# The population density sensing and suppression of asexual division of planaria.

Group 5

# 1. What is planaria？

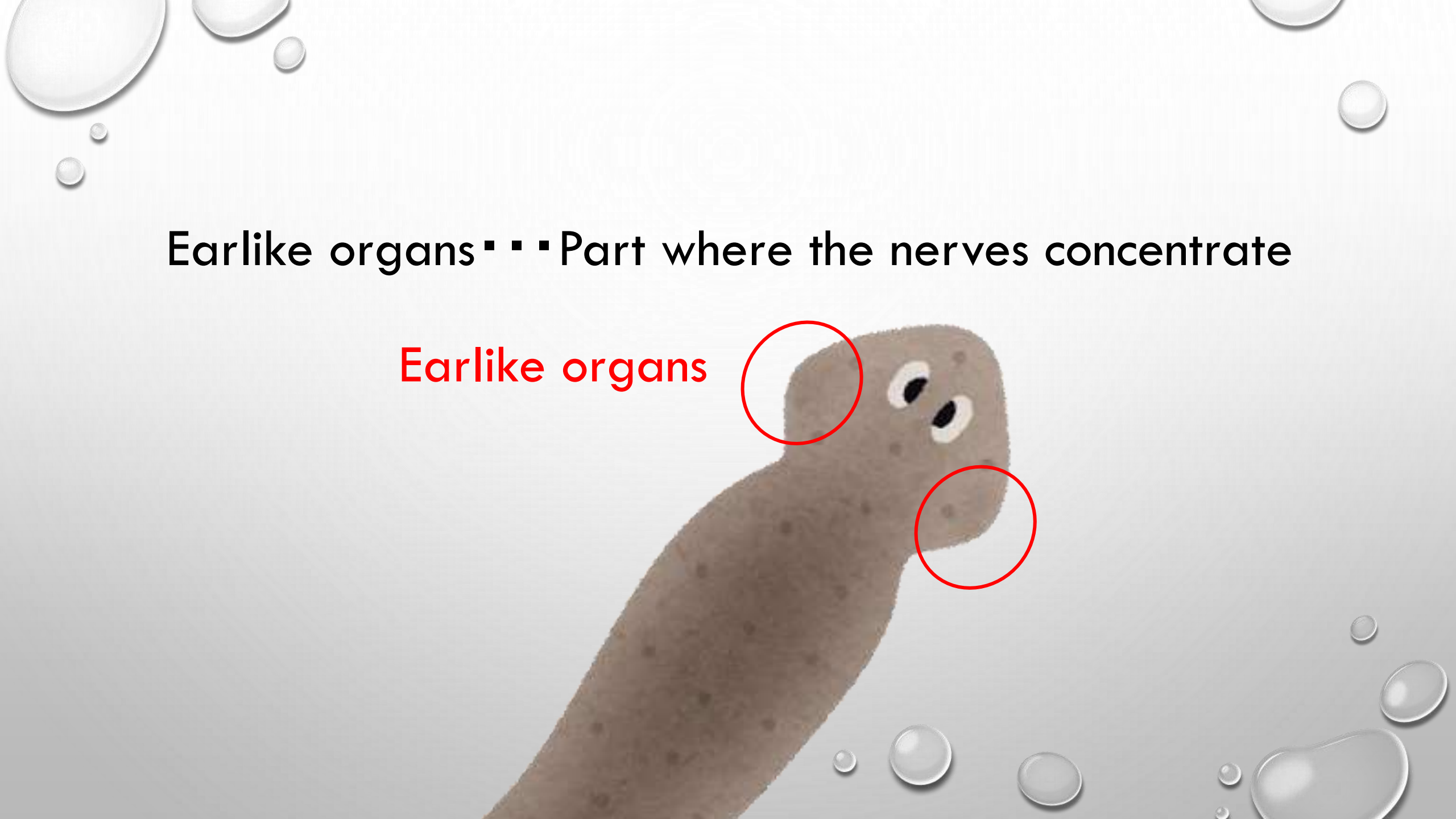
# Previous research

- High population density prevents planaria from dividing.

Petri dishes(2.3cm) { 6→12 / 12→12 }

- Planaria sense chemical substances of food with earlike organs.

