Immunity: The RPG

The Immune System

On any given day, whether someone is swimming in a triathlon or sitting on the couch, there are 37 trillion living cells working overtime to keep a person alive and thriving. If you had a glass of water for every cell in your body, you could flood a 59-mile (95-kilometer) radius area with 1 foot (30 centimeters) of water. Each and every one of these cells has a purpose in not only keeping you alive but making you who you are.

When outside invaders enter the human body, many of these cells, as well as nonliving chemicals naturally in the body, spring into action to protect the person from infection. This complex set of cells, proteins, and natural barriers are called the Immune System. They are the soldiers protecting the body from certain death on a daily basis, often without us even having to think about it. How? The short answer is that it's complicated. The better one is that you are about to find out.

Meet the team

The first line of defense in the Immune System are natural barriers like the skin, which keeps your insides in and the outside world out. Even in the places where your body opens up to the outside world--such as your mouth or nose--there are defenses in place like mucous membranes and chemical safeguards to keep nasty invaders, called pathogens, at bay.

But when these systems are not enough, there is a set of cells ready to launch into action to protect the body. This is the Innate Immune System, and it packs a considerable punch. Massive cells called Macrophages are present throughout the body and make short work of many of these pathogens by swallowing them whole in a process called phagocytosis. They also release chemical signals to alert the body to the infection, welcoming other cells such as Neutrophils and Eosinophils to swoop in from the bloodstream to join the fight. Cells called Natural Killer Cells patrolling the area are capable of killing cells that have been infected before bacteria and viruses

can use them to reproduce. Often this is enough to fight an infection before it ever takes hold.

Even when this is not enough, there are luckily still many players ready to take up the challenge, called the Adaptive System. Dendritic Cells pick up the pieces of dead pathogens and rush to nearby lymph nodes to recruit others who recognize the pieces and who can help. Dendritic cells activate these recruits to reproduce rapidly. Among those activated are T-Cells, some of whom become Helper T Cells that signal and activate other cells to coordinate the attack. The rest of the T-cells become Cytotoxic or Killer T Cells that can rush into battle and directly kill infected cells.

Meanwhile, dendritic cells also recruit B-Cells, which split into Plasma Cells (which release proteins called antibodies) and Memory B-Cells (which stick around in the body and remember this pathogen so they are prepared if it ever comes back). Antibodies bind to the outside of pathogens to neutralize them, clump them together, and make them easier for macrophages and neutrophils to consume.

Between the innate system's rapid response and the adaptive system's precise and powerful tactics, most infections are conquered over the course of days.

Gameplay

Let's see the immune system in action by playing it in game form. *Immunity: The RPG* works by having a group of 1-7 players (or teams of players) controlling each of the cells in the last section as they battle a specific illness, played by another player/facilitator called The Reaper. The players share a number of hit points that represent the Body's Health, and the players' mission is to keep The Reaper from achieving their goal: reducing the Body's Health to zero. This game is played with a pair of six-sided dice. The game ends when the Body's Health drops to zero or below or the players defeat three threats.

Differentiation

There are seven distinct differentiations, or types, of cells that will be played in this game system: Macrophages, Neutrophils, Eosinophils, B-Cells, T-Cells, Natural Killer Cells, and Dendritic Cells. Distribute these seven roles among the players by choice or by chance, handing out the character sheets for the respective roles to each player. Every differentiation's character sheet contains all the abilities they can use on their turn, as well as a place to keep track of the Body's Health, which starts at 100 at the beginning of the game.

Turns

Each round starts with The Reaper's turn. This is then followed by the Macrophages, Natural Killer Cells, Neutrophils, Eosinophils, Dendritic Cells, T-Cells, and B-Cells, in that order. After each of the differentiations has had a turn, the order starts over again with The Reaper and then continues in the same order once again.

Each time a player takes a turn, they have up to three actions. The actions the player can take for a given differentiation are written on the character sheets for each type of cell. Some abilities take longer and will mention that they take up the time of two actions or even an entire turn. Otherwise, the player can assume that it only takes one action's unit of time.

Patrolling

After everyone is familiar with their character sheets, The Reaper rolls a six sided die (called a d6) and does not tell anyone the result. The number rolled determines what scenario will take place next. The Reaper takes their first turn (further instruction on how to play as The Reaper will be discussed in a future chapter), and then the players can begin to take turns playing their differentiation(s). Neutrophils and Eosinophils cannot use any abilities until Macrophages have begun the process of inflammation, and B-Cells and T-Cells can not take any actions until

activated by a Dendritic Cell. Effectively, this means that only the Macrophages, Natural Killer Cells, and Dendritic Cells are able to detect if anything is happening at first. So it is up to these differentiations to determine whether there are any concerns that must be addressed.

