

START
CELL WARS
WITH YOUR FRIENDS
RIGHT NOW!



Our wiki is here !

<http://2017.igem.org/Team:Fudan>

Numbers of players: 2-6

Designers: iGEM 2017 Fudan
&Fudan Board game Club

Art byXinxuanXiong

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Creation background

Cancer is one of the most serious diseases that harm human health. The psychology of excessive fear affects the therapeutic effect and the quality of life of the patients. In fact, many tumors are curable after efforts by researchers in many fields. IGEN 2017 Fudan hope that through this game, public could understand tumorigenesis, progression, anti-tumor immune cells, and the process of tumor in a lively way, reduce the excessive fear for tumor.

Your advices are warmly welcomed!

Email: igem@fudan.edu.cn

Our WeChat platform:



Game Object

Welcome to the “Cell War”. In this game, players will lead immune cells or cancer cells against each other in the body. Players of immune cells need to vanquish all cancer cells before you come to the end of the game, or you can choose to suppress the number of cancer tissue blocks to a certain number. For players of cancer cells, you need to expand your territory, which means the number of cancer tissue blocks need to exceed a certain degree.

When cancer tissue number exceed 21, the cancer camp win;

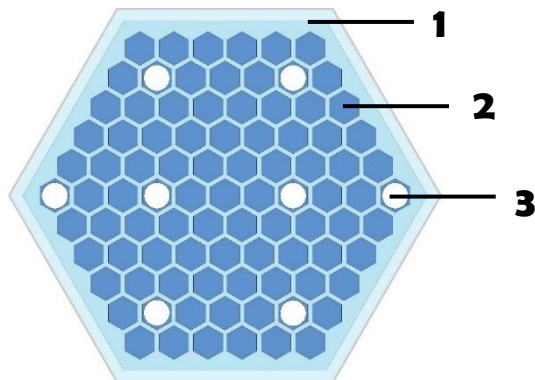
When cancer tissue number fall below 4, the immune camp win;

When all cancer cells are out of the board (died). The immune camp win.

Accessories

1	-Gameboard
61	-Double sides tissue blocks
4	-CARD sign
1	-Biomass generator
1	-Wall factory
2	-Bloodvessel.
6	-Token for Biomass
3	-Cancer cell pieces
3	-Immune cell pieces
1	-Unmarked piece
6	-Dice
40	-Immune cards
40	-Cancer cards
1	-Round recording board
6	-Players board
1	-Handbook

Board plate



1:Board plate. Where the battle begin...

2:Tissue blocks. Blue side up means normal tissue, while red side up means cancer tissue exist. When the ability “degradation” or “purification” is triggered, flip the blocks to show the change of tissue.

3: Sign for cards, Biomass generator,Wall factory and Bloodvessels.These are special spots locate above tissue blocks. Make the most of them to win the game!

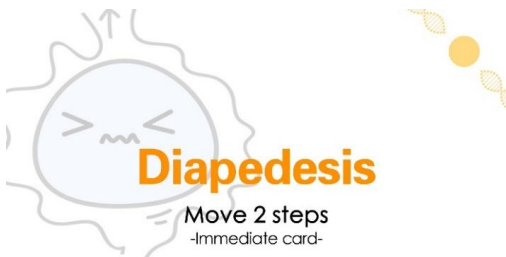
Round board



To record the rounds that has passed. At the start of the game, place the unmarked piece on the number "1" place. When the new round comes, move the piece to the next number. After 16 rounds, if there is still no winner, the game will be a tie end.

Hexagon with orange rim represent the reloading of cards. In this round, all the CARD signs on the board flip to the active state: the side says "CARD positive". At the start of the game, Signs are inactive.

Cards



---- Leukocytes migrate through the vessel wall primarily by squeezing ----
between cells at intercellular junctions.

- **Name:** this card possess a name of “white blood cell swimming”
- **Effect:** the buff you get after you play this card, the example here will permit your piece move two steps immediately.
- **Type:** There are totally three types of cards: immediate card, normal card, and continuous card.

