



# AUTOIMMUNITY PROBABILITY



## Materials required

- Popsicle sticks (at least three of each colour)
- Bag
- Six-sided die
- Result sheet

Autoimmune diseases are conditions in which the immune system produces antibodies that attack the body's own cells. Some examples of autoimmune diseases are coeliac disease, rheumatoid arthritis, type 1 diabetes, and multiple sclerosis. Autoimmune diseases affect around 5% of people in Australia.

Please note, you need to watch the video, click [here](#): for a full explanation prior to beginning the experiment.

## Instruction

### Experiment part one

In this part of the experiment, we will firstly examine a model of the immune response for people without an autoimmune disease.

1. Place the popsicle sticks in a bag, make sure there are the same number of each colour.
2. Use the provided results sheet noted "general population risk" table. Note: each of the four data tables will represent a group of 3 people with a different genetic predisposition to autoimmune diseases.

3. Start with person 1, randomly pick a stick out of the bag, look away and mix the sticks so you don't know which colour you will pick.
4. Write the colour of the stick you picked in { } next to the "person 1".
5. Move to Checkpoint 1, randomly pick a stick from the bowl. Possibility A -if the colour matches the setup colour, then roll a die, if the die number is 4-6, end testing for this person, if the die number is 1-3, put the stick back and go on to the next check point. Possibility B -if the colour doesn't match, then put the stick back and move on to the next checkpoint.
6. Move to the Checkpoint 2 and Checkpoint 3 respectively, repeat the procedure used in the Checkpoint 1.
7. Once you have down all three checkpoints, fill out the bottom row to answer "did the person get an autoimmune disease."
8. Repeat this procedure for the other two people, you can do as many people as you can to try to get the most representative sample.

### Experiment part two

You now need to repeat the same procedure in part one for people at higher risk of developing an autoimmune disease, and fill out the tables: "Higher risk at 1 checkpoint", "Higher risk at 2 checkpoints" and "Higher risk at 3 checkpoints".

### Experiment part three

1. Use the analysing the data table to analyse the results you have collected from these four different groups.
2. Count the number of times you wrote "yes" in the bottom row for "Did the person get an autoimmune disease?" divide by the number of people you have tested and then multiply by 100 to calculate the percentage of people who would have an autoimmune disease.
3. Write your answer in the table in your result sheet.

Combine the answers from the class for each checkpoint to get a good representation of the population.

### Contact

E [Science@anu.edu.au](mailto:Science@anu.edu.au)

W [Science.anu.edu.au](http://Science.anu.edu.au)

