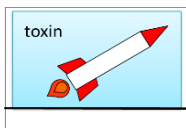## ○Introduction of the game

This game is played by two people. It is a strategic game that players make full use of four kinds of cards and defeat the opponent in adapting to a condition.

1. Cards

・**Life**・・・.It will be lost when you get damaged by the attack of the opponent. Each player will start with three lives.

・**toxin**・・・Toxin is a poisonous substance produced within living cells or organisms.

・**antitoxin**・・・Antitoxin is an antibody that is capable of neutralizing the specific toxin. It has a role to counteract the action of toxin.

・**lasI**・・・lasI is a synthase that converts SAM into a small molecule called an acyl-homoserine lactone (3OC6-HSL).

・**rhlI**・・・rhlI is a synthase that converts SAM into a small molecule called an acyl-homoserine lactone (C4-HSL)

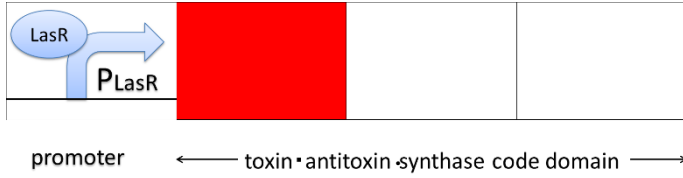・**luxI**・・・luxI is a synthase that converts SAM into a small molecule called an acyl-homoserine lactone (3OC12-HSL).

・promoter・・・Translation is activated and it expresses toxins and antitoxins on the downstream of it when AHL concentration is sufficient to express. Plas, Prhl, Plux corresponds to lasI, rhlI, luxI respectively. Firstly, lasI, rhlI, luxI synthesize each specific AHL.

Secondly, the promoter expresses toxins and antitoxins. The cards in the red range of the figure can be expressed in this game.
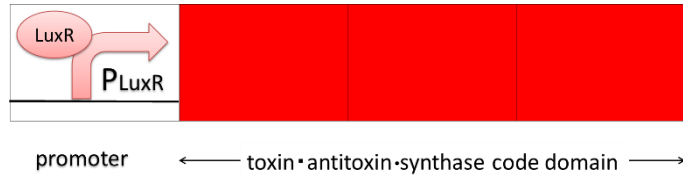
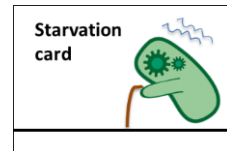: the area where promoter can be expressed.

Plas

LasR
P~LasR~

promoter ←—— toxin・antitoxin・synthase code domain ——→

Prhl

RhlR
P~RhlR~

promoter ←—— toxin・antitoxin・synthase code domain ——→

Plux

LuxR
P~LuxR~

promoter ←—— toxin・antitoxin・synthase code domain ——→

・**Starvation card**・・・Each player has to express at least a toxin within two turns when this card is in the field. One of your "life" will be lost if you cannot express it..
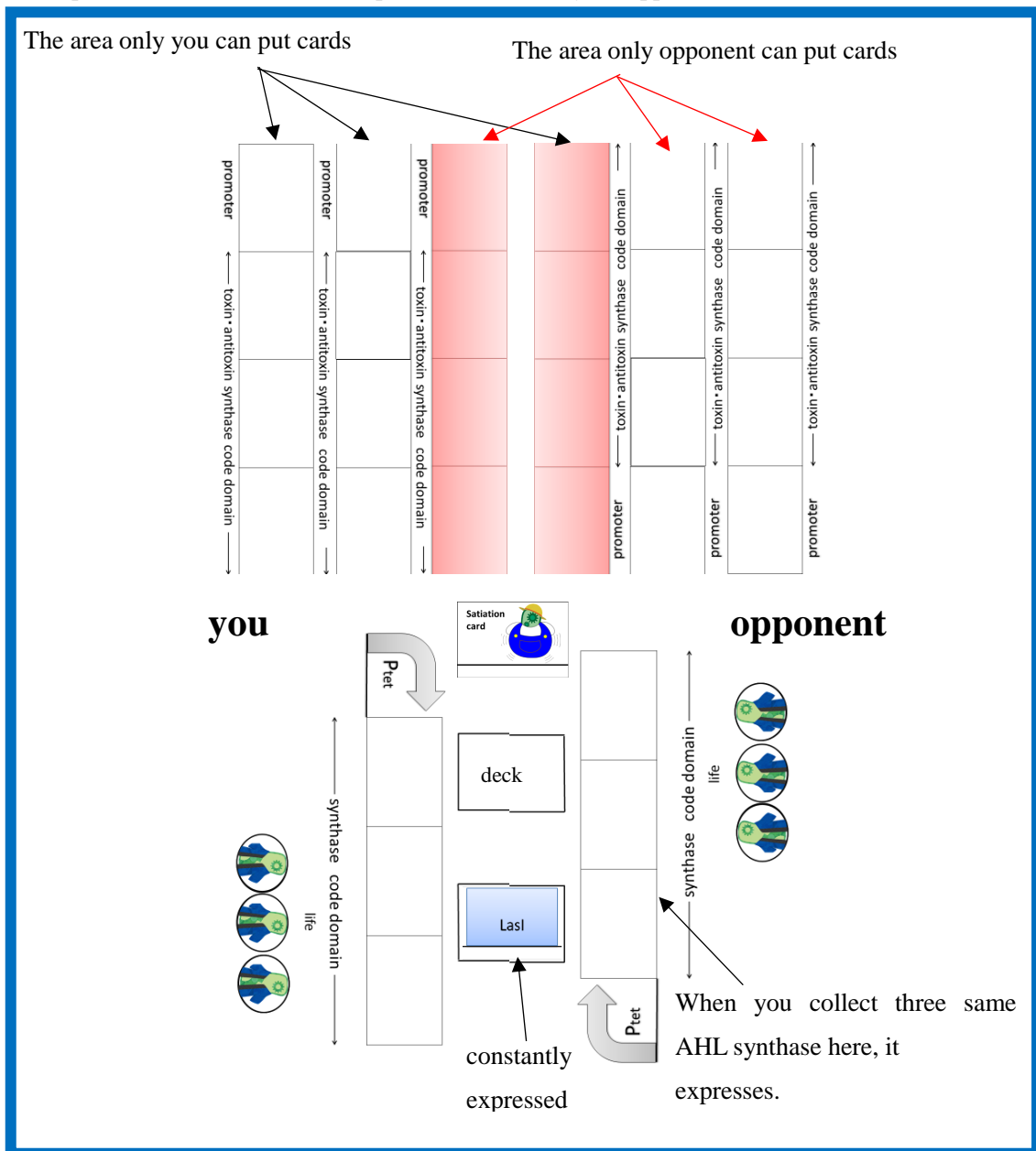
Starvation card