- For immediate card, you have to play it as soon as you draw this card, the card will take effect immediately as well.
- For normal card, you can play it immediately or keep it in your hand till you want to play it, the card will take effect as soon as you play it.
- For continuous card, you can play it immediately or keep it in your hand till you want to play it, the card will take a continuous effect after you play it. (you need to place this kind of card on your panel for a continuous effect.)

Deck setting

There are two piles of cards(deck), one pile for immune cells and the other for cancer cells. When it comes to drawing cards, players can draw a card from the deck of their own camp. If there is no card left in one of the two decks, you can collect the cards that have been used, reshuffle and use them to recreate the deck. Here we provide a set of cards for a quick start; you can also design your own cards, creating new deck after you get bored of this setting.

Immune		Cancer	
Name	Number	Name	Number
Diapedesis	4	Detachment	4
Chemotaxis	2	Invasion	2
Glucose	5	Glucose	5
Maltose	3	Maltose	3
Balanced diet	3	Balanced diet	3

Immune		Cancer	
Preciserecognition	3	Dodge	3
Complement activation	3	Nuclear radiation	2
Cytokine	3	Blood seller	2
Excalibur	2	Architect	2
Adjuvant	2	Card assistance	2
VEGF	2	VEGF	2
Neutrophil	1	Metastasis	1
Teleporting	2	Teleporting	2
Translocation	1	Translocation	2
		Canceration	2
Humoral immunity	1	Infinitive division	2
Circuit Engineering	1		
SynNotch	1		
New drug	1	Aladdin's lamp	1

Player's Panel

Cancer Cell - Alpha

Initial data:

Biomass - 5



Attack - 0

Your Cards

Immune Cell - Alpha

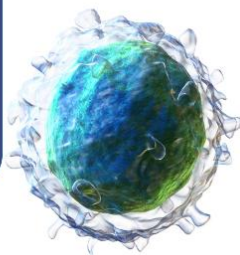
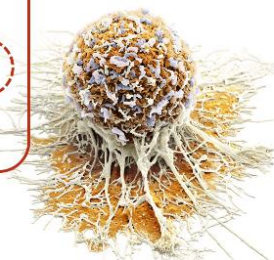
Initial data:

Biomass - 4



Attack - 1

Your Cards



The panels with a theme color of red are provided for cancer cell players to calculate the Biomass and place their cards on, while those with a theme color of blue are for immune cell players.

- **Your Cards:** Here you can place the cards that have continuous effect after you draw and play it.
- **Biomass:** Biomass represents the activity of your cell. If the Biomass goes to 0, you have to move your cell off the board and commit a failure (whether temporary or final.) Number of spots represents the limit of your Biomass, while moving or changing the number of tokens represents the actual value of that.
- **Attack:** Attack represents the damage you can deal. Initially, immune cells possess 1 point attack, while cancer cells are 0.

Other items includes...

- Cell Pieces: Place them on the board to represent your cell during the game!
- Dice: Roll the dice for movement and attack.
- tokens for Biomass: Place them on your Player's panel to show your biomass value.

Start!

1. Information confirmation:

Confirm your camp (Immune or Cancer), distribute the panels and corresponding pieces. In a 3 vs 3 game, we recommend a turn for playing as: Immune alpha, Cancer alpha, Cancer beta, Immune beta, Immune gamma, Cancer gamma. If a player's cell die, this player's round will be skipped.

2. Place the board plate and tissue blocks.

We recommend that using 7 cancer tissue blocks with 54 normal tissue blocks to build the board.

First, one side's players decided the location of buff signs, including 4 CARD signs, 1 Biomass generator, 1 Wall factory and 2 Bloodvessels.

Then, the other side's players choose the location of all cancer tissue blocks.

- All the tissue blocks should be fit to the grid of the board

Cell Wars

plate, and all signs should be placed on tissue blocks.

