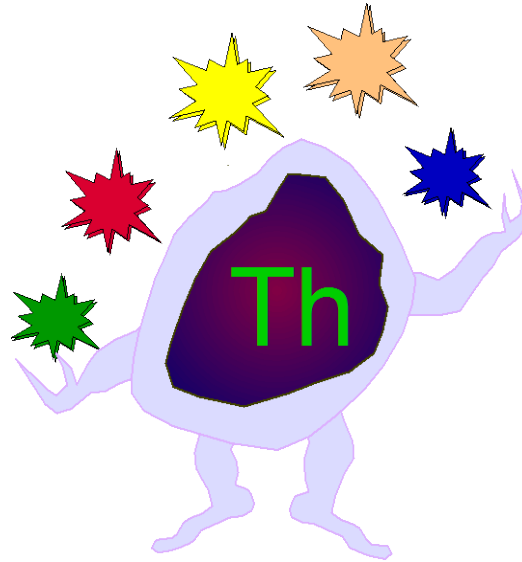


Meet the Team

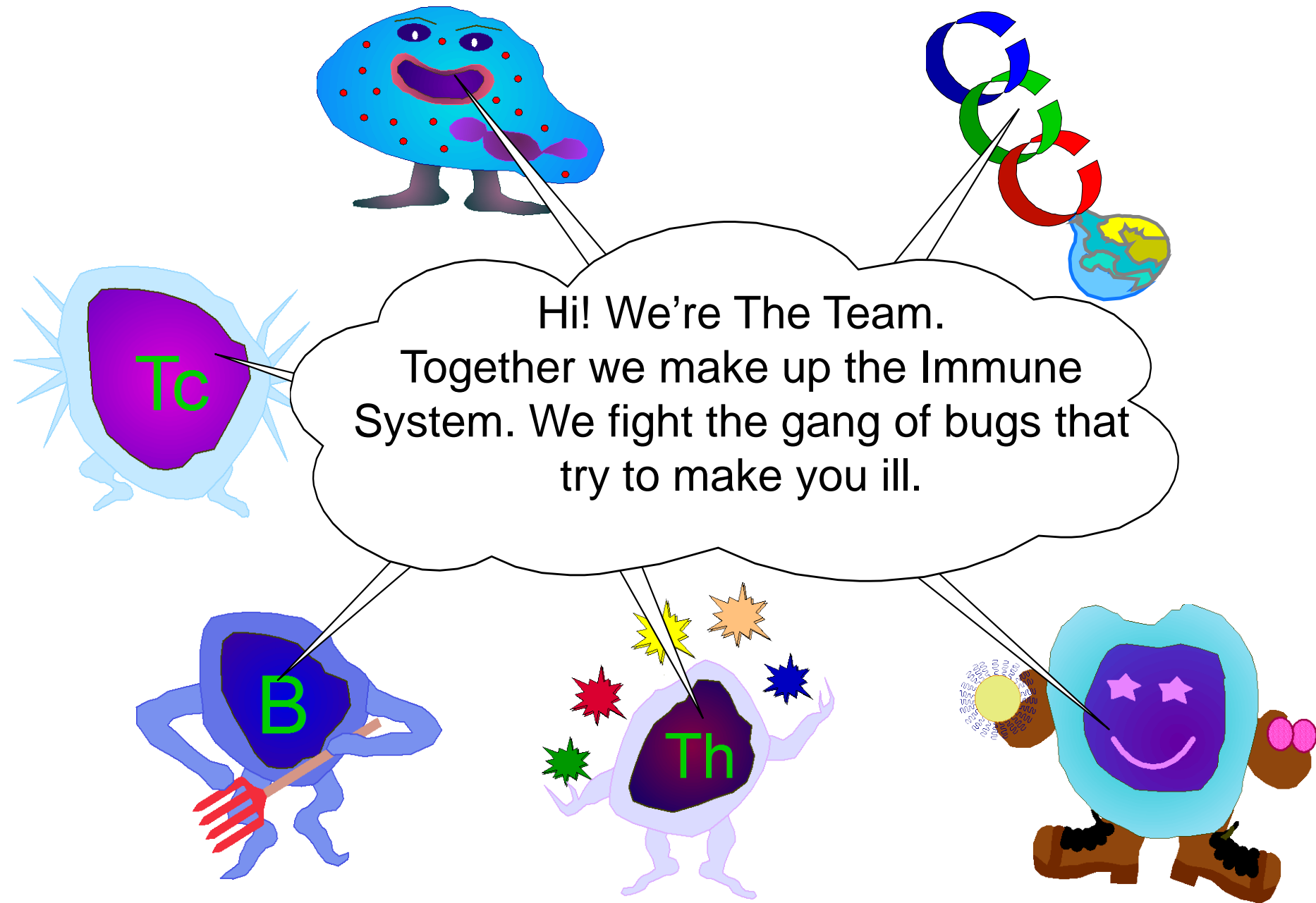


A Guide to the Immune System for People
with 22q11DS and Their Families.

Written and drawn by Hilary J Joyce.

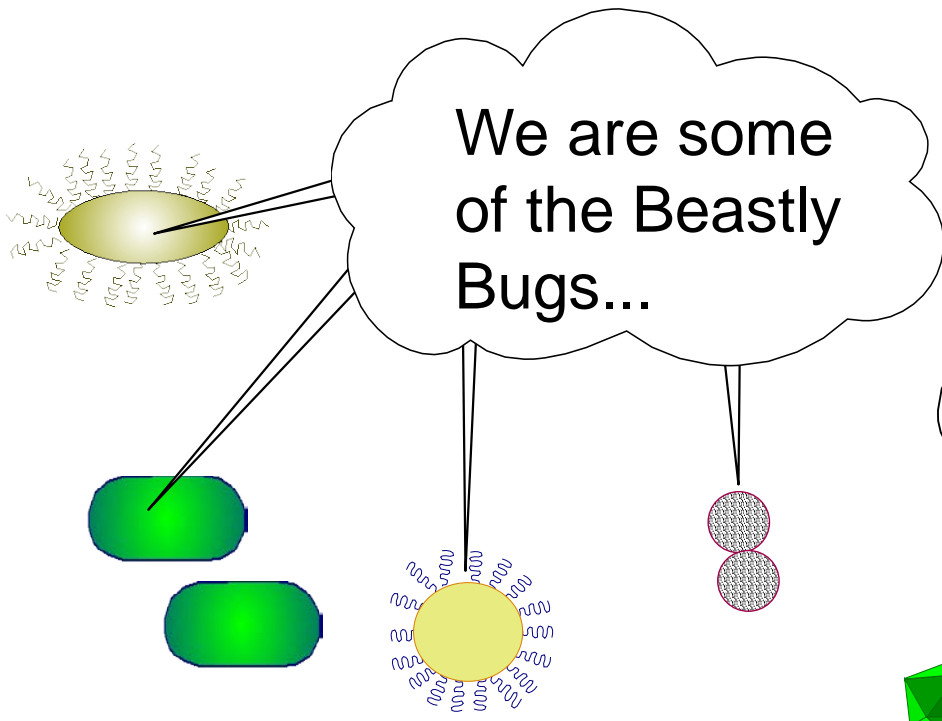
Our bodies have a defence mechanism against infection that is called the **Immune System**.

It is made up of cells and proteins that can move around the body and fight the germs or bugs that make us ill.



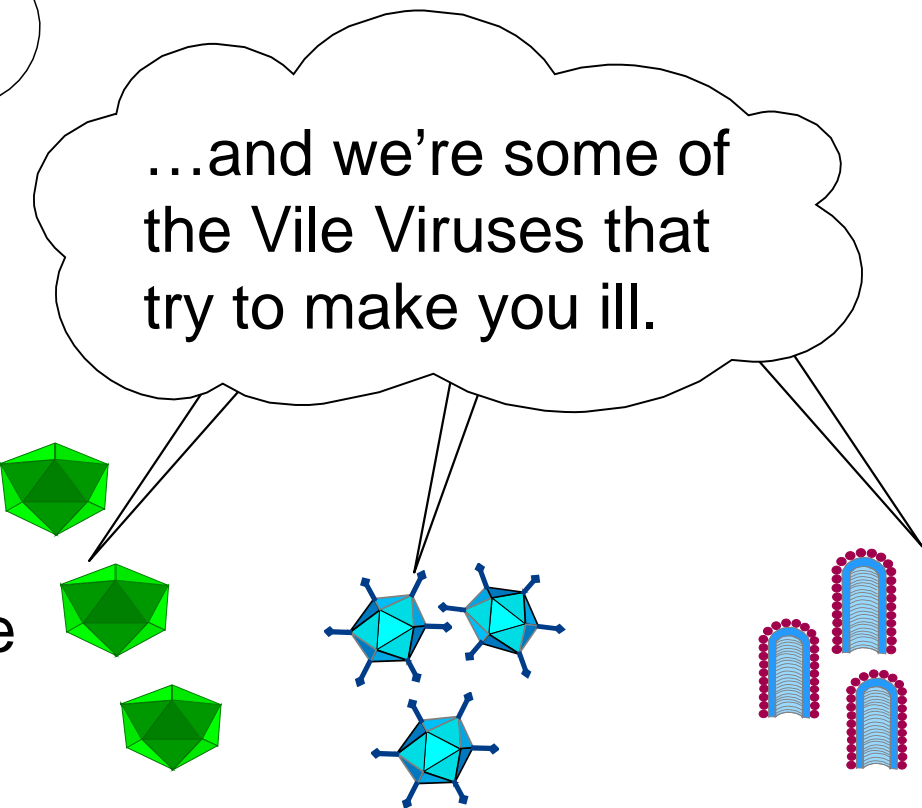
Hi! We're The Team.
Together we make up the Immune System. We fight the gang of bugs that try to make you ill.

Now meet the Gang:

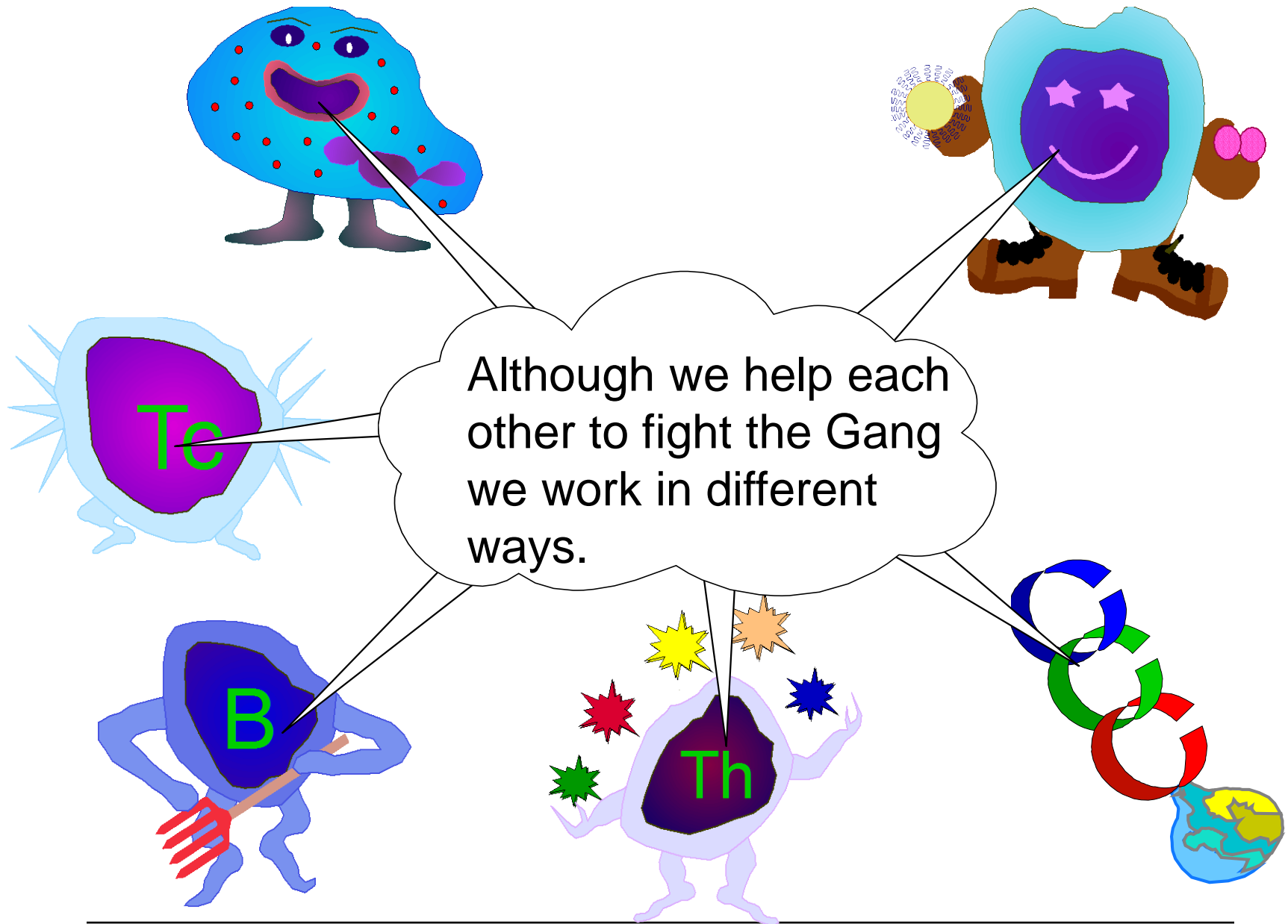


We are some of the Beastly Bugs...