・**Satiation card**・・・When you express toxin while this card is in the field, one of your "life" will be lost.

Satiation card

2. How to use the sheet

・This game is played in the field which consists of your position and your opponent's position surrounded with a blue frame. You can put your cards on only the white area of your position and the red area of your opponent's position.

・lasI always expresses in the field and you can express the downstream of Plas- by using it.

・When you collect three luxI" with a Plux or three rhlI with a Prhl in the synthase code domain, you can express its downstream. This expression can affect your opponent as well.

The area only you can put cards

The area only opponent can put cards

you

opponent

Satiation card

P_tet

deck

LasI

synthase code domain

life

synthase code domain

life

constantly expressed

When you collect three same AHL synthase here, it expresses.

P_tet
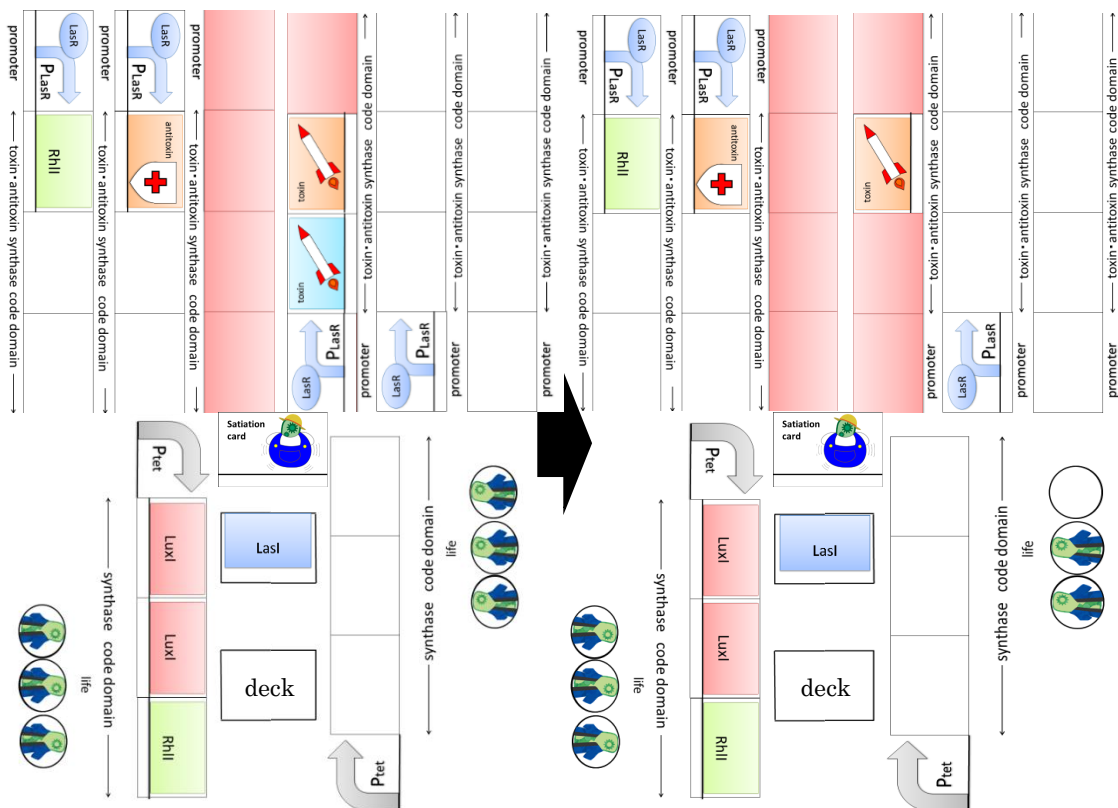
field

3. How to play the game

Decide which plays first with rock-paper-scissors. Take the first three cards from the deck alternately.