If the players all agree that there is not, they can tell the Reaper to roll again and begin the next scenario. Otherwise, players can decide to take turns in responding to the potential threat.

Body Health

The players all share a hit point total that represents the Body's Health that they are protecting. It begins at 100 and takes damage as pathogens cause infection and as the collateral damage of defending the body stacks up. If the Body Health drops to zero or lower, then the players lose as the body dies. Otherwise, if the players can keep the Body Health above zero, the players defeat The Reaper and the body survives. After each illness is fully eradicated, the body heals completely to 100.

Character Sheets

The following pages contain the character sheets for each of the differentiations. Each sheet can be handed out to the player roleplaying as that type of cell and includes all of the actions that cell differentiation can do during their turn, as well as a place to track the Body's Health.

Macrophages

Body's Health: _____/ 100

Actions

- **Detect pathogens -** use toll-like receptors to recognize pathogens
    - When this action is used, the player is told by The Reaper whether or not there is a pathogen present and how many kinds, but not what they might be.
- **Release Cytokines -** cause inflammation and alert the immune system
    - When cytokines are released, the process of inflammation begins, allowing the players controlling Neutrophils and Eosinophils to take actions.
- **Phagocytosis -** eat and digest pathogens
    - Roll two dice. If pathogens have been detected, this is the amount of damage done to that threat.

Natural Killer Cells

Body's Health: _____/ 100

Actions

- **Detect abnormal cells -** Recognize lack of healthy protein on cell membrane
    - If any cells are abnormal, The Reaper must tell the player.
- **Apoptosis -** Releasing enzymes that kills infected or cancerous cells
    - Roll one die. If the threat has infected any cells or turned any cells cancerous, this die roll is the amount of damage done to the threat.

Neutrophils

Body's Health: _____/ 100

Attack Number: _____

Actions

- **Migration -** exit bloodstream and move toward inflammation
    - Each time this action is taken and inflammation is occurring, the neutrophil's attack number goes up by one. The Attack number resets after each threat.
- **Phagocytosis -** eat and digest pathogens, sometimes dying in the process
    - Roll a number of dice equal to the attack number. If pathogens are present, the sum of this is equal to the damage done to a threat. For every die that rolls an odd number, the attack number goes down by one.

Eosinophils

Body's Health: _____/ 100

Actions

- **Degranulation -** release toxic chemicals that kill pathogens and parasites
    - Roll three dice and add up the highest two results. If pathogens are present, this sum is the amount of damage done to the threat. This requires two actions to do.
- **Phagocytosis -** eat and digest pathogens
    - Roll one die. If pathogens are present, the result of this roll is equal to the damage done to a threat.

Dendritic Cells

Body's Health: _____/ 100

Actions

- **Present pathogens -** Pick up and attach pieces of pathogens to the cell
    - Roll one die and write down the result below. If that number has already been written down, roll again until you get a new number.
    - Presenting: _____ , _____, _____
- **Travel to lymph nodes -** travel to lymph nodes to activate t-cells
    - If presenting a piece of a pathogen, the player may take one action to travel to a lymph node.
- **Activate T-cells -** Encourage T-cells with proper receptors to multiply and fight
    - Roll one die. If the player has traveled to the lymph node and the result matches one of the numbers you have written under "Presenting," then you may add two to the T-Cell's Number Activated. The T-Cell's Number Activated resets after each threat.

T-Cells

Body's Health: _____/ 100

Number Activated: _____

Helper T-Cells: _____

Killer T-Cells: _____

Actions

- **Form Killer T-Cells or Helper T-Cells -** divide into two types of T-Cell
    - The Number Activated is how many total new T-Cells can be made, with the player deciding how many should be Killer T-Cells and how many should be Helper T-Cells. This does not change the Number Activated, and the numbers of all T-Cells are reset to zero after each threat.
- **Activate B-Cells -** use Helper T-Cells to activate B-Cells
    - For each Helper T-Cell formed, add two to the B-Cells' Number Activated.
- **Kill infected cells -** use Killer T-Cells to destroy infected cells
    - Roll a number of dice equal to the number of Killer T-Cells. If the threat has infected any cells, this sum of these dice is the amount of damage done to the threat.