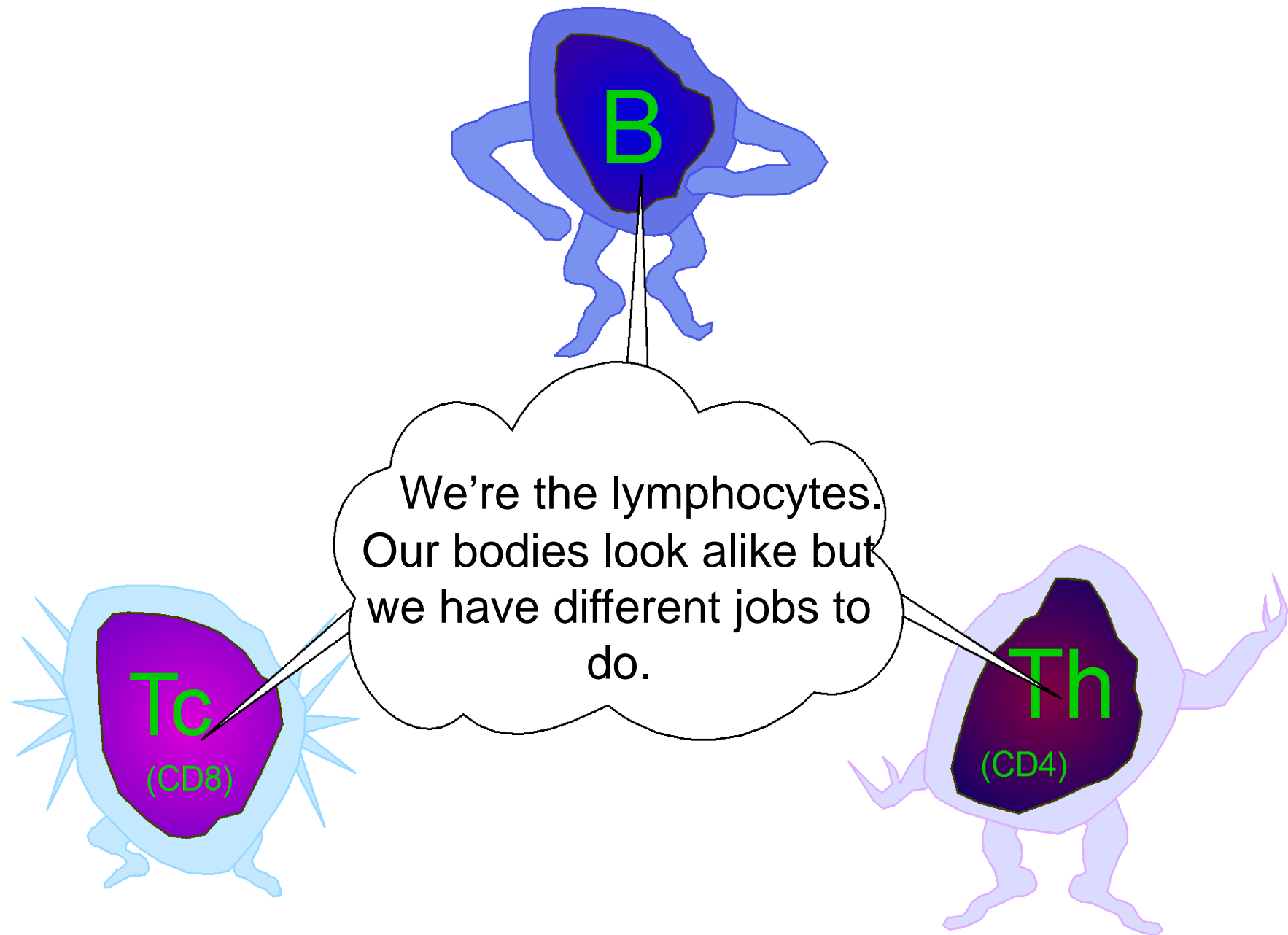
We're often called "bugs" or "germs"... ..and sometimes we let fungi, yeast (candida) and parasites join the Gang.



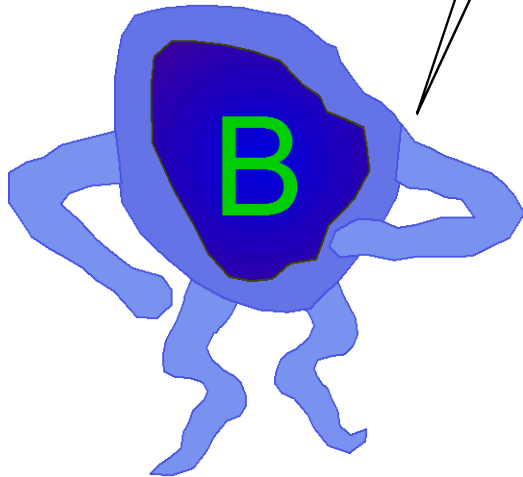
...and we're some of the Vile Viruses that try to make you ill.



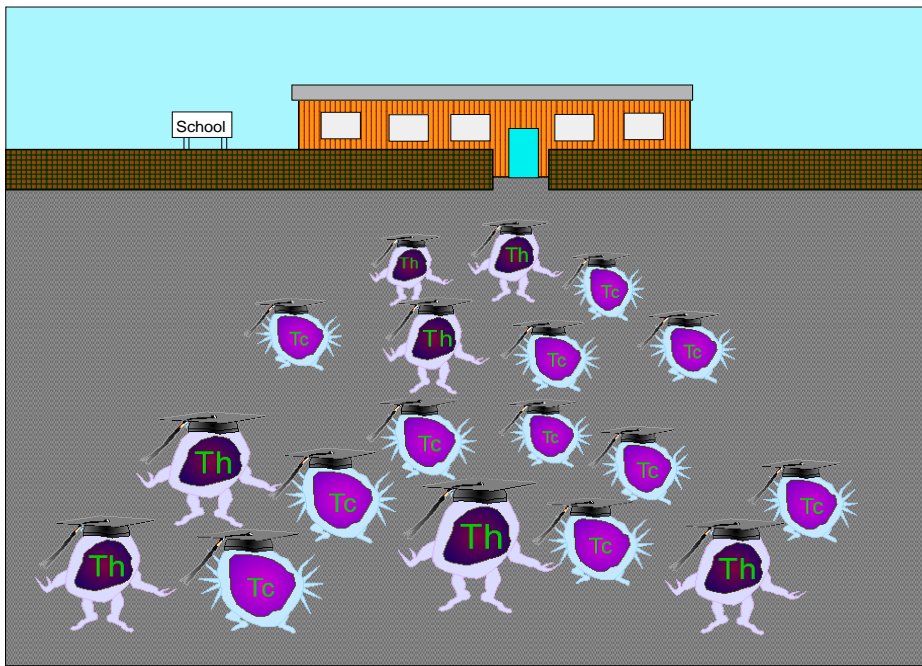
Although we help each other to fight the Gang we work in different ways.



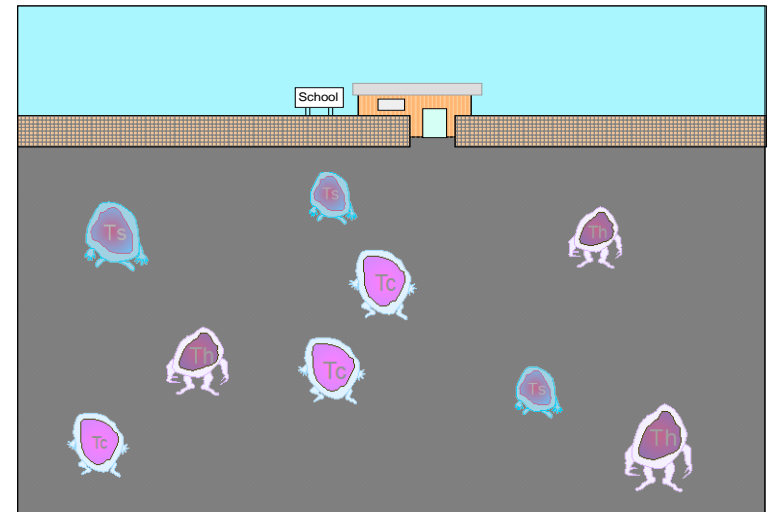
I'm a **B cell**. B cells grow up in your bone marrow. We make antibodies. These help protect you against infection.



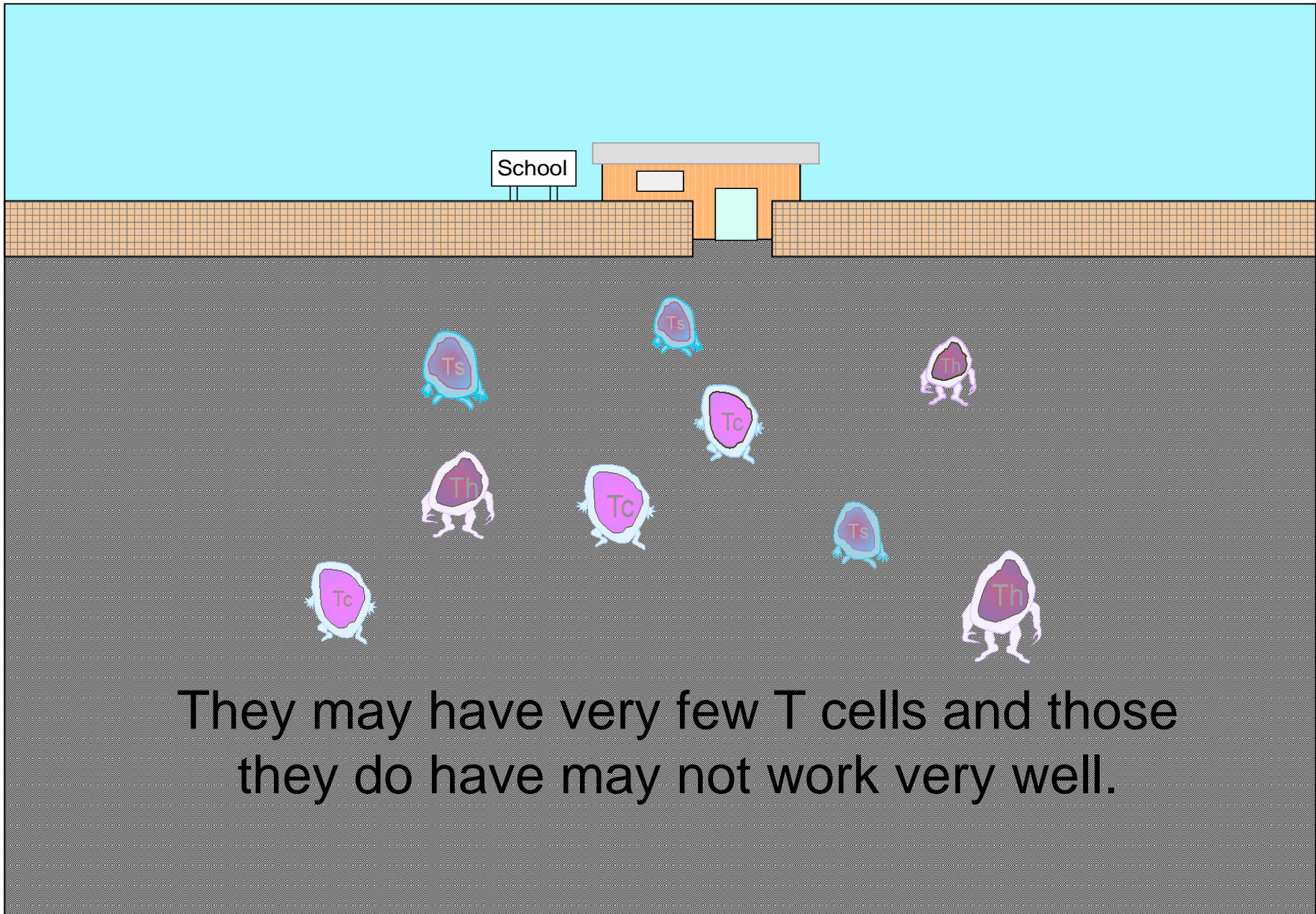
We are T cells. T cells go to school in the Thymus gland. There they learn their part in the Team.



People with 22q11DS
may have a tiny thymus...

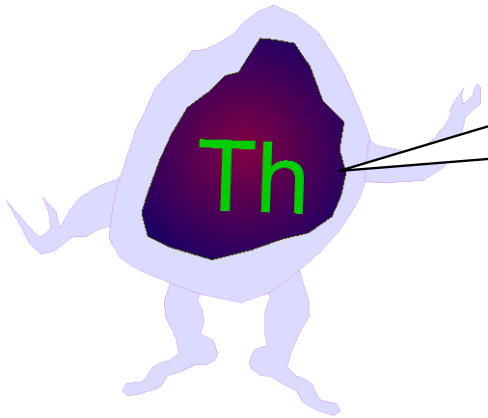


...or it may be missing
all together.