① A player who won the rock-paper-scissors takes one card, then choose "PASS" if you don't want to put your card. . After that, another player do it as well. It is defined as "one turn".
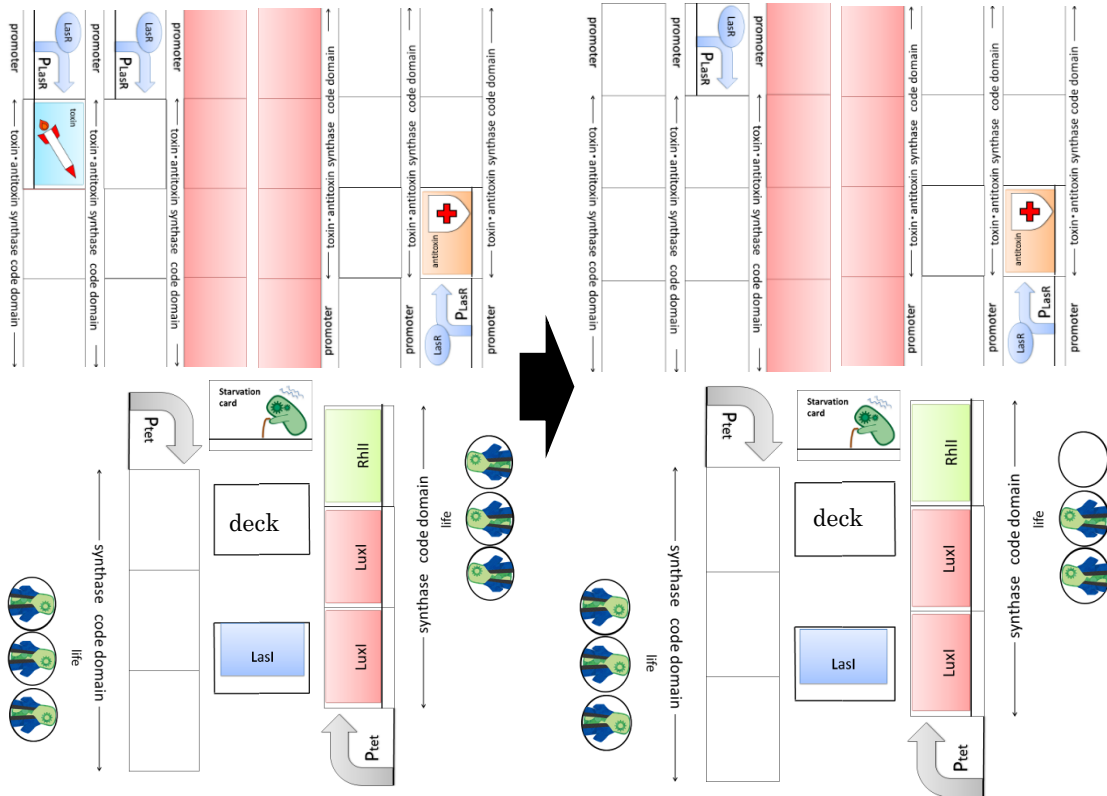
② There is a heap of cards where only starvation cards and satiation cards were in separately from a deck and turns up a card in the first of the deck after 5 turns.
   Afterwards, turn up one piece every turn twice.

③ When lasI, which constitutively expresses in the field, or three rhlI, or luxI are in your /your opponent's code domain, special AHL is produced. In this way, the corresponding promoter is expressed in the opponent cannot express antitoxin while expressing toxin, the opponent loses his/ her one life.

④ If you cannot express toxin in 2 turns on the state that a starvation card is over, one "life" decreases.

⑤ If either player loses his/her one "life", he/she takes two cards. As one life is lost, the number of cards you have increases by one.

⑥ When all lives are lost, the game is over. The survivor is a winner.

○**Supplement**

・Once express **toxin**, **antitoxin**, **promoter, synthase** are expressed, players have to remove all of synthases in their fields.