Earlike organs･･･Part where the nerves concentrate



# How do they sense the population density？

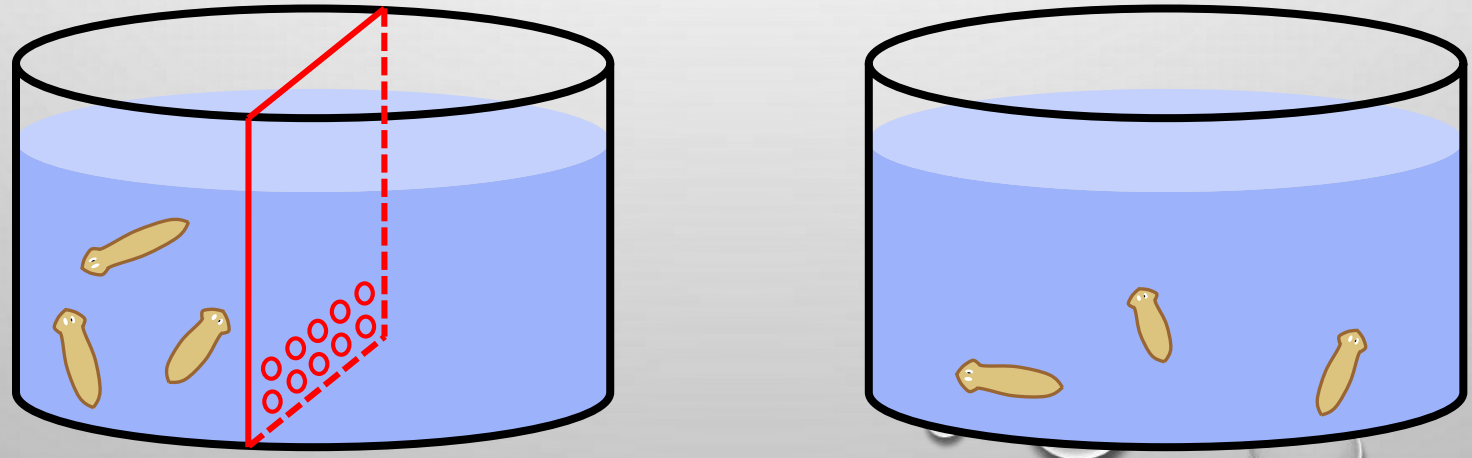
Hypothesis ① Chemical stimulation

Hypothesis ②　Contact stimulation

# Outline of experiment

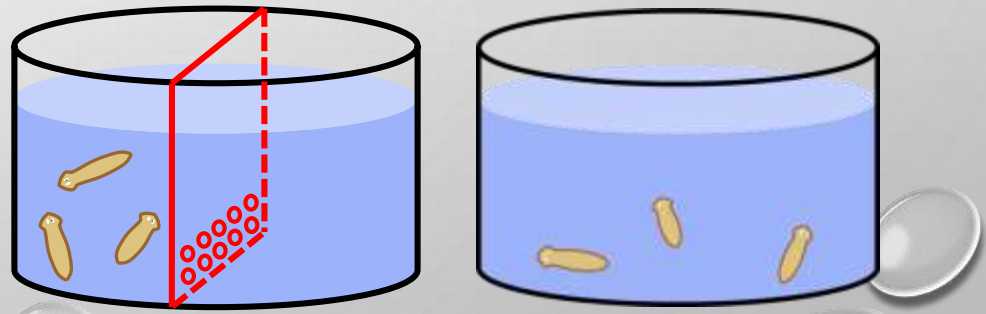
- Concentration of chemical substance : constant
- Contact frequency of planaria : increased

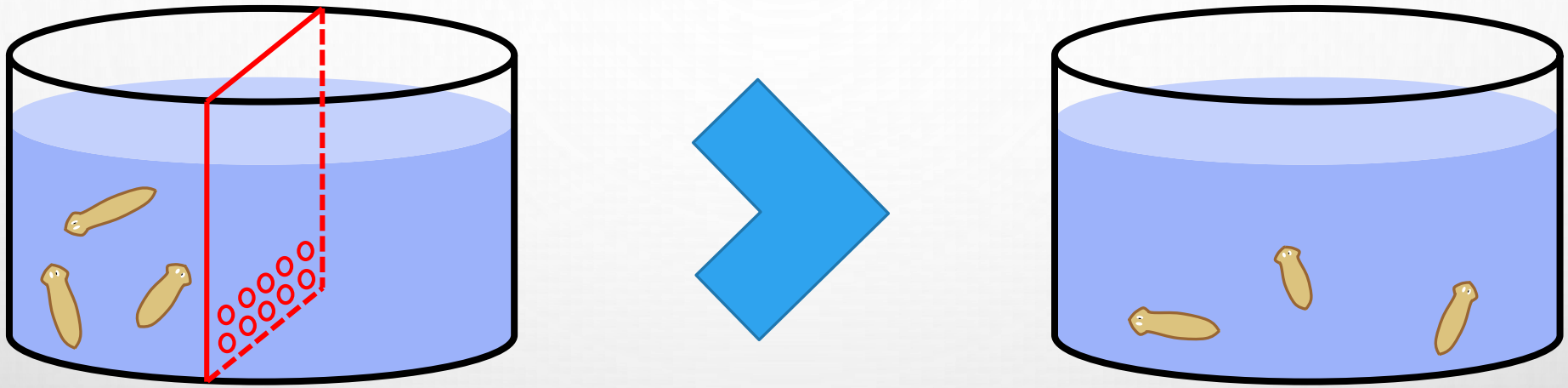
Let's make a partition plate with holes!!