- Signs should not stretch across multiple tissue blocks or overlap with each other.

After that, all the players start to place their cell pieces on board by the turn for playing.

- Cancer cell pieces can only start on cancer tissue blocks, and immune cell pieces can only start on normal blocks.
- Be careful that all tissue blocks right beneath buff signs and those around these blocks cannot be chosen as a start position for any pieces! Wisely deciding the locations of buff signs or cancer tissue blocks helps your camp start with advantages.

3. Accessories setting.

Each player places tokens for Biomass on their plate. Initial Biomass amount equals to the cell's limit.

Divide two decks by the picture of card's back (red represent cancer, while blue represent immune). Shuffle the cards separately, place them aside with backside up.

When these are all finished, the game could start and goes into round 1.

Example(1):

Amy (A), Bob(B), Cathy(C), David(D), Edward(E) and Frank (F) are six iGEMers gathering together to join in this game. Amy, David, and Edward decided to choose the Immune camp, while Bob, Cathy, and Frank choose the Cancer camp. After discussion, they confirm their roles and playing turn, take their panels:

	Camp	Turn	Panel
Amy	Immune	1	Immune-Alpha
Bob	Cancer	2	Cancer-Alpha
Cathy	Cancer	3	Cancer-Beta
David	Immune	4	Immune-Beta
Edward	Immune	5	Immune-Gamma
Frank	Cancer	6	Cancer- Gamma

As green hands, they decide to use the 7-54 settings for tissue blocks. First, Amy, David and Edward decide the location of buff signs like this:

(pic. Unfinished)

After the Immune camp set the location of buff signs, players of Cancer camp start a discussion based on the buff signs' location to choose the location of their cancer tissue blocks. At last, it comes out like this:

(pic. Unfinished)

Amy place her piece on the board, then Bob, each one following the playing turn. After the pieces are all set, decks are set up, tokens for Biomass are placed, and the game start.

Round1 to Round 16

The game last for 16 rounds, each round consists of the **“System Round”** and **“Individual Round”**. When a new round start, it first comes to “System round”, when global events are triggered and some resource are reloaded. After these refreshments, it comes to “Individual Round”, when players take actions by turn.

“System round”

1. Move the unmarked piece on the Round bar, from “1” to “16”, each round move one step.
2. Reload the signs for cards each three rounds, flip all the “CARD negative” ones to “CARD positive”.

“Individual round”

1. Relapse:

For players whose cancer cell out the board (died) and there is any solidified tissue block on the board.

The players of the dead cell can choose to relapse the cell at the start of his or her “Individual round”. After relapse, one piece of solidified tissue block is changed to a normal cancer tissue, while the relapsed cell arises on this tissue block.

Relapsed cells have one point of biomass, and the limit of the biomass decreased one.

2. Pre-draw of cards:

For the players who have their pieces on an active spot (“CARD positive”)before this stage.

The player get an opportunity to draw a card free in the stage of “Card drawing” of this round. If

there are more than one players on the spot, roll the dice to decide who get the card. After the sign has been triggered, turn it to inactive state ("CARD negative") immediately. Passing the sign provides nothing.

3. Collect walls:

For players of Cancer camp who have their pieces on the Wall factory before this stage.

The player can collect at most 2 pieces of walls immediately. The factory produce 1 piece of wall each round. At start, there are nothing on the spot. Passing the sign provides nothing.

4. Moving by Blood vessels:

For players who keep their pieces on the blood vessel from the end of his or her last round.

The player have to move their pieces to the other blood vessel spot immediately. Passing the sign provides nothing.

Example :

Bob moved his piece to one of the blood vessel last round. His cell has not move at all since then. Now it's his turn again. According to the rules, he has to move the cell to another blood vessel sign.

5. Card drawing:

There are three ways to draw cards: Free drawing, Charge drawing, and Mutational drawing.

Free drawing: Players who have pre-drew a card from the CARD signs and still alive now can draw a card for free.