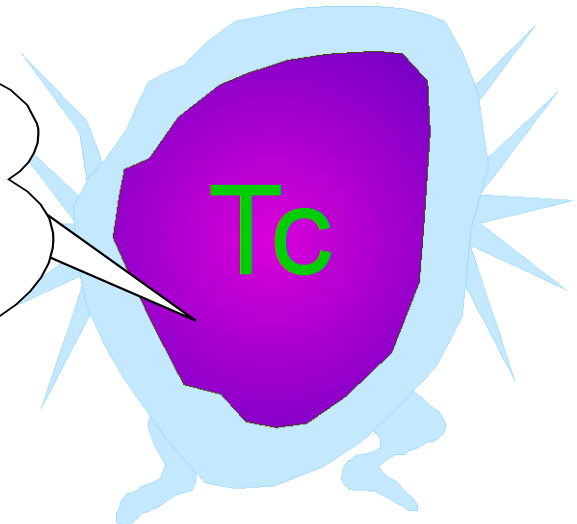
Why are T cells so important?

Because they all have very important jobs.



I'm a **Helper T cell**. I send messages to other cells to tell them to start work.

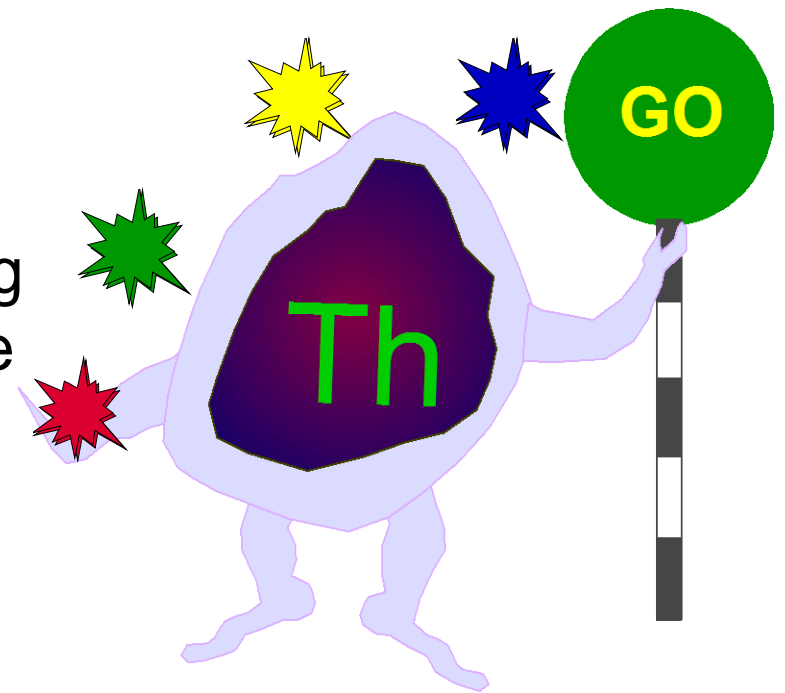
I'm a **Cytotoxic T cell**. I kill cells that are infected with viruses.



We Th cells are really very important.
We help other cells play their part in
the Team. If there are only a few of us
then the other cells can't fight the bugs
as well as they should.

We help by sending messages to
other members of the Team asking
them to join in the fight against the
Gang.

How do we help? Let's take a
look...

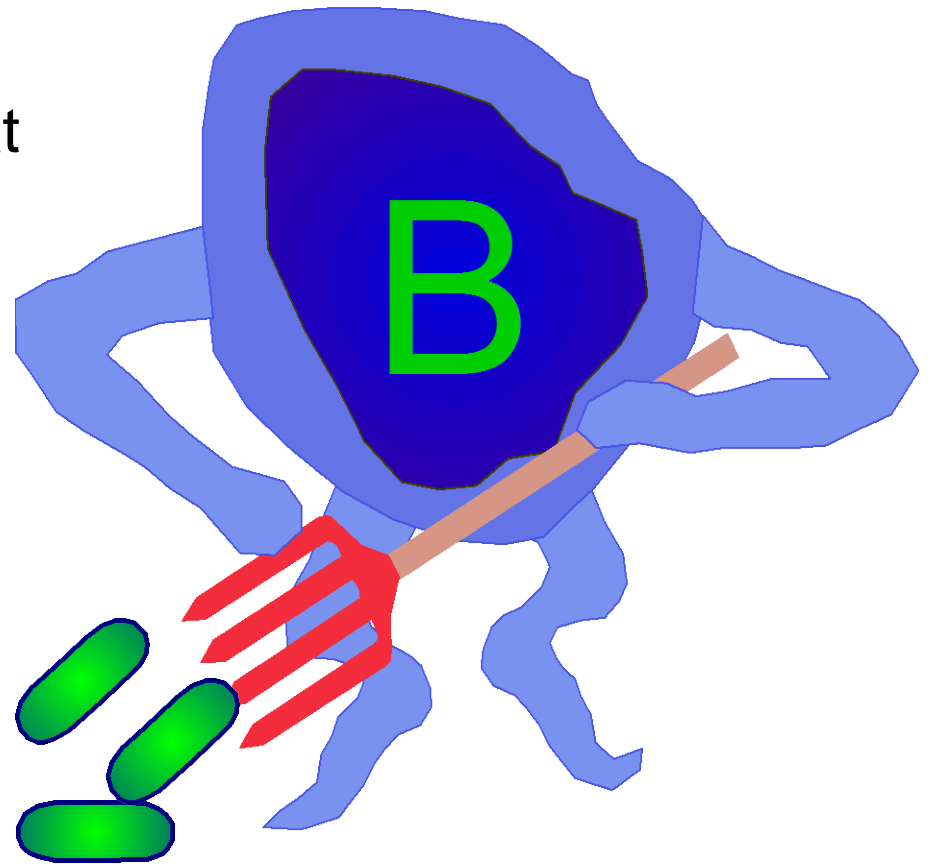
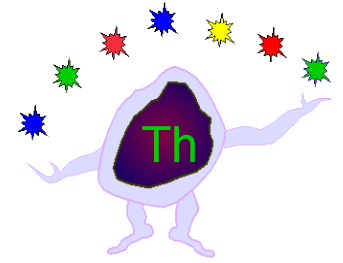


I'm a B cell.

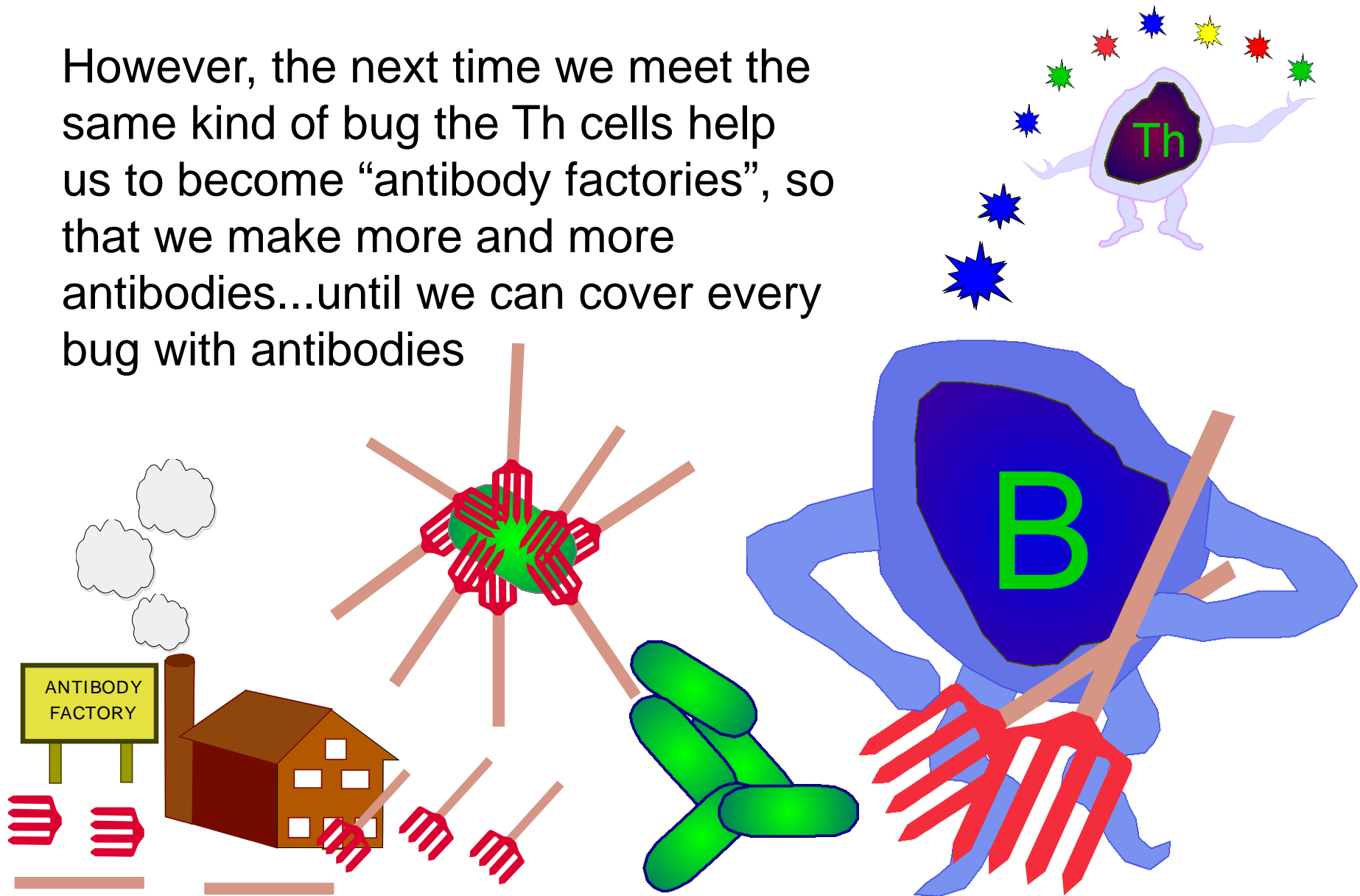
I look like the other lymphocytes but I have a very special job.

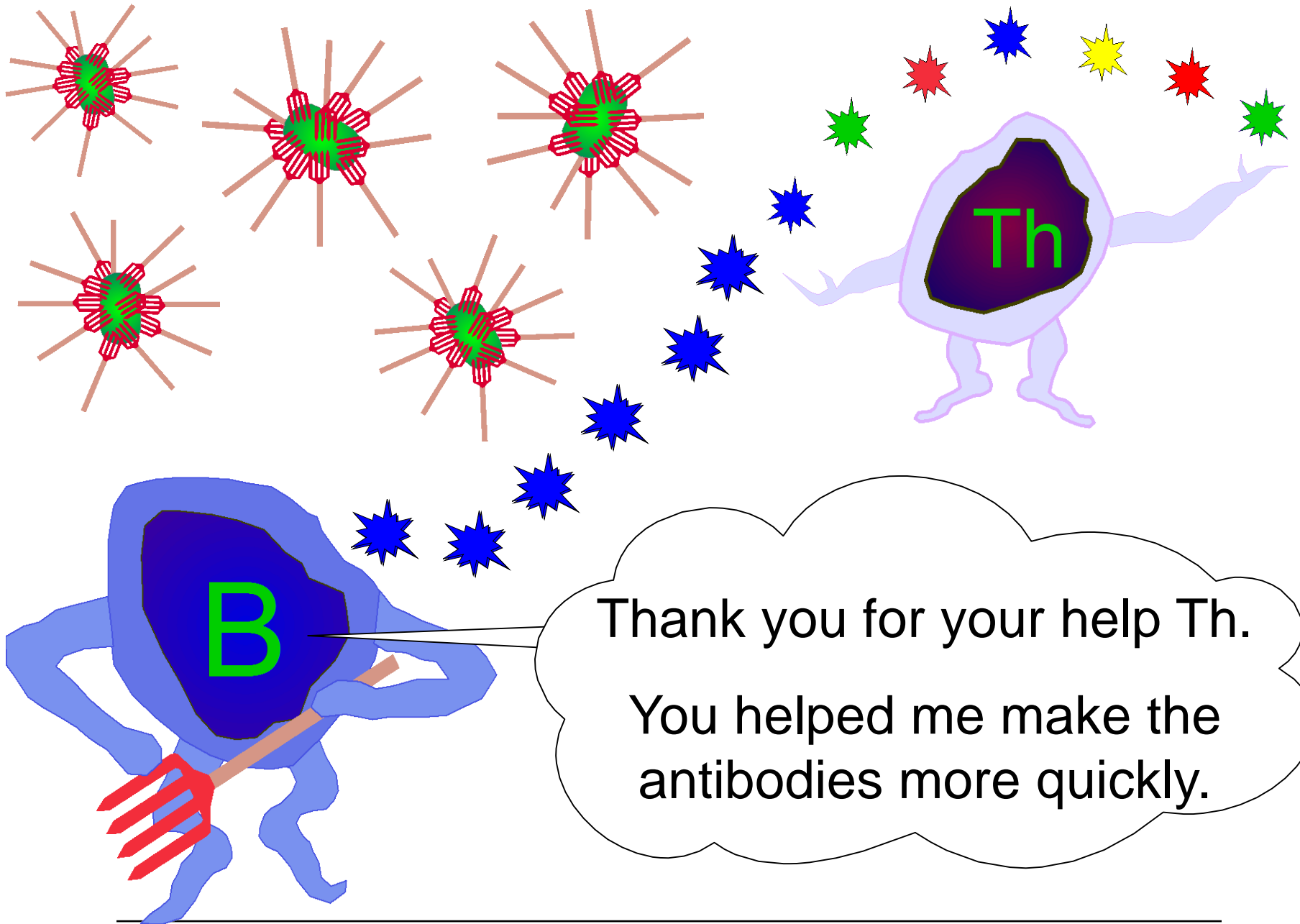
I make immunoglobulins that help protect you from infection.