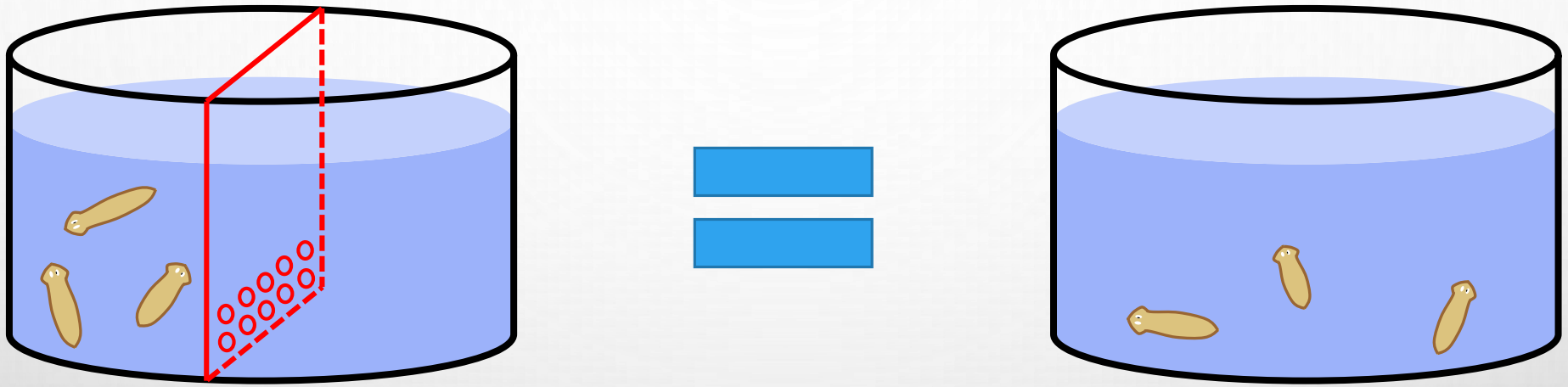
# Conditions of partition plate

- Planaria cannot pass through the holes.
- Water and chemical substances can pass through the hole.



