

# Hong Kong Student Science Project Competition 2023

Template of Extended Abstract (Investigation)

(Word Limit: 1,600 words, Pages: 3 pages only)

**Team Number: JBBC172**

**Project Title: Juices for you, leukemia "果"然有用:對抗白血病**

**Project Type: Investigation**

*To our best knowledge, there are / are no \* similar works in the field*

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## I. Background

Our group aim is to investigate whether the four type of fruit: kiwis, peaches, pears and strawberries can successfully kill leukemia cell (HL-60) at 0.25mg/ml, 0.5 mg/ml, 0.75mg/ml, 1mg/ml concentration. four types of fruit were useful in treating liver cancer, breast cancer and colorectal cancer.. Yet, no research is found to have used these four types of fruit for treating leukemia cancer, which is the most common cancer in children younger than 15..

## II. Objectives

Aim: To kill leukemia using 4 types of fruit juices (kiwis, peaches, pears and strawberries) and with different concentrations.

1. To understand the trait of leukemia cancer cells
2. To observe whether the chosen fruit juices can inhibit or kill leukemia
3. To compare the effects of different concentrations (0. 25 mg/ml, 0.5 mg/ml, 0.75 mg/ml and 1 mg/ml) of the four types of fruit juices

## III. Hypothesis

1. Assume the culture condition of HL-60 cancer cells is compatible with the conditions that patients have in their bodies.
2. Assume all favorable substances are water soluble and completely dissolved in the juice before extraction.

## IV. Methodology

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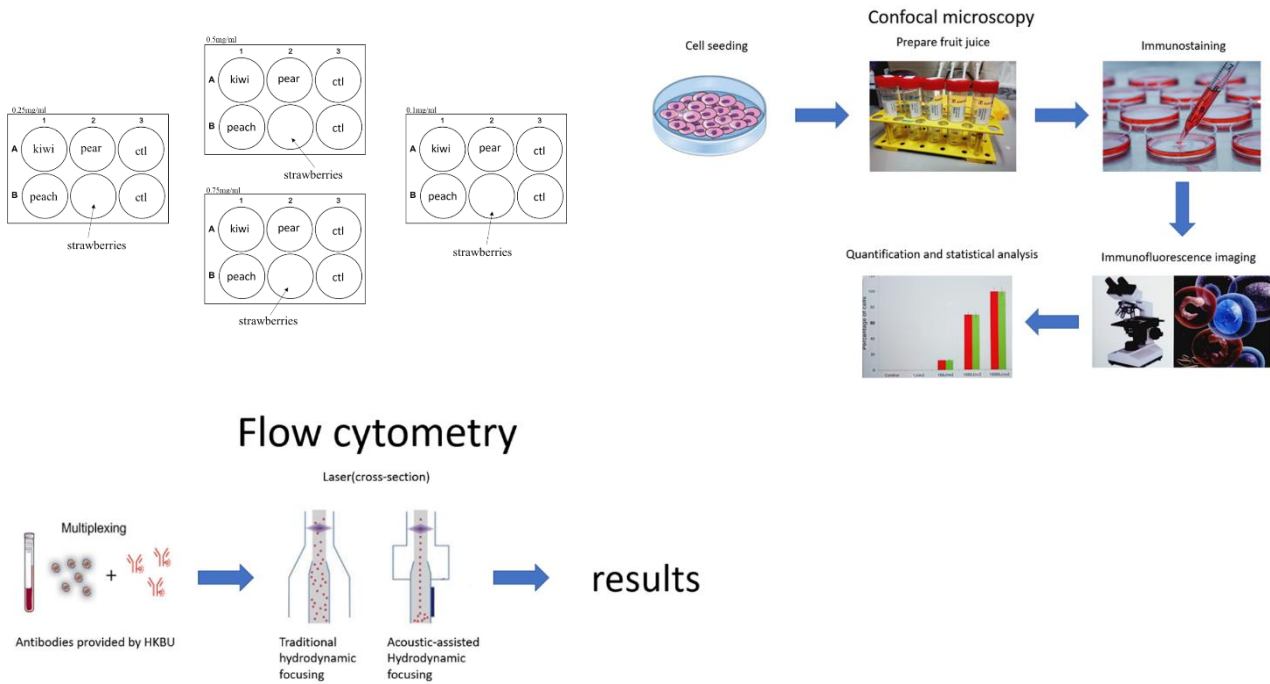
In our experiment, there are four types of fruits, which are kiwis, peaches, pears and strawberries.