The first time we meet new bugs we don't have many antibodies with which to grab them.

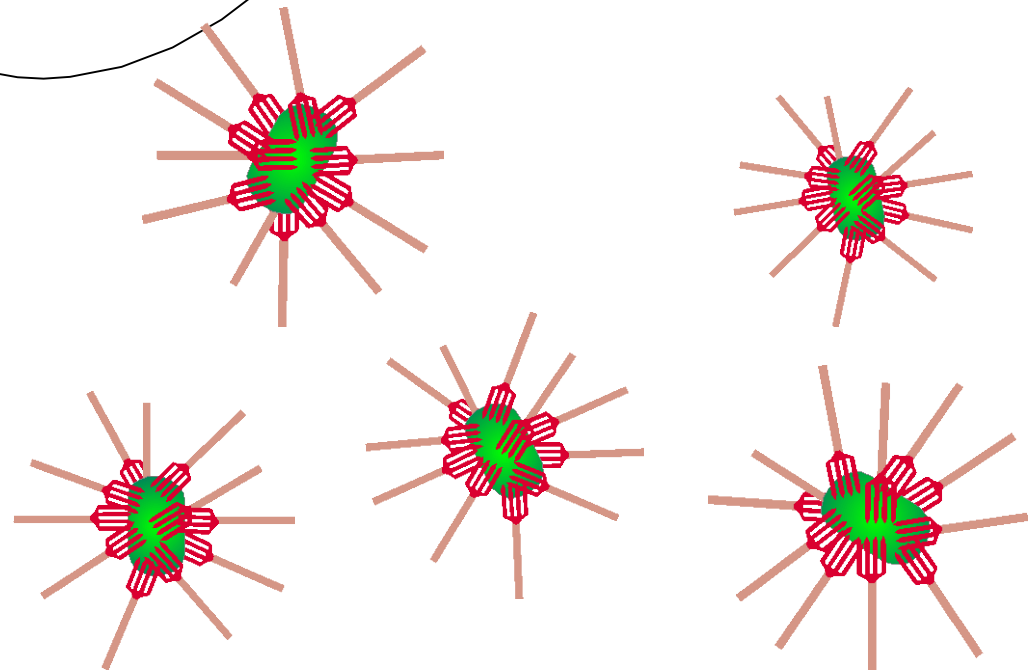
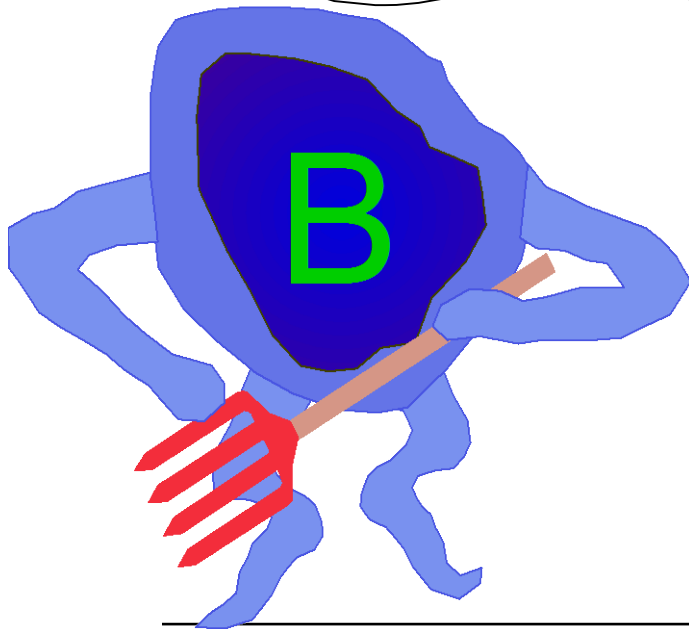
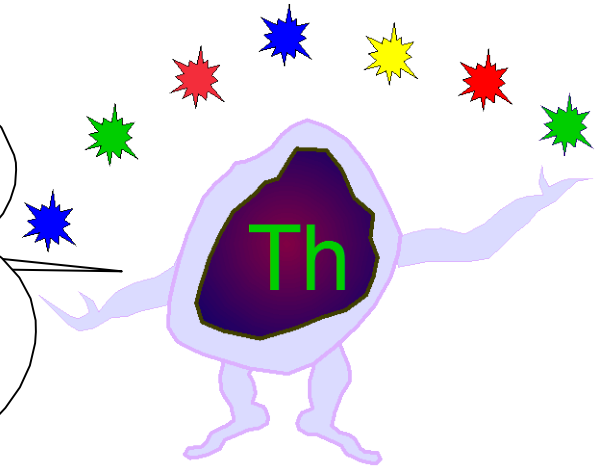


However, the next time we meet the same kind of bug the Th cells help us to become “antibody factories”, so that we make more and more antibodies...until we can cover every bug with antibodies



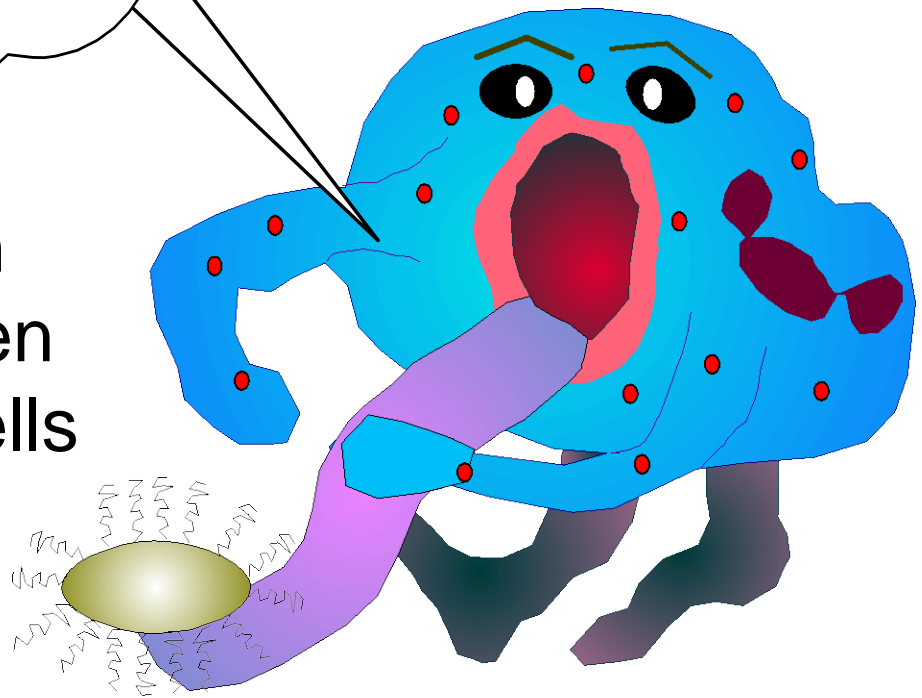


My pleasure B cell.
I'm here to help you and other
members of the Team.
Now that there are more
antibodies the Polys can act faster.

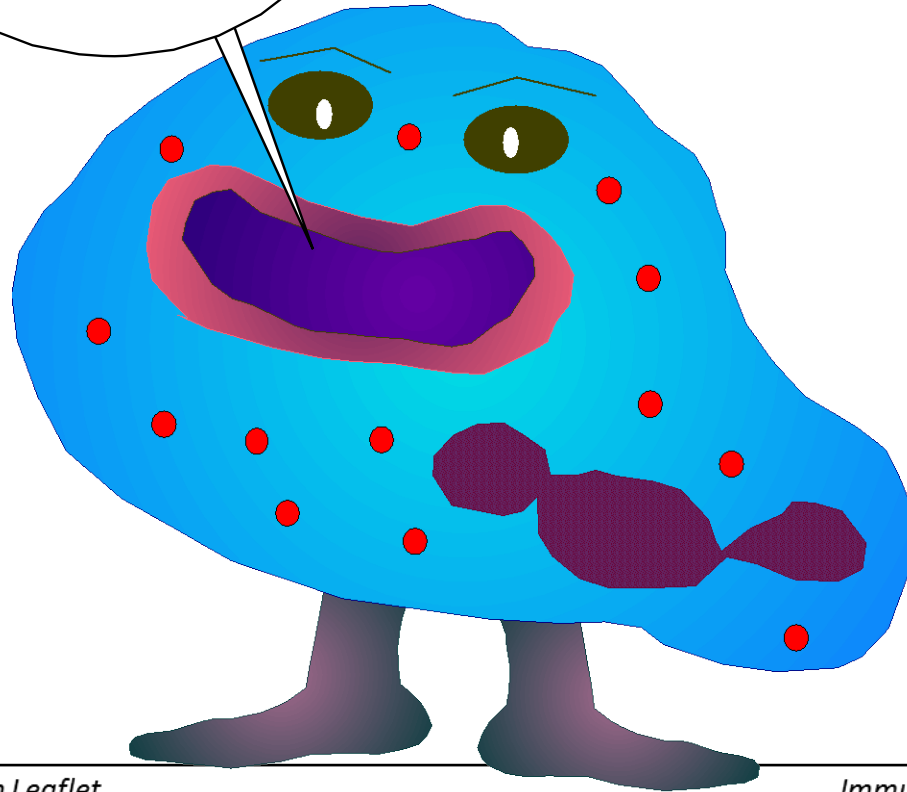
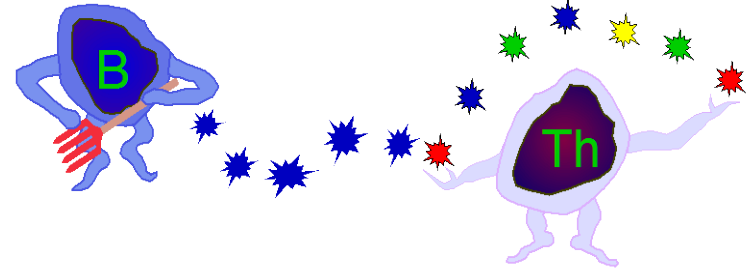


I'm a Poly, which is short for a VERY long name: Polymorpho-nuclear-leucocyte ... if you really must know..

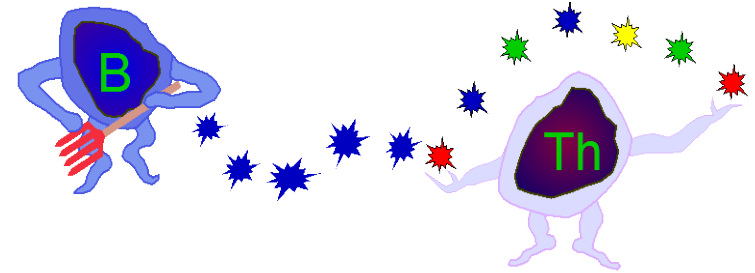
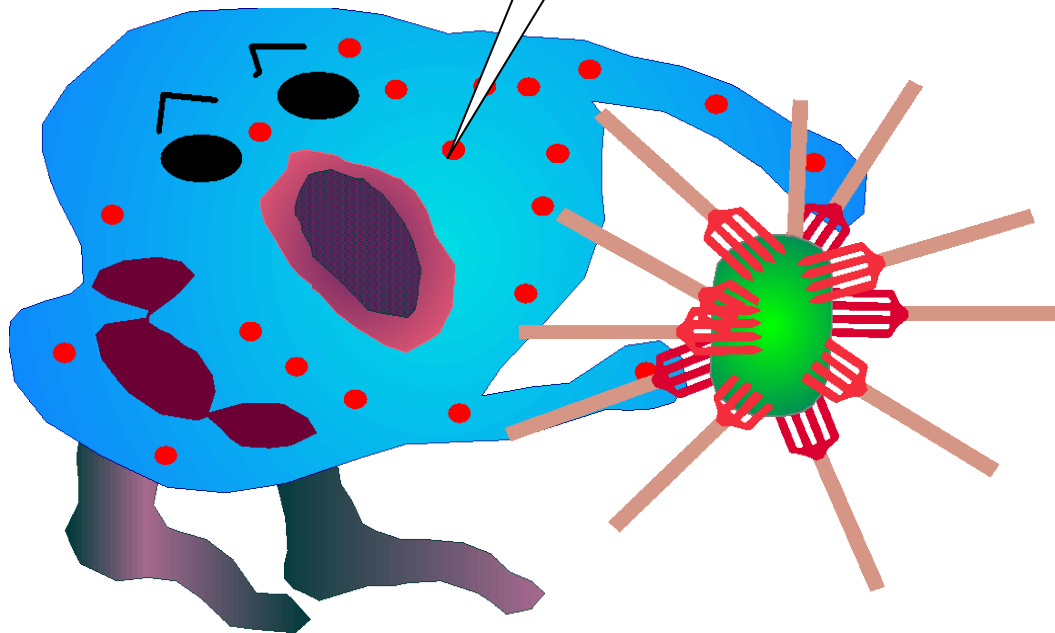
I gobble up bugs as soon as I can catch them. When the Th cells help the B cells to make antibodies more quickly...



When the Th cells help the B cells to make antibodies more quickly...