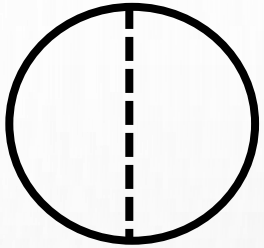


Contact frequency of planaria

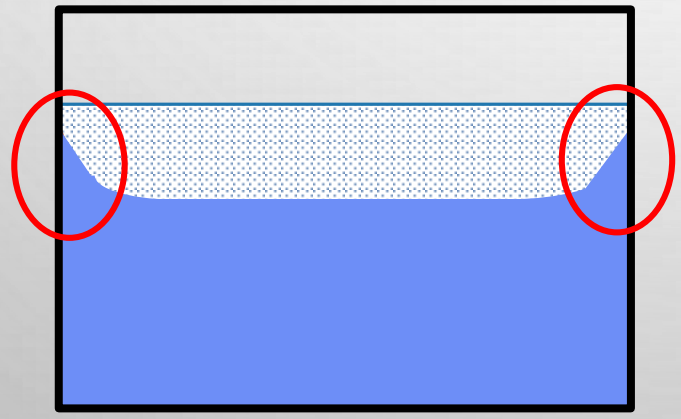


Concentration of chemical substance

# Type A : Linear partition

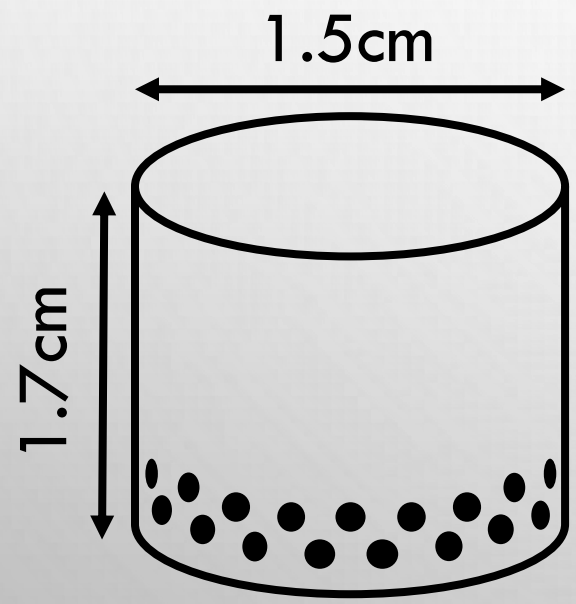


- Plastic partition plate with holes
- Fixed in with wax



Planaria escape

# Type B : Cylindrical partition

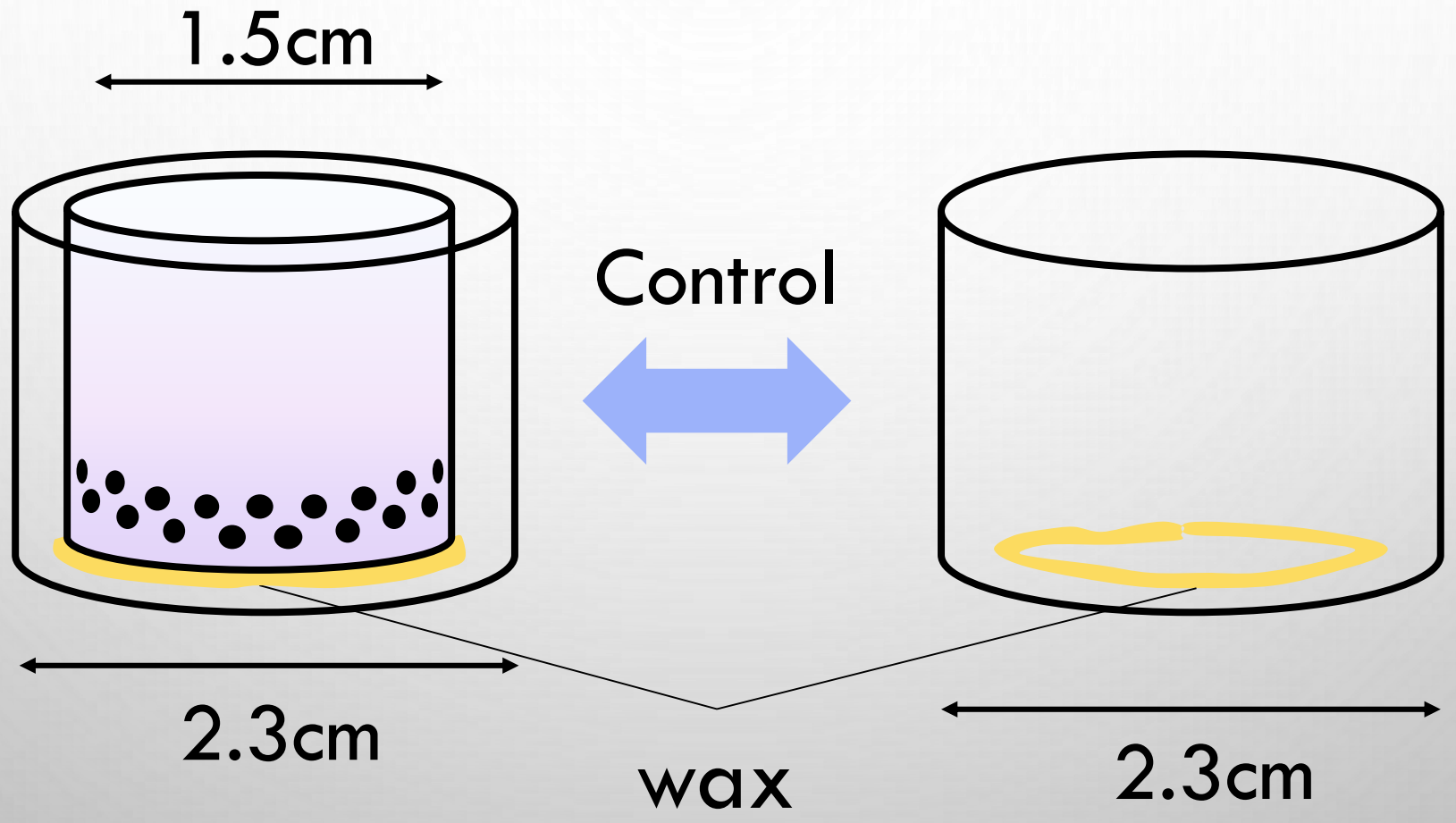


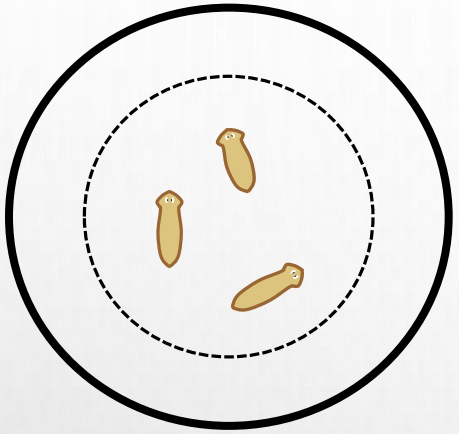

- Cylindrical partition plate with holes
- Plate is fastened with wax

⇨ Planaria can't escape

- Paraffin wax ⇨ micro wax

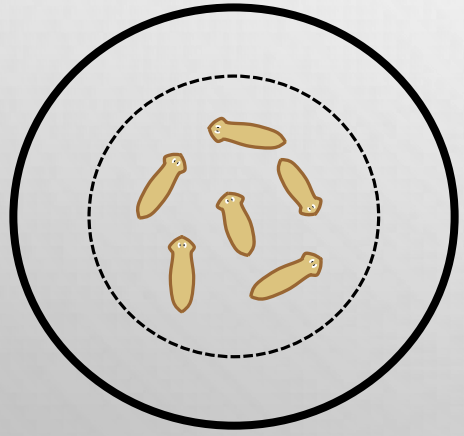
# Experimental method





With plate
3 planaria

No plate
3 planaria



With plate
6 planaria

No plate
6 planaria

## Equipment material

- Cylindrical partition plate
- Micro wax to adhere
- Plastic petri dishes

  (Inner diameter 2.3㎝)