B-Cells

Body's Health: _____/ 100

Number Activated: _____

Plasma Cells: _____

Memory B-Cells: _____

Actions

- **Form Plasma cells -** create cells that can release antibodies
    - The Number Activated defines how many Plasma cells can be created by this action. Both the Number Activated and the number of Plasma Cells reset to zero after each threat.
- **Form Memory B cells -** retain copy of antibodies for future pathogens
    - The Number Activated defines how many Memory B-Cells can be created by this action. The number of Memory B-Cells **DOES NOT** reset after each threat.
- **Release Antibodies -** release proteins that bind and clump together pathogens
    - An amount of damage equal to the sum of the numbers of Plasma and Memory B-Cells is done to the threat, if there are pathogens present. Also, if there are pathogens present and this is the first time this action is used on a turn, The Reaper loses one action on their turn.

The Reaper

The Reaper plays by a different set of rules than the Players. In competitive play, the role is to defeat the players by reducing their Body's Points to zero or less. In educational environments, the role may take on a more generous role of gently challenging the players so that they engage and learn about the role of each cell's part in the immune system. Educators can feel free to cheat to help their students if they see them struggling, but the players losing can also be a lesson in itself.

Threat Roll

In either case, The Reaper begins every game of *Immunity* with the roll of a d6 (a six sided die). These can be found as part of a set in most friendly local game shops, online, or in pairs in several popular board games. Roll the d6 and use the result to determine what threat (or lack of a threat) the body will face next.

Dice Roll	**Threat**
1	No threat
2	Influenza
3	Staphylococcus
4	Cancer
5	Pollen
6	Abrasion

Turns As The Reaper

Do not tell the players what the result is of the roll or what threat they are facing. For the first turn of a new threat, The Reaper also does not need to announce what they are doing and may act according to the actions listed under their threat.

This encourages those playing the Macrophages and Natural Killer Cells to search for any potential threats, even if there are none.

After the first turn, The Reaper needs to announce what they are doing each turn just like the players, but they may keep the Health Points of their threat secret if they wish. Like the players, The Reaper can take up to three actions per turn, choosing from the options listed under each individual threat.

If there is no threat, wait until the players agree to move on to the next threat. Successfully moving on from the lack of a threat counts as one defeated threat towards the three needed for the players to win. If there is a threat, but the players decide to move on, you may play both the current threat and the next one at the same time against the players.

Threat Points

Each threat has a different number of Threat Points that they start out with. That number can sometimes increase as the result of an action, representing the increasing strength of a multiplying pathogen. When the threat points are reduced to zero, the threat is neutralized and the Body's Health is healed back up to 100. If the players defeat three threats without the body dying, the players win and the game ends.

Potential Threats

No threat

There are no pathogens, allergens, nor cancerous cells present. Once the players decide to move on, they may count this threat as one success.

Influenza

The body has been infected by the flu virus. Begin with 50 threat points and three actions per turn, which you may use to do the following:

- Spread Virally - Roll one die and multiply the result by five. This is how many additional threat points you may add to your total.
- Infect Cells - Roll two dice. The sum is the amount of damage done to the Body's Health.

Staphylococcus

An opening in the skin has begun a staph infection. Begin with 50 threat points and three actions per turn, which you may use to do the following:

- Divide and Conquer - Roll one die and multiply the result by four. This is how many additional threat points you may add to your total.
- Bacterial Infection - Roll one die. The sum is the amount of damage done to the Body's Health.
- Deadly Spread - Roll one dice. If the result is four or below, nothing happens. If the result is a five, the bacteria spreads to the blood and Bacteria Infection rolls do an additional point of damage. If the result is a six, the bacteria spreads to the heart valve and does an additional two dice worth of damage.

Cancer

No pathogens are present, but cells in the body have begun to replicate uncontrollably. Begin with 100 threat points and three actions per turn.

- Malignant Tumor - Roll one dice. The sum is the damage done to the Body's Health by the growth of a tumor.
- Metastasis - Roll two dice. If the sum is six or less, nothing occurs. If the sum is between seven and nine, the cancer moves to a new place. Add one to the number of dice rolled for the Malignant Tumor action. If the sum is ten or higher, the number of dice rolled for the Malignant Tumor increases by one and the sum rolled is also an amount of damage done to the Body's Health, as the cancer metastasizes in a vital part of the body.

Pollen

A harmless allergen can still result in damage as the body overcompensates to fight it off. Begin with 30 threat points and three actions per turn.

- Systemic Response - For each time that the B-Cell player uses "Release Antibodies," roll one die worth of damage to represent the damage being done by an overcompensation of the immune system, specifically the Mast Cells.

Abrasion

A scrape in the skin has allowed in both bacteria and viruses. You may present the players with two simultaneous threats: one from a flu virus with fewer threat points (30 to start

with) and one from a staph bacteria with fewer threat points (20). These viruses and bacteria can use the same actions as above with The Reaper having four actions per turn.