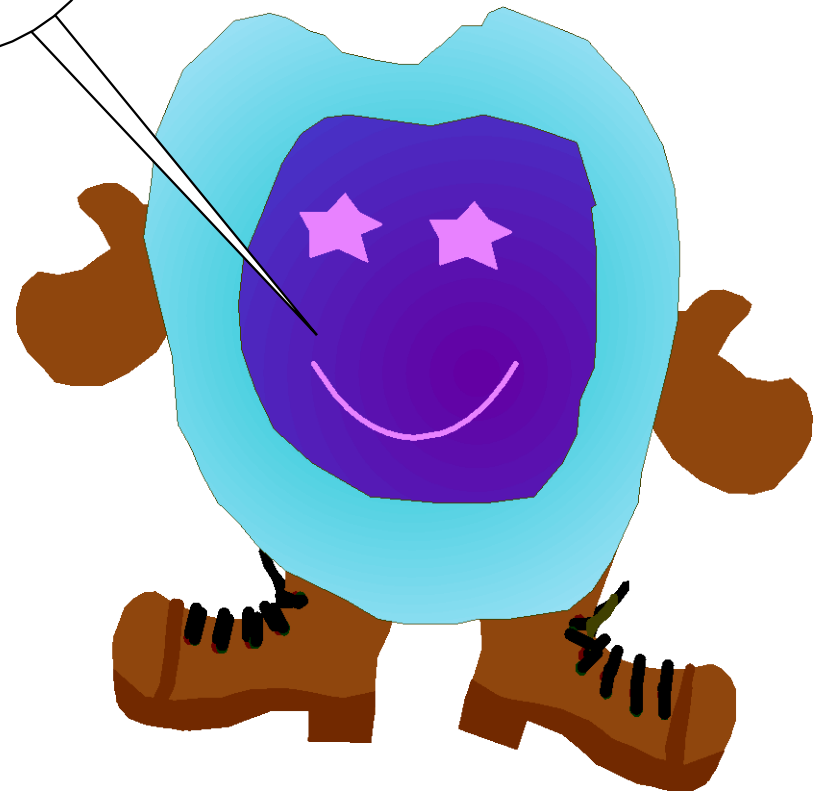


...the bug becomes covered with antibodies so that I can pick it up much faster!

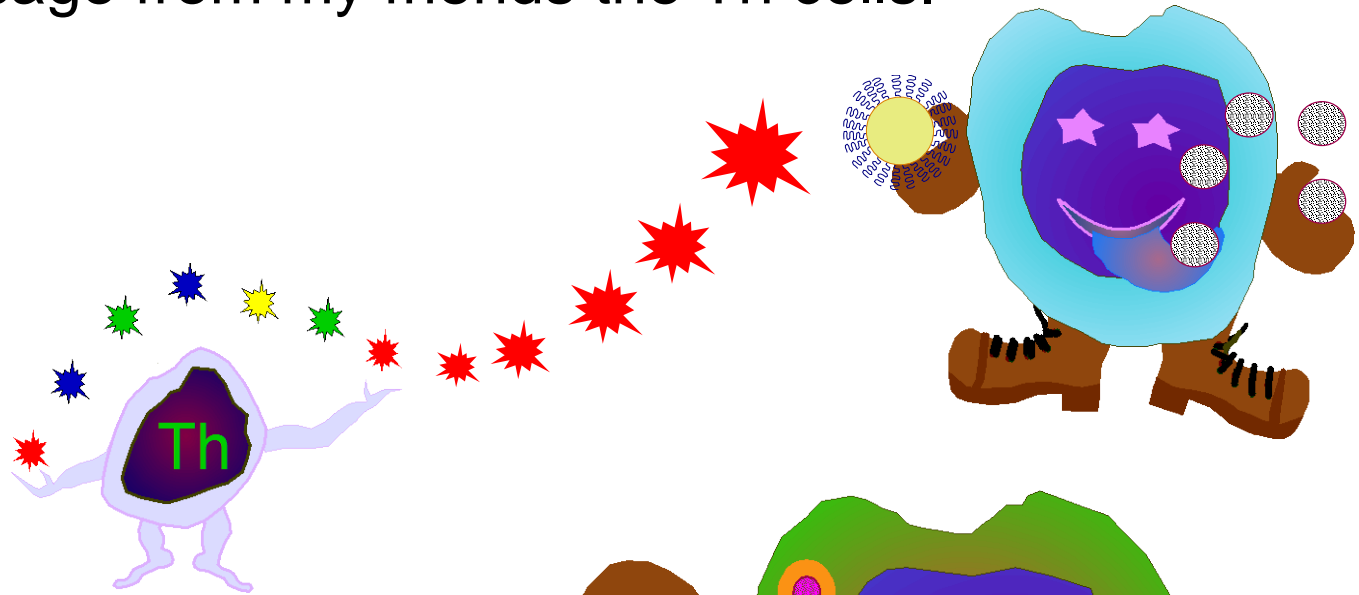


Thank you B and Th cells for making the antibodies to help me gobble up the bugs.

Hello, I'm a **Macrophage**.
I can gobble up bugs too.



But there are some bugs that I can't kill without a message from my friends the Th cells.



The messages make me angry so that I can kill the bugs.

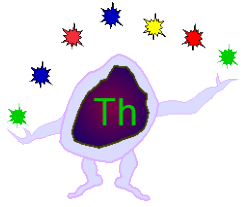


Good!

Now those nasty
bugs can't harm
you!

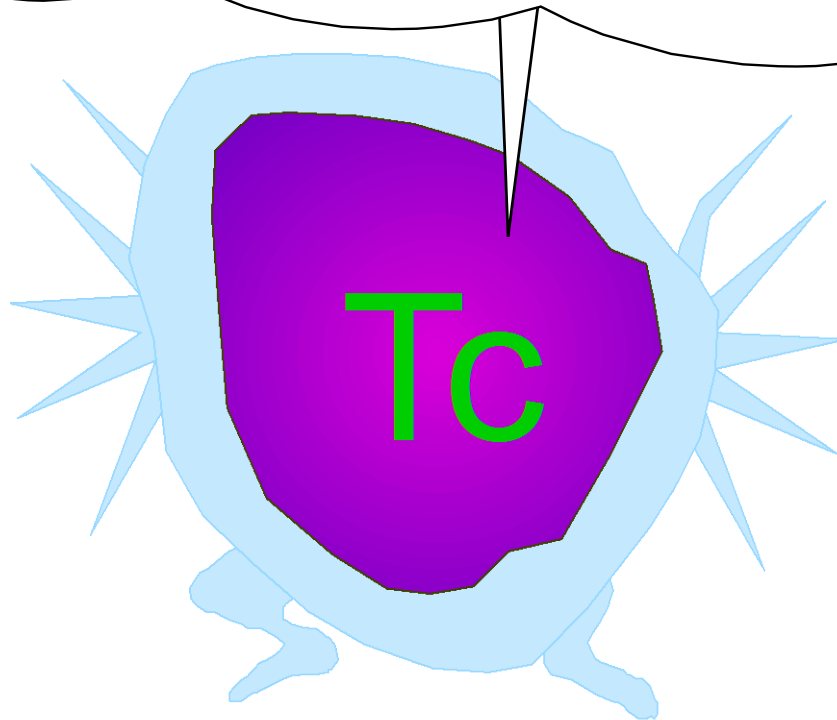


Thank you for
your help Th.

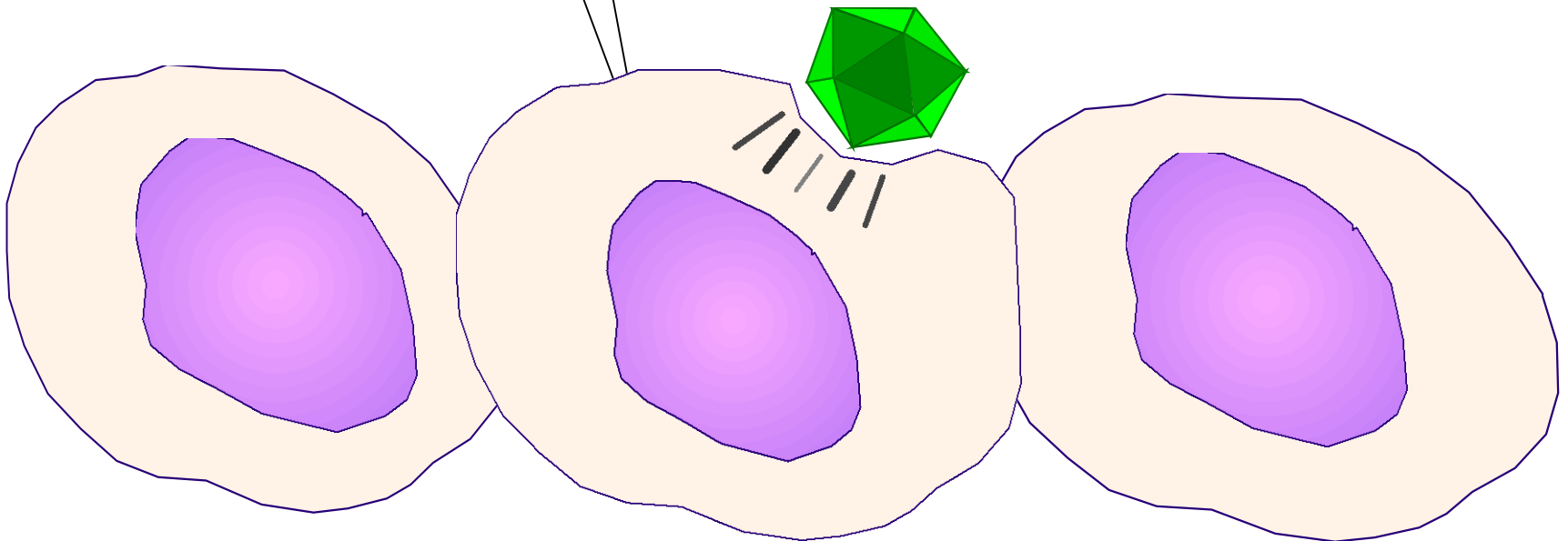


I'm a Cytotoxic T cell.

When I get help from my friends the Th cells I can kill cells that have been invaded by a virus.

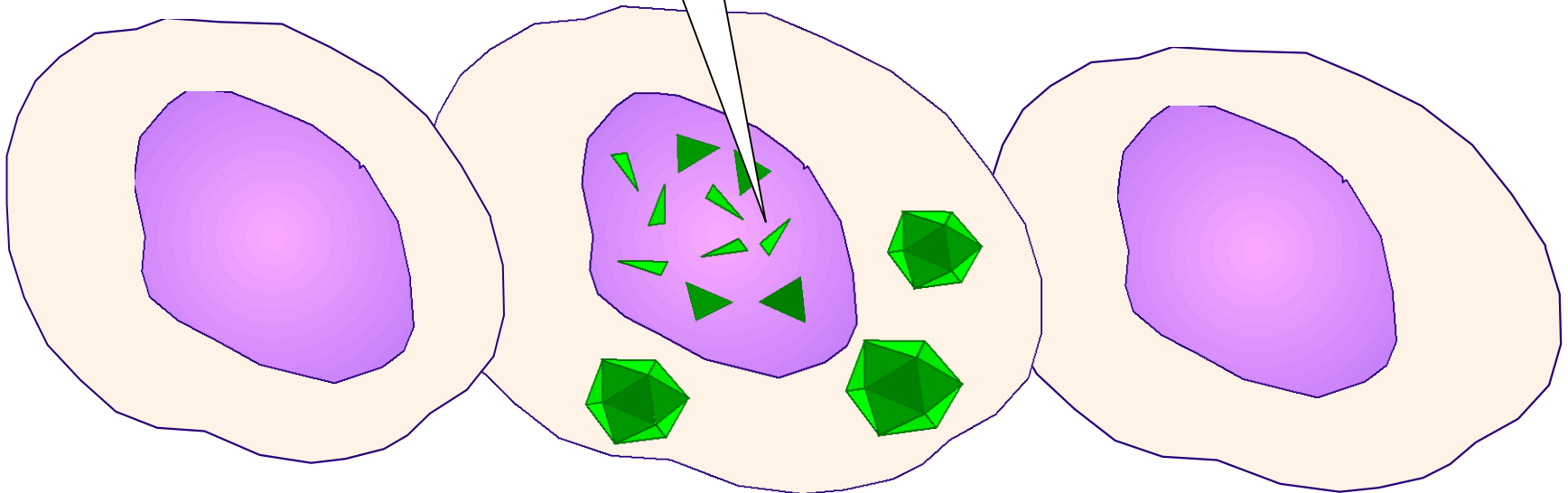


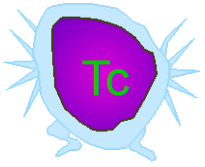
I'm one of the cells of your body. **Oww!** I'm in trouble. A virus is trying to get into me.