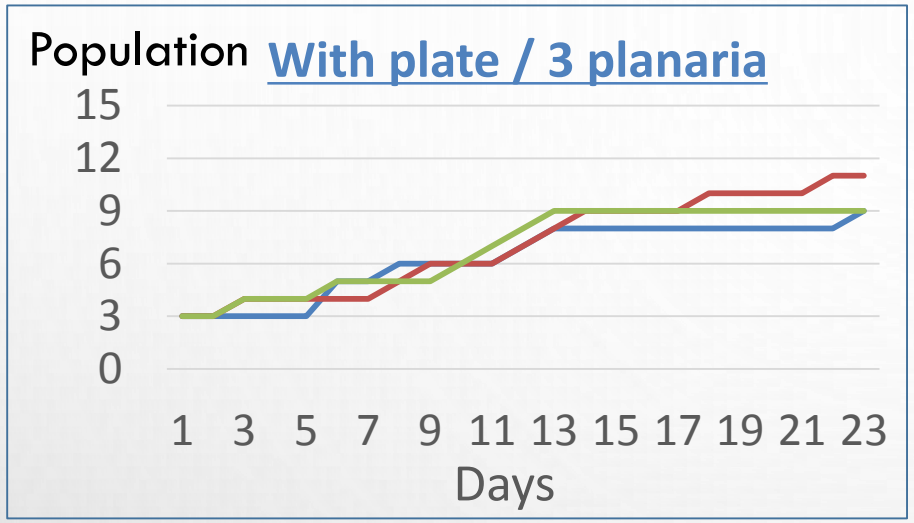
## Experimental material

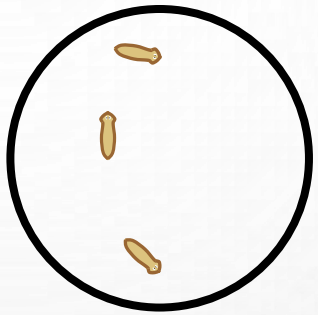
- Planaria

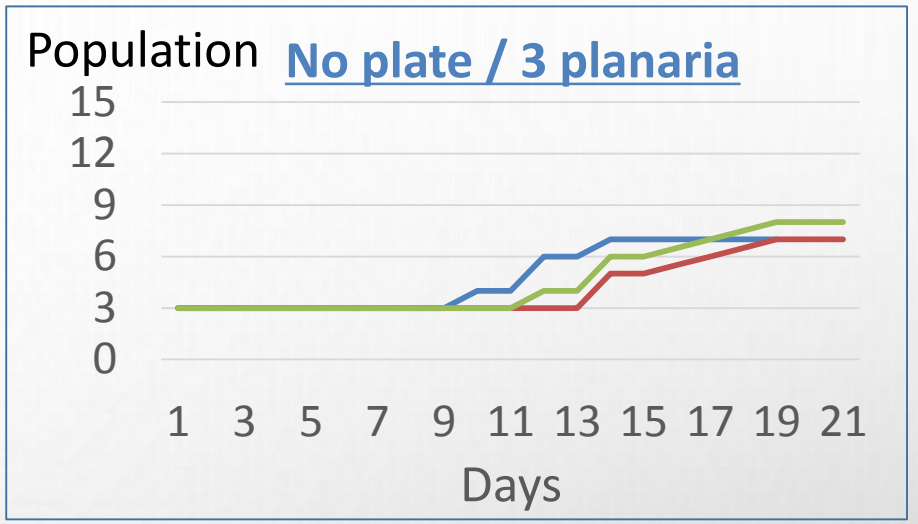
  (Body length 8㎜ or more)

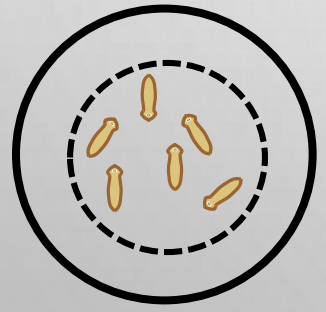
  3 or 6 × 3 sets
- Pumping water
- Food (Red worms)