**The test has been divided into pre-test, and 3 tests.**

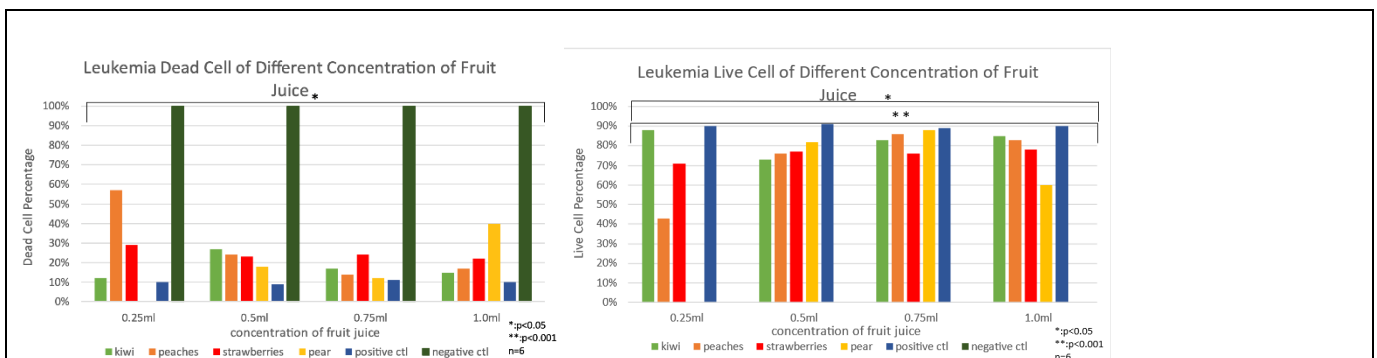
In order to know which kind of fruit is effective in anti-leukemia. Therefore, experiments were carried out to test them. For preparation work, the proliferation of the cell growth of HL-60 was recorded and the growth rate for 24 hours was fast. For the four selected fruits juices were extracted freshly before the experiments.

Leukemia cell (HL 60 cell) was found and kept in a machine with nutrient solution. Then four kinds of fruit were selected to do the test, i.e., kiwis, peaches, pears and strawberries. After cleaning, fruits were cut and squeezed into juice. They were put into the fridge and froze overnight.

On the next day, juice was heated into liquid and used the variable volume pipettes to transfer the juice into four boxes. Next, juice was separated into different volumes (0.25mg/ml & 0.5mg/ml, 0.75mg/ml & 1.0mg/ml) and added to the leukemia cell to test the results. Then, the well mixed samples were put into an AI machine.



**V. Results**



**Viable cell count:**

In the experiment, after four fruit juice (peaches, kiwis, pears and strawberries) and the cell( HL 60 cell) were put together, peach kill leukemia cells most effectively it can kill 57% of cells, the second is pear it can kill 40% of cells, followed by strawberry, which killed 29% of the cells, finally is kiwi it can kill 27%.

**Confocal microscopy:**

In this figure, the general trend of 0.25mg/ml, 0.5mg/ml, 0.75mg/ml, 1 mg/ml, concentration of peach and strawberries juice is biased to necrosis.

**VI. If your team will compete the Sustainable Development Award, please indicate the specific sustainable development goal the project is related to, and provide justification for competing for this award. (Word limit: 300 words)**

Yes, we would like to join the sustainable award. It is because food shortage has always been a problem across the globe. With the increasing population in the world, we would like to best utilize the food source across the world. In addition, the research of leukemia with food therapy is constantly neglected, as the population of people who have been diagnosed with leukemia is not that much. With the increasing trend of food therapy, it is hoped that the fruit juice could also be another alternative and natural therapy for the patients to relieve their pain and also inhibit the growth of the leukemia cells in their blood. Hence, extend their life expectancy and improve their health.

**VII. If your team will compete the Social Innovation Award, please list the target group or social issue the project focuses on and provide justification for competing for this award. (Word limit: 300 words)**

We would like to focus on children health care. It is because whenever we talk about cancer, we would focus on the most serious ones. Hence, leukemia and blood cancer would often be neglected as it is “not as important”. In addition, we try to reduce food waste by making useful fruit juices and introduce food therapy as a natural therapy. Hence, we hope that it could be useful as a reference for treating leukemia patients in the near future.

**VIII. Conclusion**

The most effective fruit among the four types of fruit was peach. Peach Vitamin B17 has glucose which only emancipation on cancer cells, it release arsenic into the cells and kill them. Peaches can fight cancer not only because they are rich in vitamin B17, but also contain carotene and vitamin B2. This kind of vitamin related to the growth and metabolism of human cells, can promote cell regeneration as adjuvant therapy.

**Our project is developed based on previous project and the enhancement is below:**

N/A