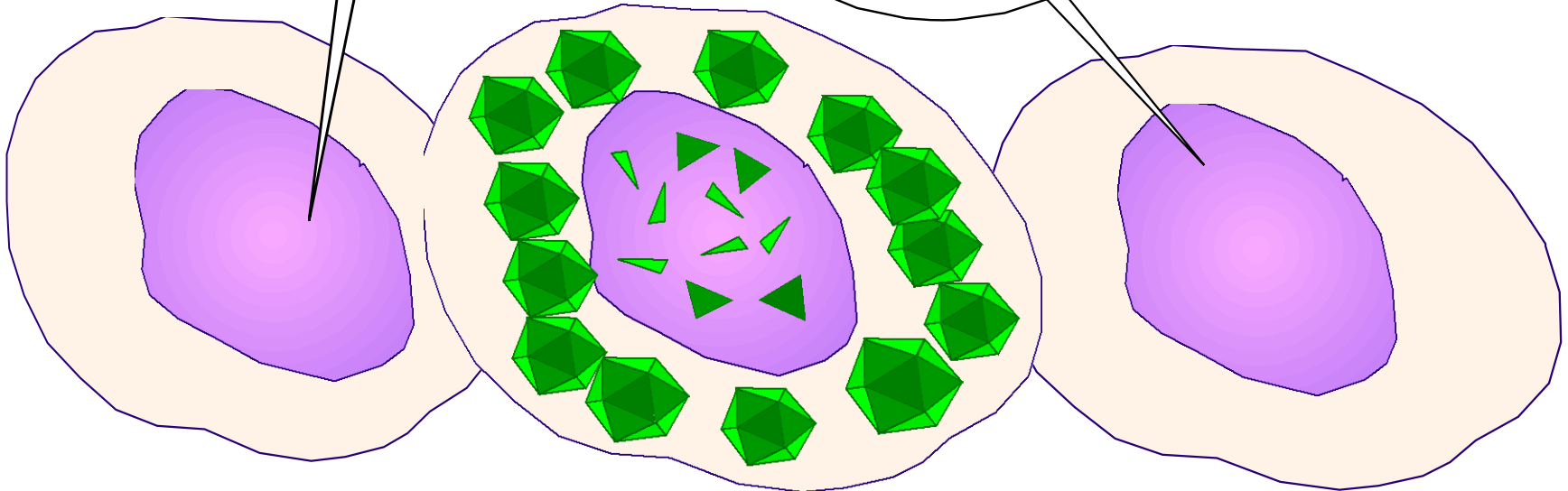
Help! I've been hijacked!

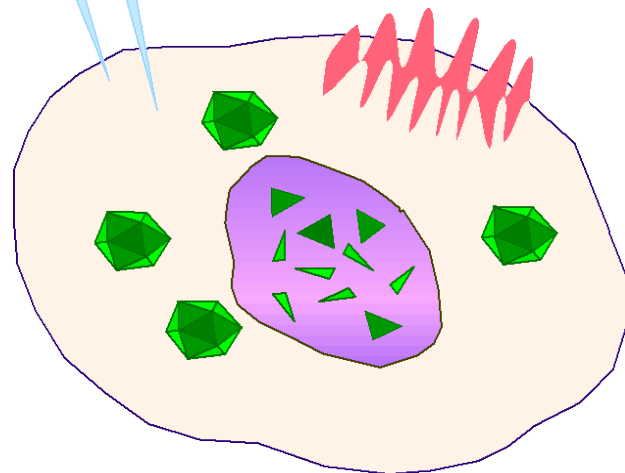
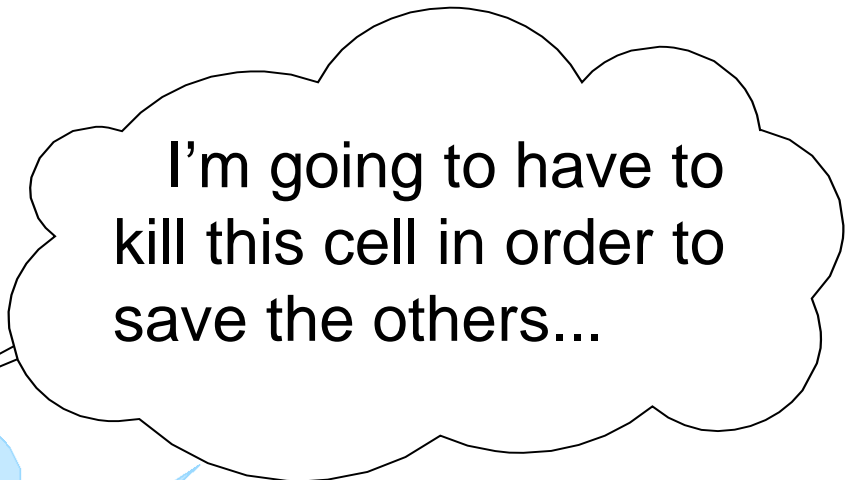
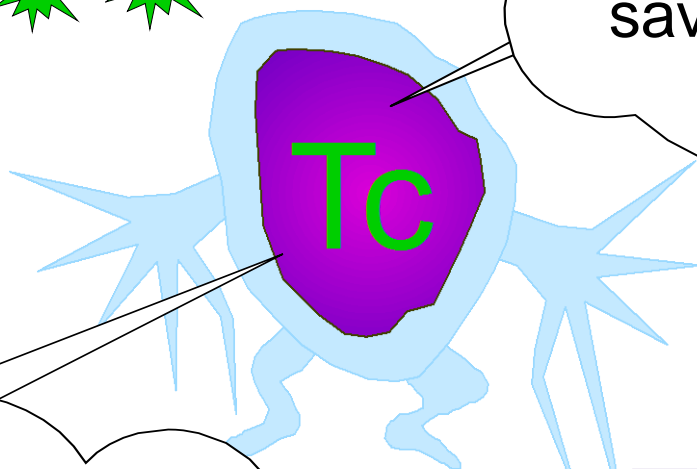
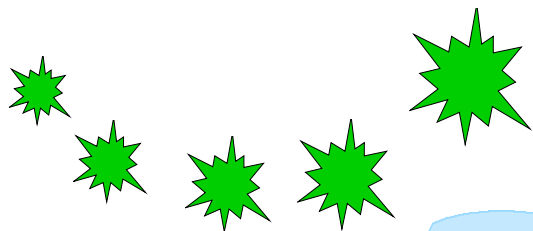
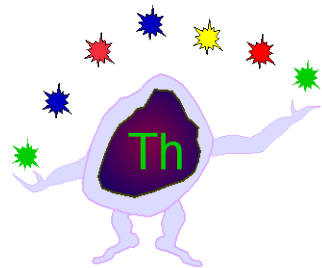
The virus is forcing me to make.....more and more viruses, so they can make you ill.

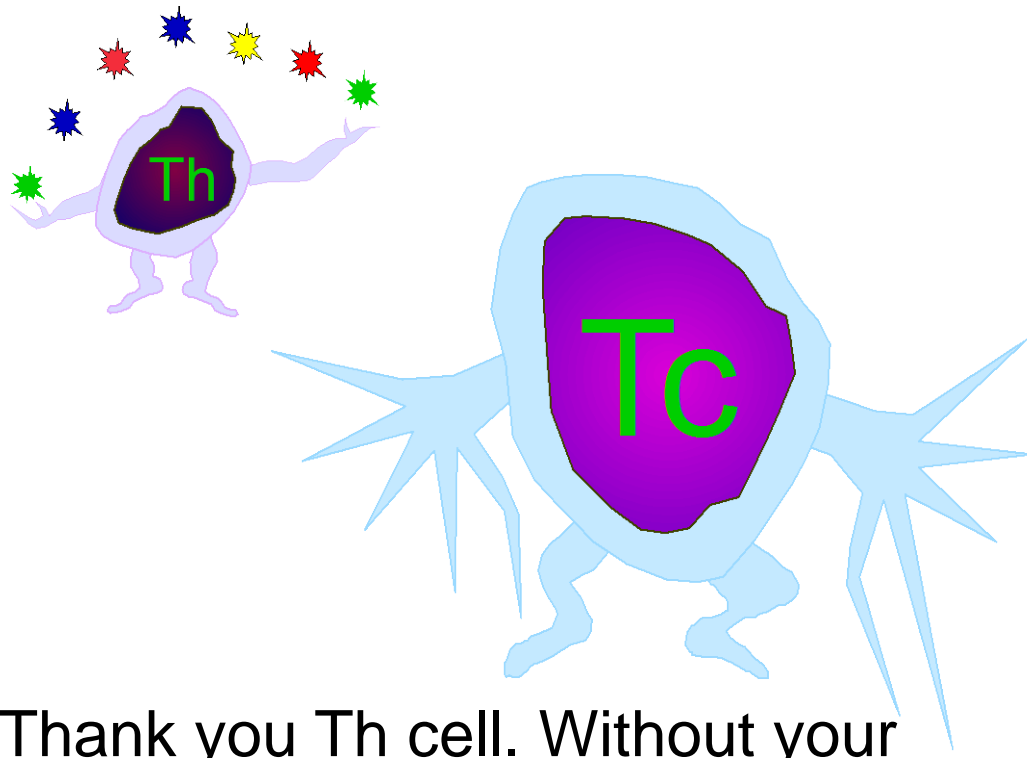




We hope that a Tc cell comes to our rescue. Otherwise the virus will spread to us as well.

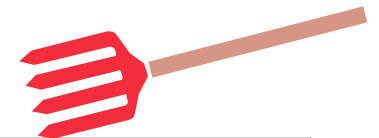
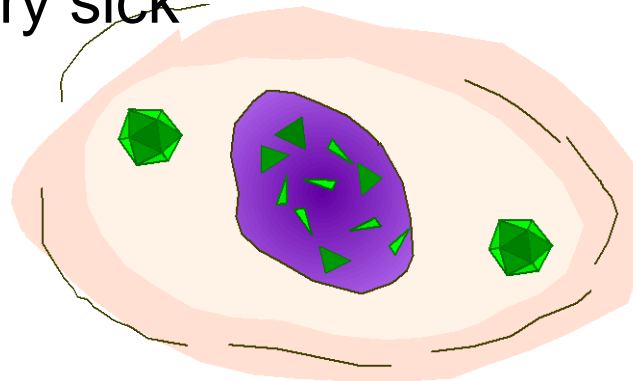
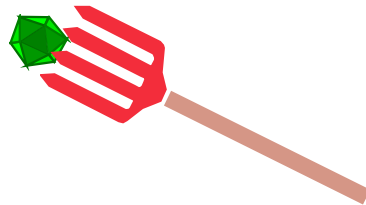




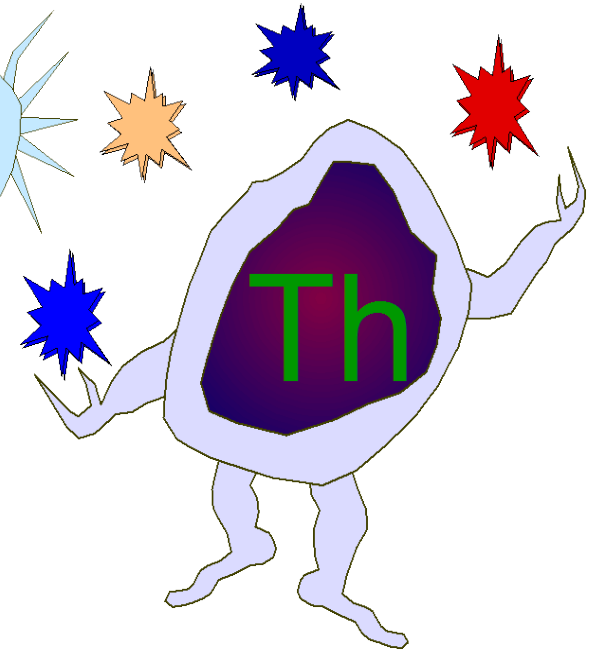
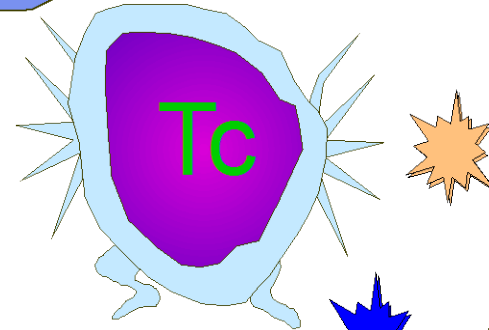
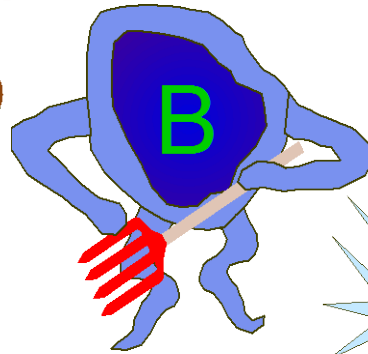
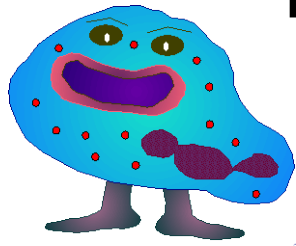


A few viruses have escaped, they will be zapped by the antibodies.