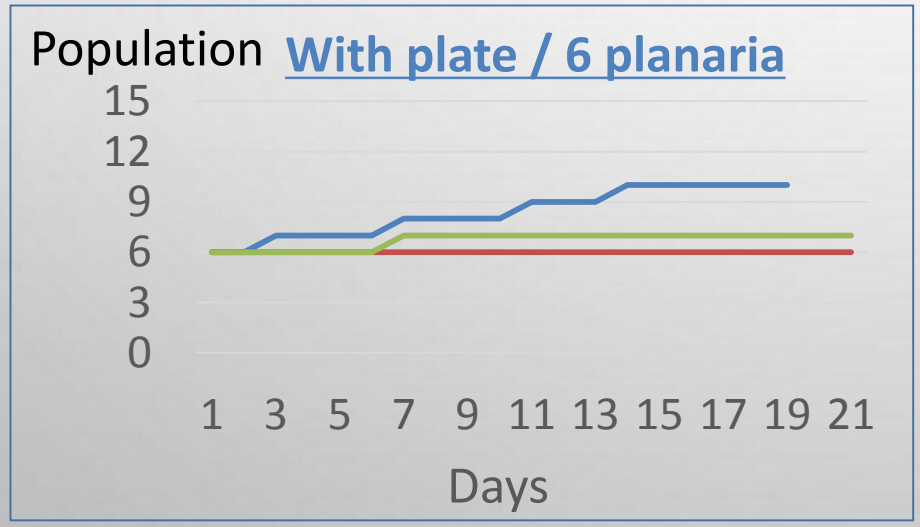
# Results

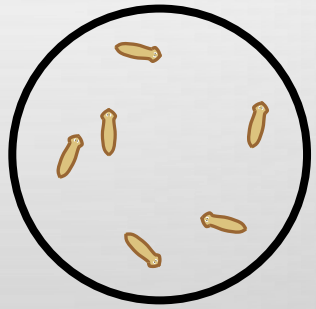

Population
With plate / 3 planaria
15
12
9
6
3
0
1 3 5 7 9 11 13 15 17 19 21 23
Days

