

**Increase or decrease  
of Butyric acid bacteria  
by supersonic wave irradiation**

# Words

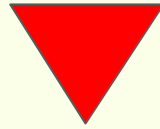
Butyric acid bacteria — 酪酸菌

Lactic acid bacteria — 乳酸菌

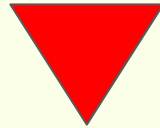
Supersonic wave — 超音波

# Motive

contribute to the treatment of cancer



butyric acid bacteria implicated in cancer treatment



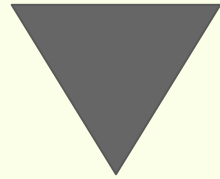
investigate the relationship between  
butyric acid bacteria and supersonic wave

# Question

How does butyric acid bacteria  
due to change in frequency of  
supersonic wave?

# Hypothesis

Butyric acid bacteria and lactic acid bacteria live without oxygen.



Supersonic wave increases butyric acid bacteria like lactic acid bacteria.

# ingredient

- *butyric acid bacteria*  
*Clostridium butyricum*
- liquid medium(GAM bouillon)
- agar medium(BL medium)

## GAM bouillon



ager medium

# Equipment



**spectrophotometer**



**Autoclave**



**amplifier**

**Function Generator**

# Equipment





《explanation of absorbance》

**absorbance** ··· the amount of light which was absorbed by a solution

**吸光度**

Absorbance	Bacteria
increase	increase
decrease	decrease



**Spectrophotometer**

Colony  
⇒ The group  
of **live** bacteria

Colony



# Method

① put butyric acid bacteria into liquid medium



bacteria : liquid medium  
= 1 : 100

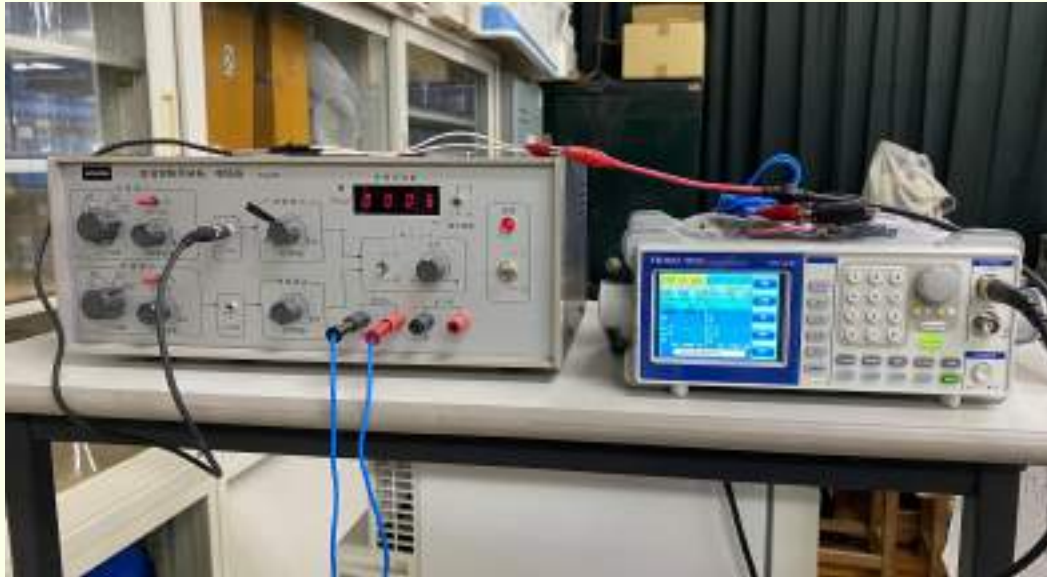
② Measure the absorbance  
before cultivation

③ Put bacteria into the  
Aneropack



④Generate Supersonic wave with function generator and apply butyric acid bacteria

Cultivate for 14 hours



# ⑤ Measure absorbance



フォトメトリック 550.0nm 1.970A

試料 No.	ABS	K*ABS
5	1.974	1.9738
6	1.974	1.9738
7	1.974	1.9738
8	1.974	1.9738
9	1.974	1.9738
10	1.974	1.9738
11	1.974	1.9738
12		

K = 1.0000

試料 No. Data管理 一覧表示 係数: K





⑥ Dilute 100 times.