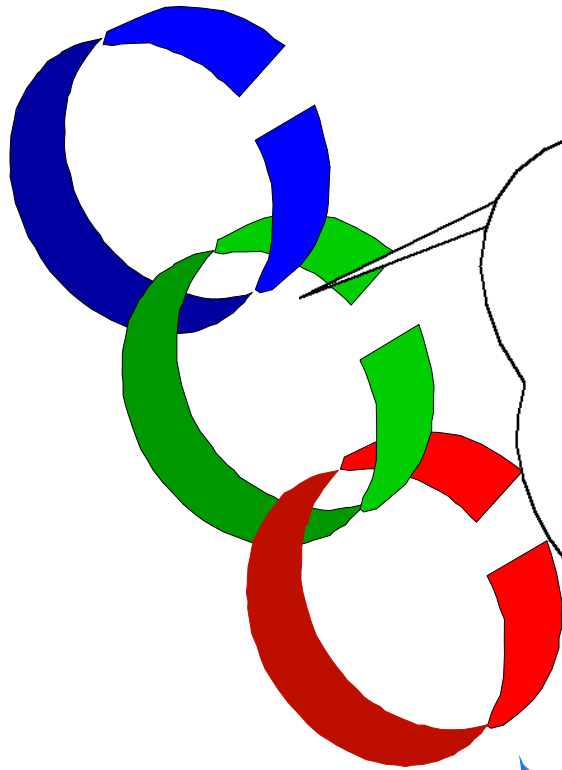
Thank you Th cell. Without your help those nasty viruses would have made someone very sick indeed...



Now that you have met all the cells in
the Team together with some of
their friends...

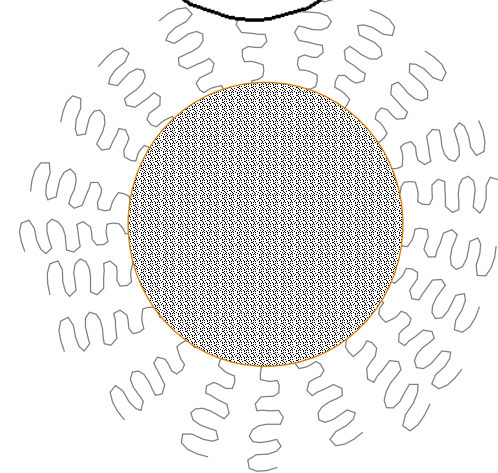
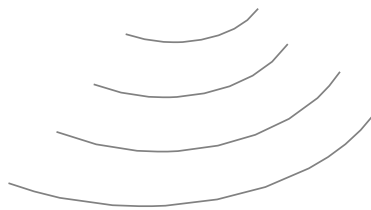


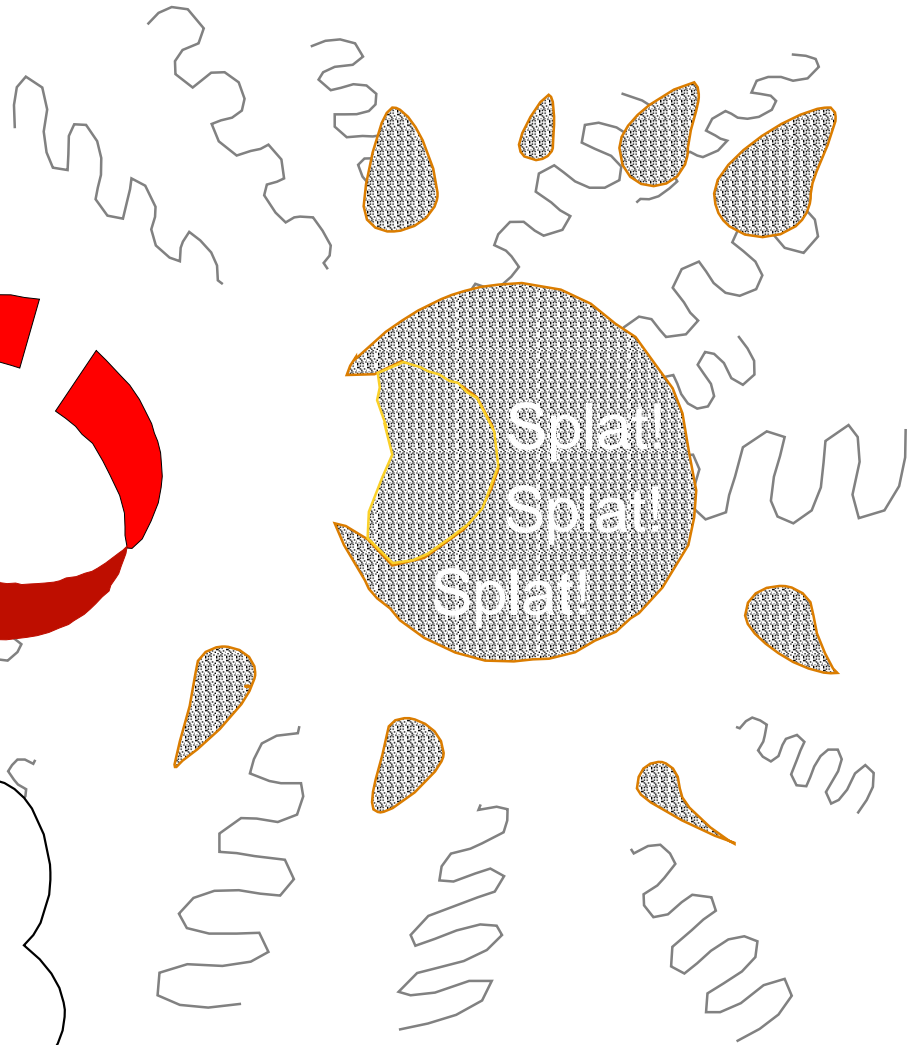
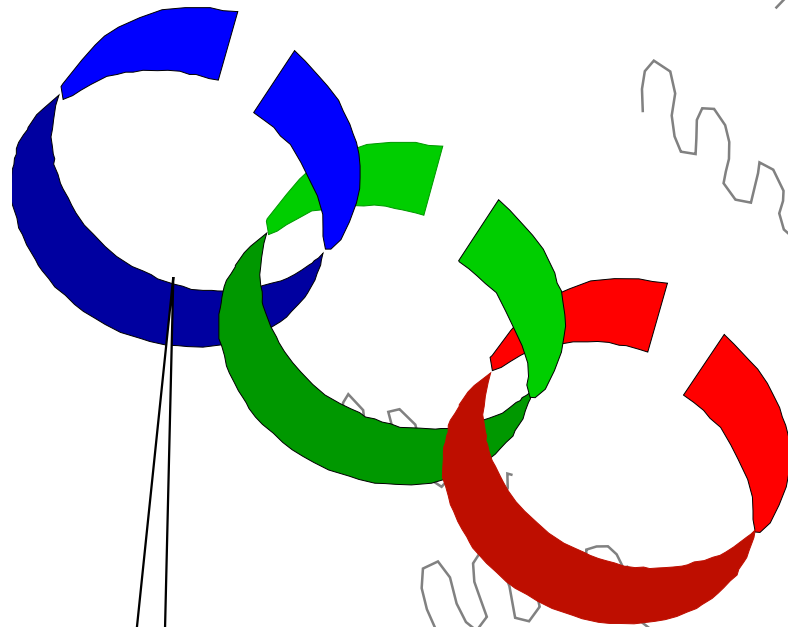
...let us meet
another group
of friends...



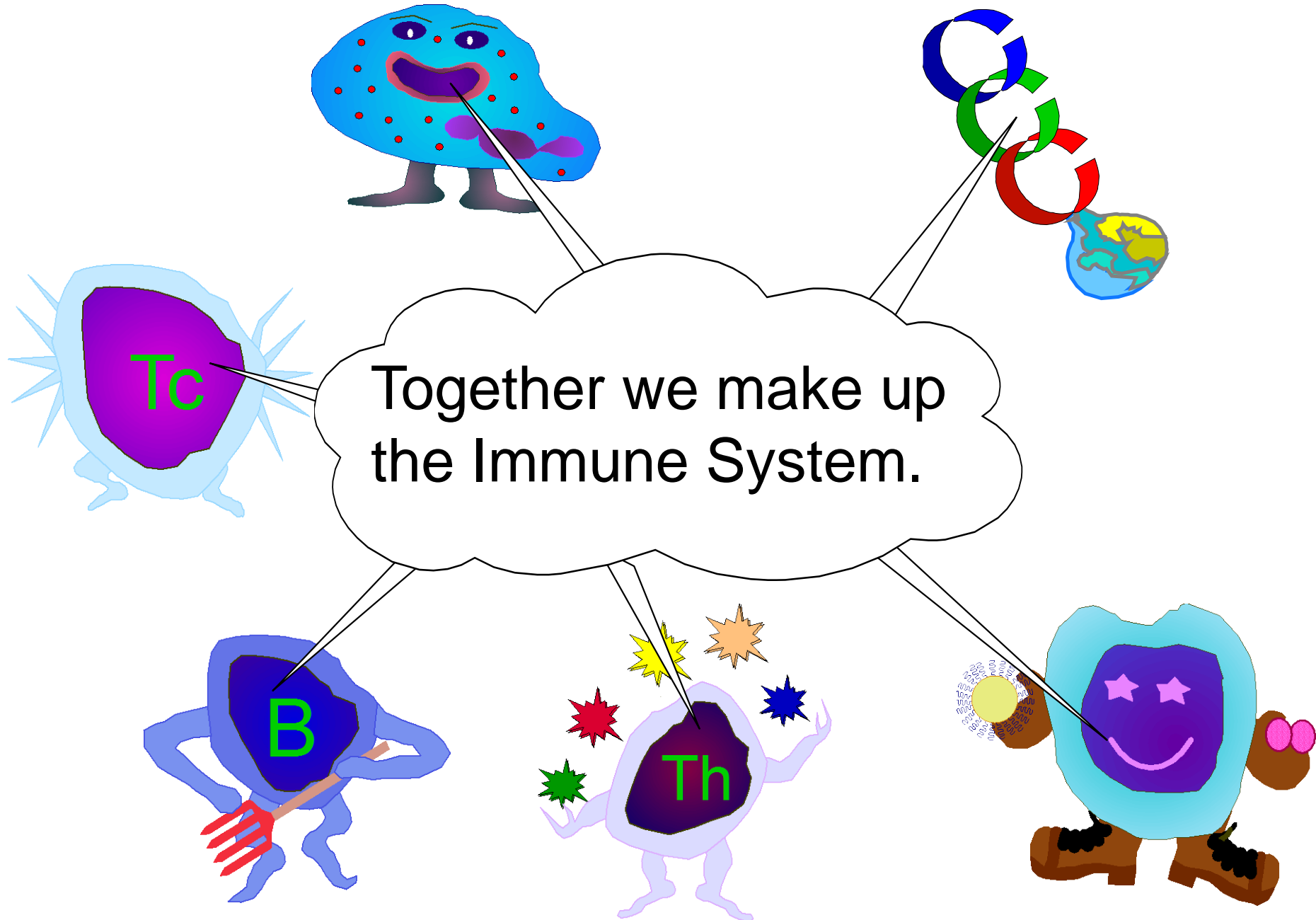
The Complement Chain.

We're rather clever proteins. We make a chain and then we can punch holes in some really nasty bugs.





Even if there are
no antibodies
around to help...

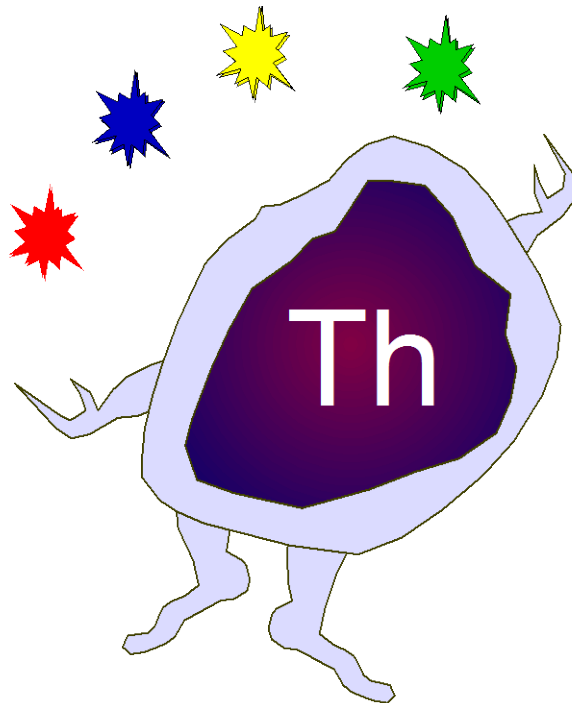
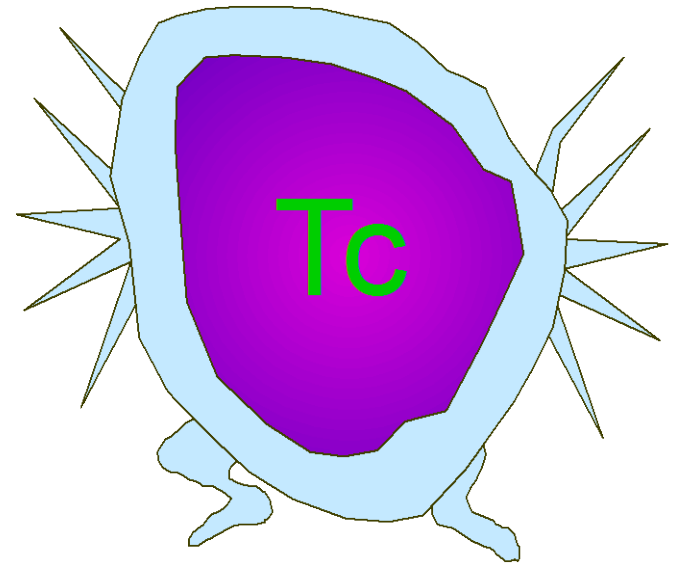


Sadly, people with 22q11DS are unlucky, their immune system may not work properly because not all the team is able to play its part in fighting the Gang.