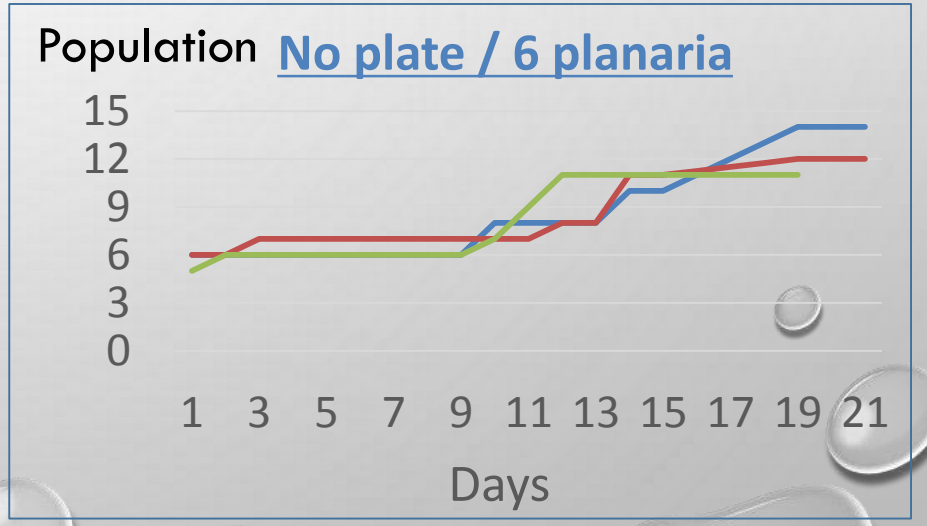



Population
No plate / 3 planaria
15
12
9
6
3
0
1 3 5 7 9 11 13 15 17 19 21
Days



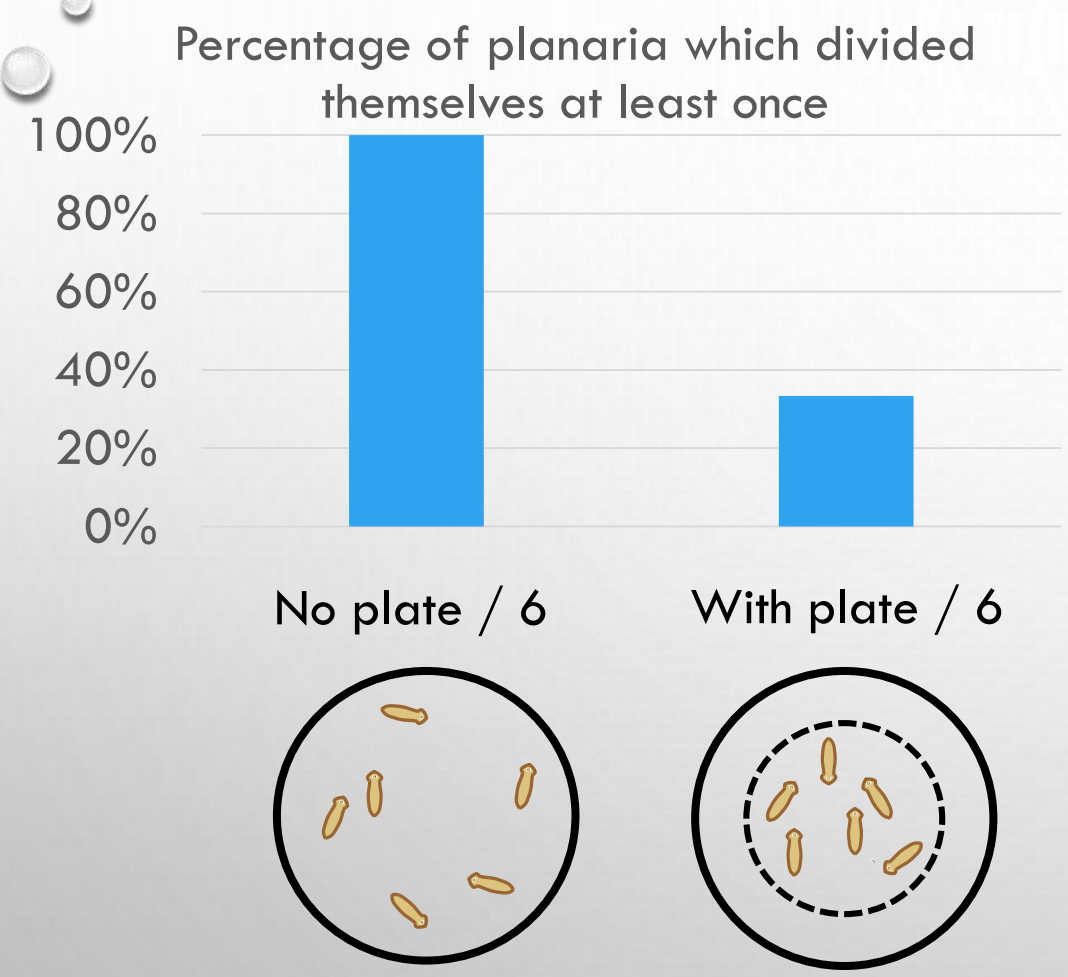

Population
With plate / 6 planaria
15
12
9
6
3
0
1 3 5 7 9 11 13 15 17 19 21
Days