⑦ Transplant to agar medium and cultivate them for 24 hours



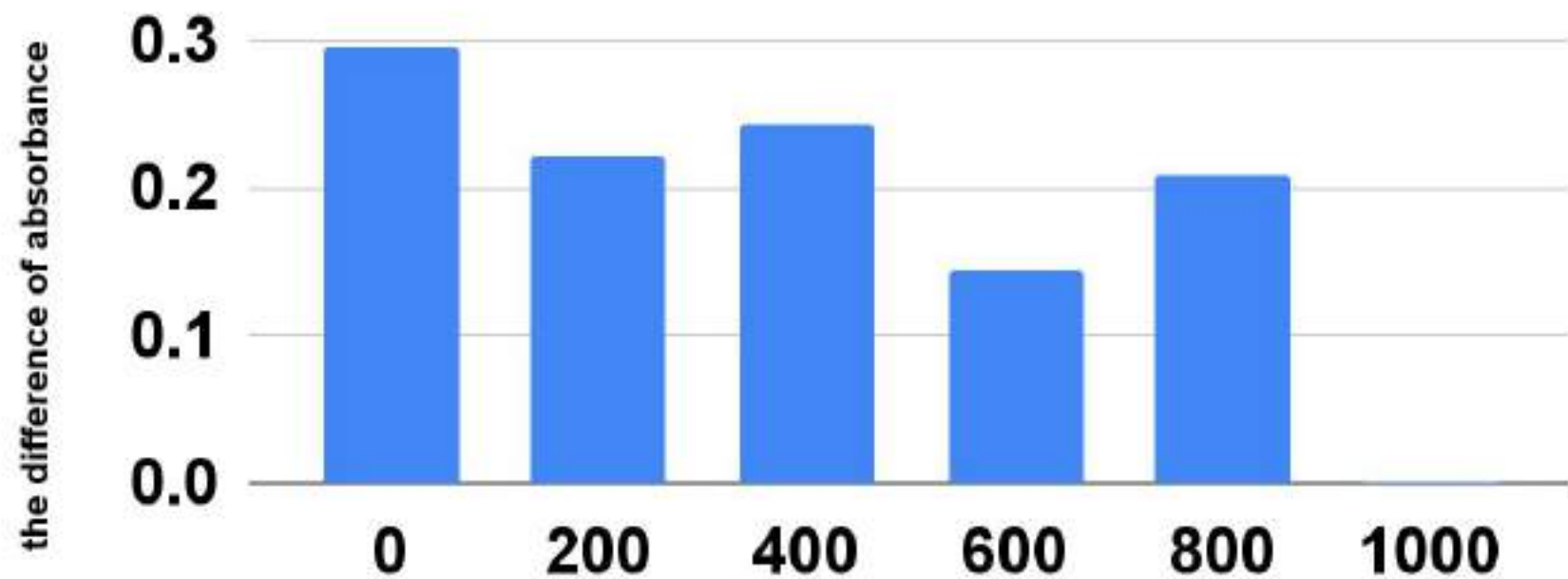
⑧ Observe the coronary on agar medium



⑧ Change the frequency of supersonic waves every 200kHz.

Conduct the experiment (0~1000kHz)