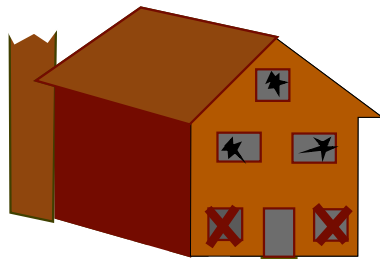
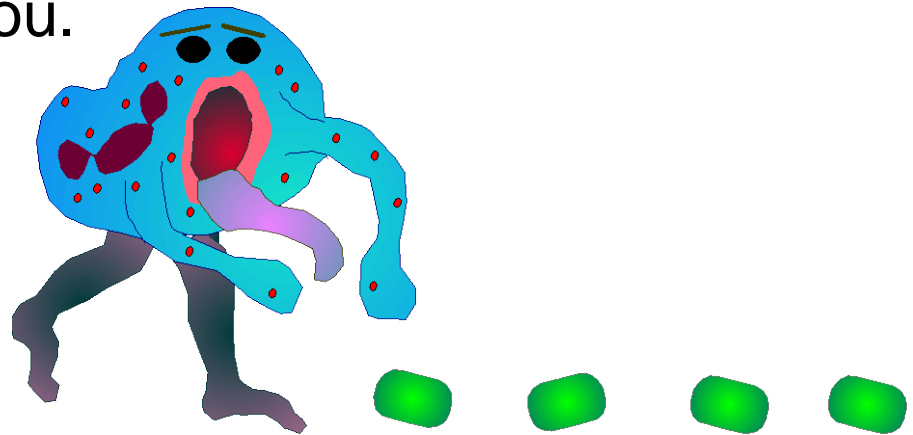
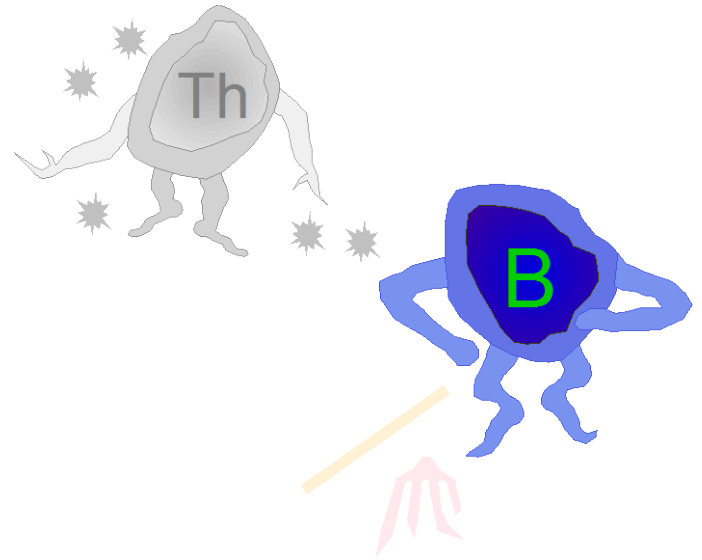
If your body does not have enough T cells you might get more infections that your friends.

Why is this? Let's look...



If the T cells cannot help the B cells make antibodies there may not be enough to help the Polys catch the bugs.

Polys then have to work harder to catch the bugs, but the bugs might escape and infect you.

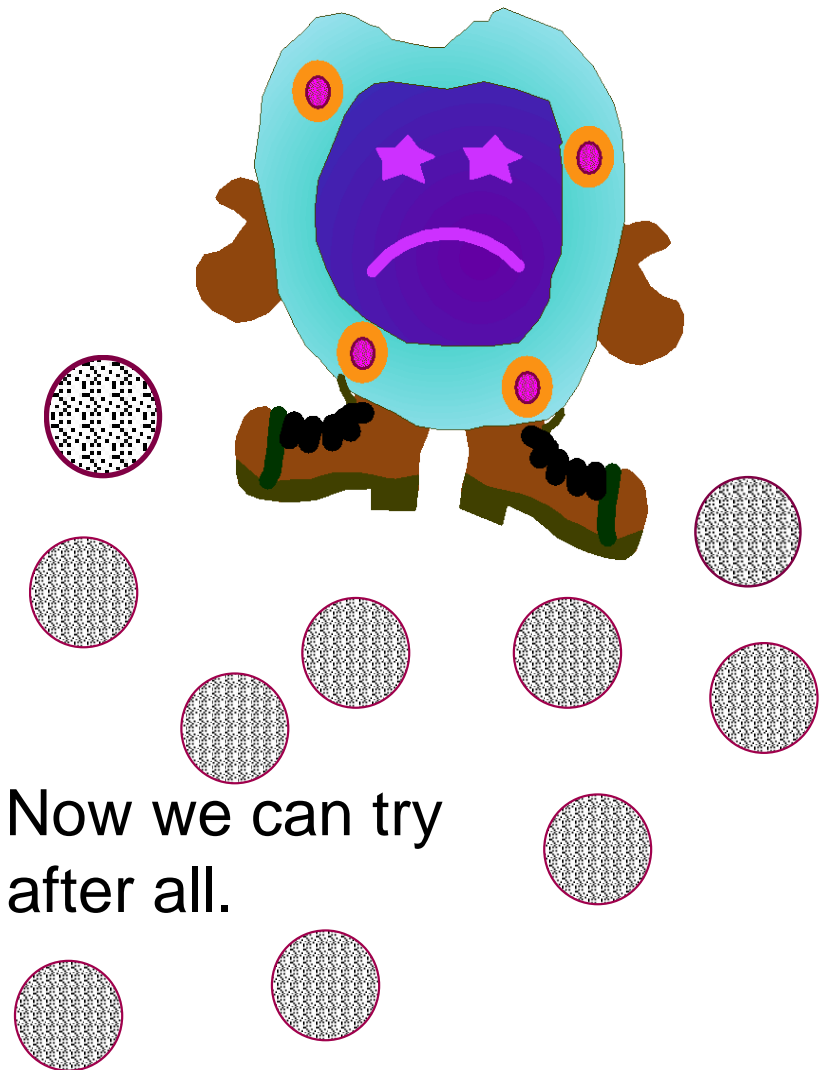
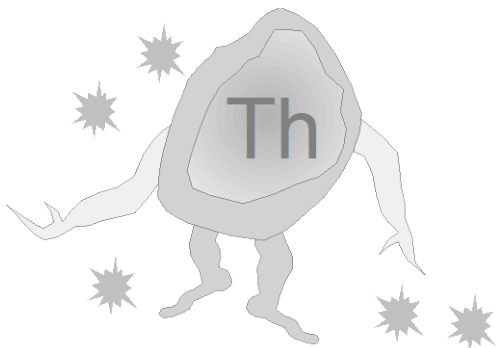


If the Helper T cells can't send the messages to the Macrophages they can't get angry and kill the bugs.

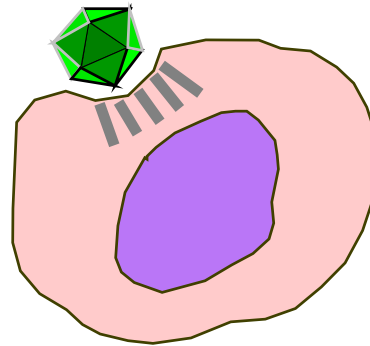
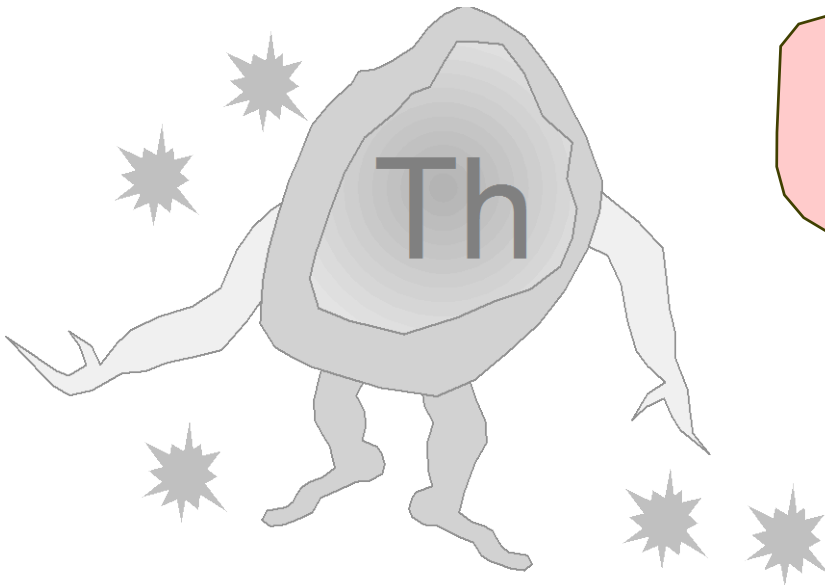
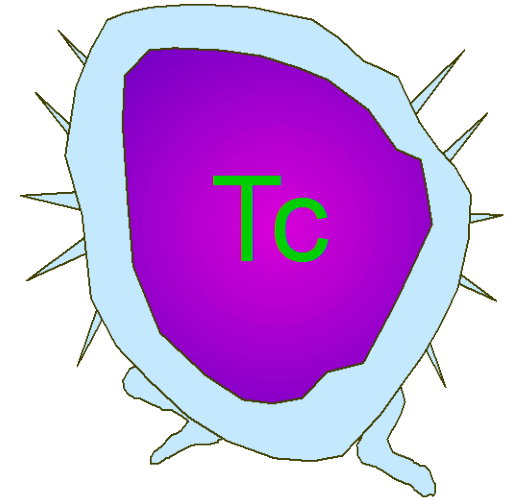
Then the bugs can escape and live to fight another day.

Yippee!

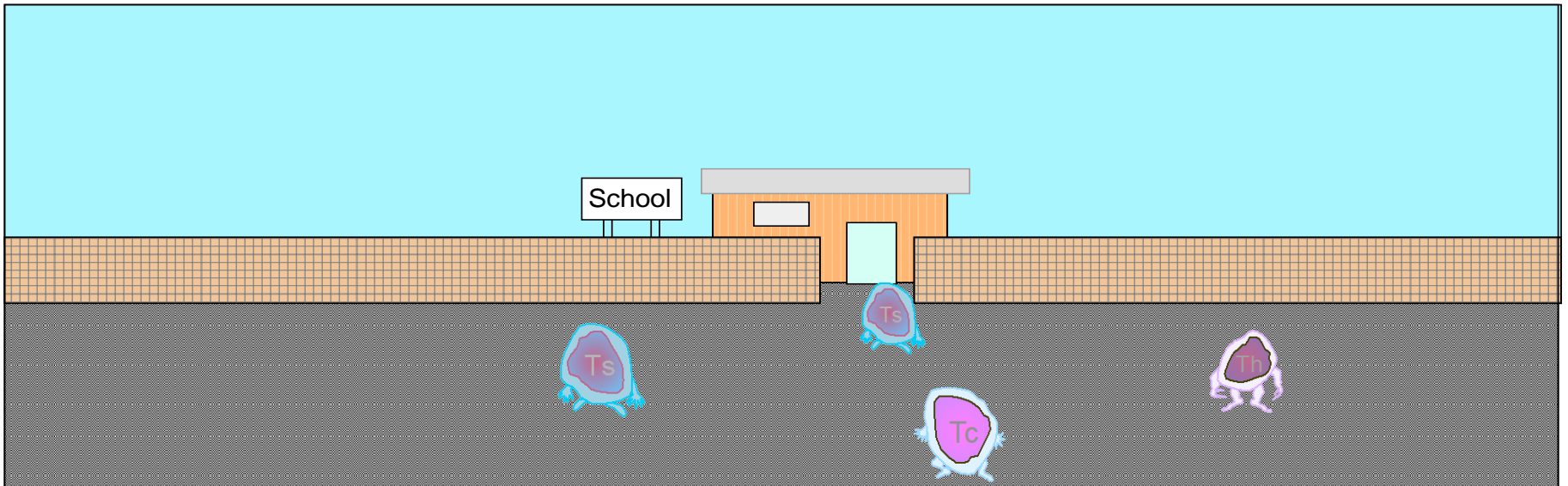
We've got out! Now we can try to make you ill after all.



If the Helper T cells can't send messages to the Tc cells the viruses can infect cells and multiply ...



...until there are enough viruses to make you ill.



The main part the Thymus has to play in our lives is to train the T cells and this mostly occurs early in life.

As we grow up the Thymus becomes less important.

Even the healthiest of teenagers and adults have very little thymus gland left functioning so the lessons learned in the thymus in the first few years of life are extremely important.

A cartoon illustration of a school building. The building is yellow with a grey roof. A sign on the front of the building says "Closed". To the left of the building, a sign on a post says "School". The building is set on a light brown tiled ground. The background is a light blue sky.

School

Closed

Even the healthiest of teenagers and adults have very little thymus gland left functioning so the lessons learned in the thymus in the first few years of life are extremely important.

- Children with 22q11DS are at the greatest risk of infection in their early life.
- Once any major heart defects are corrected then the Immune System slowly learns how to fight disease.
- There is no link between the severity of any other problems with those of the immune system.
- The time it takes for the immune system to function well depends on the individual child.
- The problems linked to 22q11DS vary tremendously in severity and in future many milder cases will be identified.