Population
No plate / 6 planaria
15
12
9
6
3
0
1 3 5 7 9 11 13 15 17 19 21
Days

# Percentage of planaria which divided themselves at least once

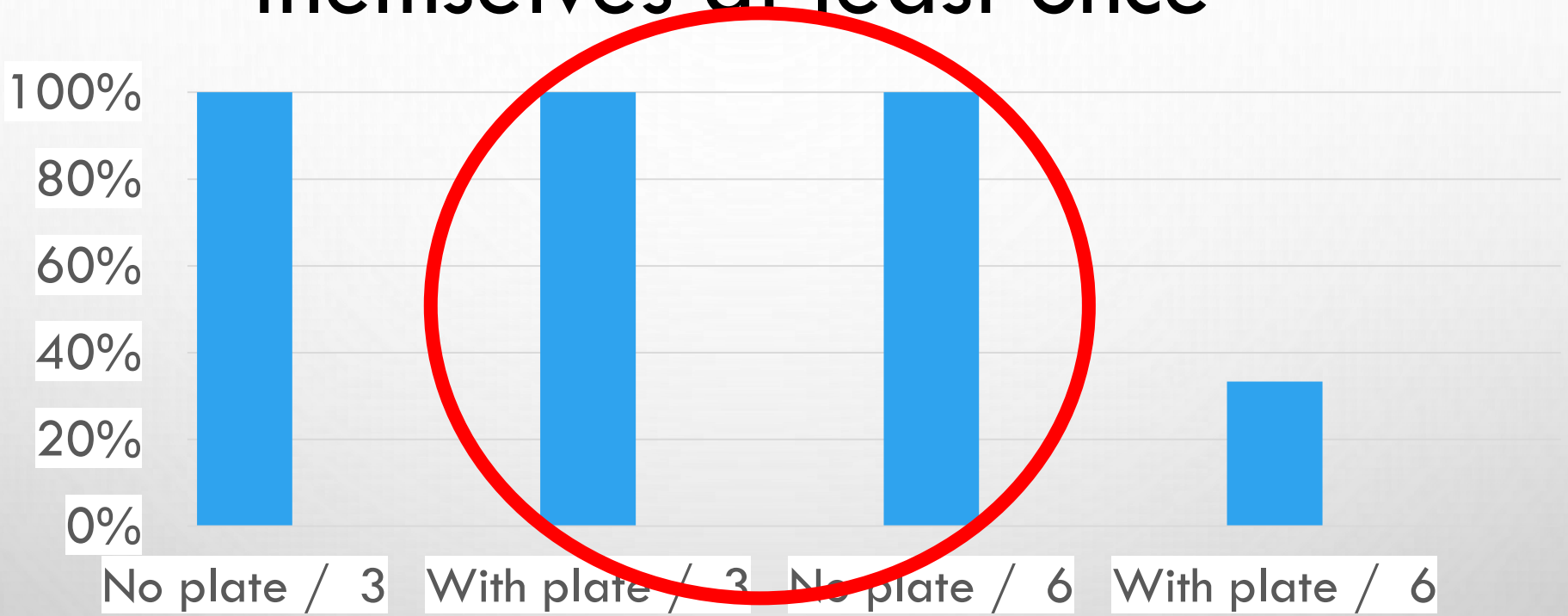

# Consideration Ⅰ



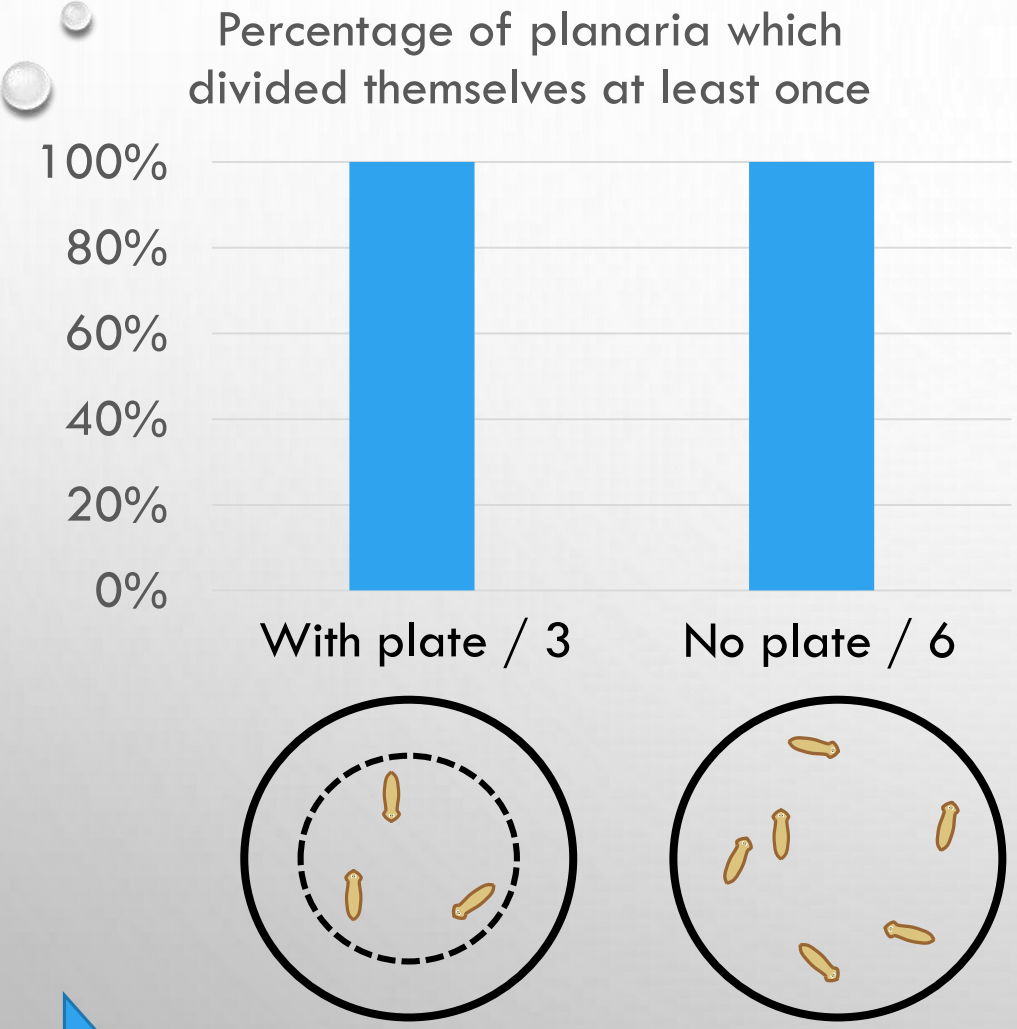

| ① | No plate/6 | With plate/6 |
|---|---|---|
| Asexual division occurred | 100% | 30% |
| Chemical substance concentration | Constant | |
| Contact frequency | Few | Many |

Contact stimulation suppresses asexual division.

# Percentage of planaria which divided themselves at least once




# Consideration Ⅱ




| ② | With plate/3 | No plate/6 |
|---|---|---|
| Asexual division occurred | 100% | 100% |
| Chemical substance concentration | 1 time | 2times |
| Contact frequency | Constant | |

Chemical stimulation doesn't affect asexual division.

# Summary

Hypothesis① Chemical stimulation

・・・High possibility that it doesn't affect asexual division.

Hypothesis② Contact stimulation

・・・High possibility that it suppresses asexual division.

# For future work

- Take more data to increase reliability.
- Find out more about the relationship between contact frequency and the suppression of asexual division of planaria.

# References


- Kakogawa East High School

Students Research Paper VOL.8 and VOL.9

# Acknowledgments

In this research, we got a lot of advice from Hyogo Prefectural University Professor Yoshihiko Umesono.

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# Thank you for listening.