# result①

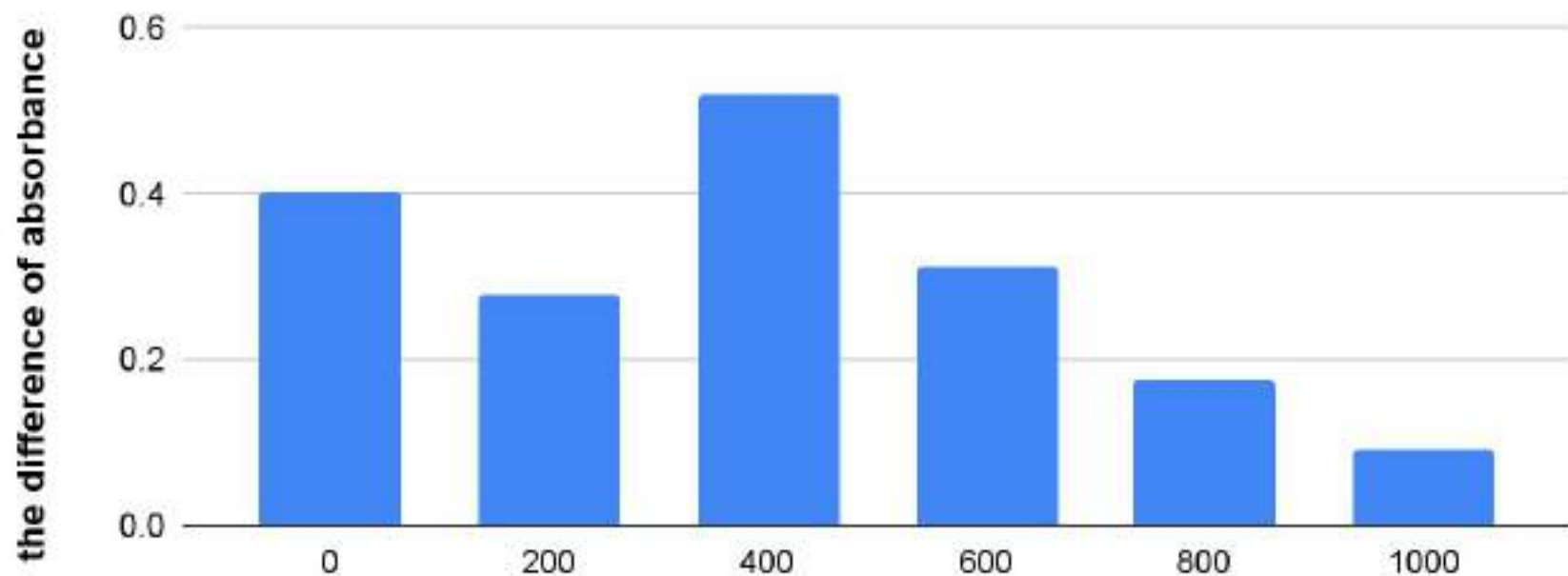


the frequency of supersonic waves



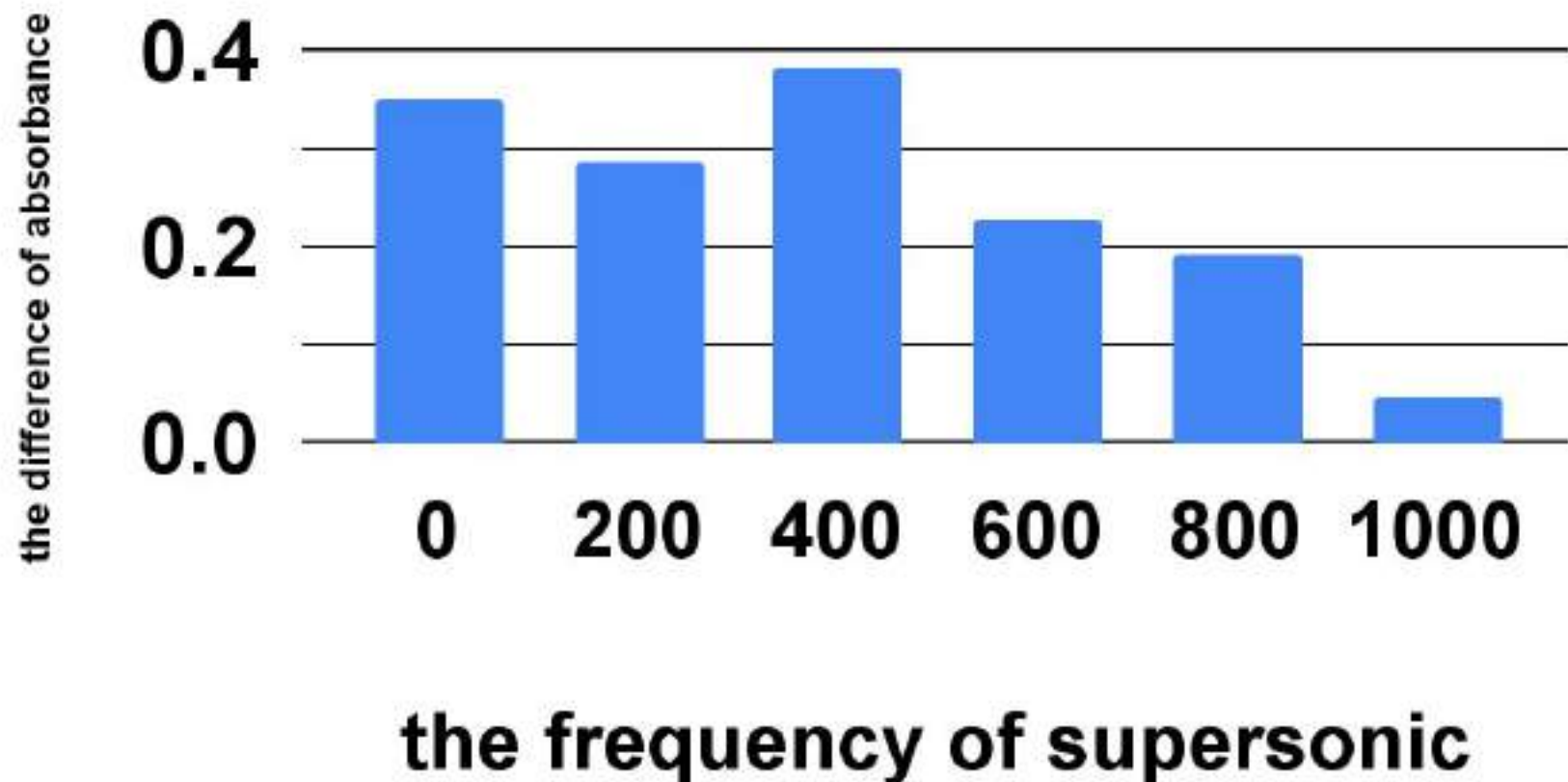
**0Hz**

## result②



**the frequency of supersonic waves**

# result (average)



# Discussion 1

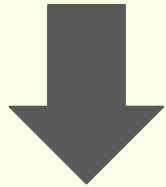
- The higher frequency is, the fewer the amount of increasing bacteria is.



Supersonic wave prevent butyric acid bacteria from increasing

# Discussion 2

▪ when we apply supersonic wave to bacteria with 400kHz, the amount of bacteria is big



400kHz is best frequency that promotes increasing bacteria.

# summery

supersonicwaves  
is not effective to  
the treatment of  
cancer

we may be able  
to use them  
if we use the  
proper frequency



Thank you for listening!!

# References

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# people who contributed to our experiment

- Noster K.K. Ms.Keiko Hisa
- Fukui university Mr.Masuo Maeda
- Industrial Research Institute  
of Fukui Mr.Masuo Tuji

**Thank you for their cooperation !!**