If you stay at the spot before the reloading of CARD signs, you can draw the card in this round.

If you move to the site during your “Individual round”, you can’t draw the card immediately, but wait till next round for you.

It’s ok to leave the spot after you have made the

pre-draw.

Passing a sign provides nothing.

Charge drawing: Players who have more than two points of Biomass can claim burning, lost 2 points of Biomass and draw a card immediately, no matter where you are.

Mutational drawing: Players of Cancer camp who have more than one point of Biomass can claim mutation, lost one point of biomass and roll a dice. For 1 and 2, you get nothing. For 3 and 4, you only get one point of Biomass back. For 5 and 6, you can draw a card immediately.

6. Play cards

Players hold any cards can play them freely in this stage. There is no limitation of amount or order for playing. You cannot play any card after or before this stage.

7. Special actions

For Immune Camp players, they can use “Purification” or “Demolition” in this stage; for Cancer Camp players, they can use “Degradation”, “Solidification” or “Construction”. Each player can only use one special action per round. As long as a player have claimed an special action, he or she cannot movethe cell piece any more in this round.

Purification- Immune cells on cancer tissue can turn the tissue to normal tissue.

Demolition- Immune cells can demolish a piece of contiguous wall.

Degradation- Cancer cells on normal tissue can turn the tissue to cancer tissue.

Solidification- Cancer cells on cancer tissue can claim “Solidification”. After continuous three times of solidification of the same cancer tissue without locational changes on the board, the tissue will be

changed to a solidified tissue.

Players during a process of solidification can draw cards and play cards with immediate effects.

Solidified tissue equals one cancer tissue when counting, but cannot be changed by purification or cards.

Any movement or action result in locational change will interrupt solidification and empty the counting.

Construction- Cancer cells possessing walls can build a wall between two tissue blocks on the board. Wall stops immune cells from passing. Walls have no effect on cancer cell movement.

8. Movement:

Cells choosing not to claim any special actions can roll a dice for movement. For 1, 2 and 3, cell can move one steps (form one block to another). For 4 and 5, cell can move two steps. For 6, cell can move 3 steps. You can change directions while moving.

9. Attack:

For Immune cell who has roll a dice for moving, if the cell end up getting close enough to a cancer cell, the player can attack the cancer cell by rolling a dice.

Initially the attack range is 0, which means an immune cell has to move to the same block where the cancer cell staying to attack the cell.

Cards can enhance attack range. Enhanced range represent a radius of attack, all cancer cells inside this range is vulnerable.

If there are multiple cells inside the range, each one will trigger an attack movement. The player of the immune cell can choose the order of attack. Before each attack, you have to make sure the target is inside your range.

Rolling:

Damage is related to the number you roll.

For 1, immune cell takes s a step back(the direction opposite to the last movement), and turn

the normal tissue block closest to the target cancer cell to a cancer tissue block.

For 2 and 3, immune cell just takes 5 a step back.

For 4, 5 and 6, immune cell deal the damage according to the cells attack, which means the target cancer cell will lost the Biomass equals to the attack value of immune cell. If the cancer cell still alive, it will be repelled a step back as the same direction of the immune cell's last movement.

Double attack:

If a cancer cell was repealed a step back, but after the movement it still locates in another immune cell's attack range, it will be attack immediately, caused damage equals to the second immune cell's attack, move another step as the same direction of the first step.

Double attack will not be triggered by double attack again.

For cancer cells locate at the border of the board, it won't be repelled out-of-bound but stay still, the immune cell will be rebound one step instead.

10. Recover:

Cells on the Biomass generator get a point of Biomass. Biomass can't exceed the limit.

Ending

When everyone's Individual round ends, check the game object to see if a camp has won the game:

When cancer tissue number exceed 21, the cancer camp win;

When cancer tissue number fall below 4, the immune camp win;

When all cancer cells are out of the board (died), the immune camp win.