



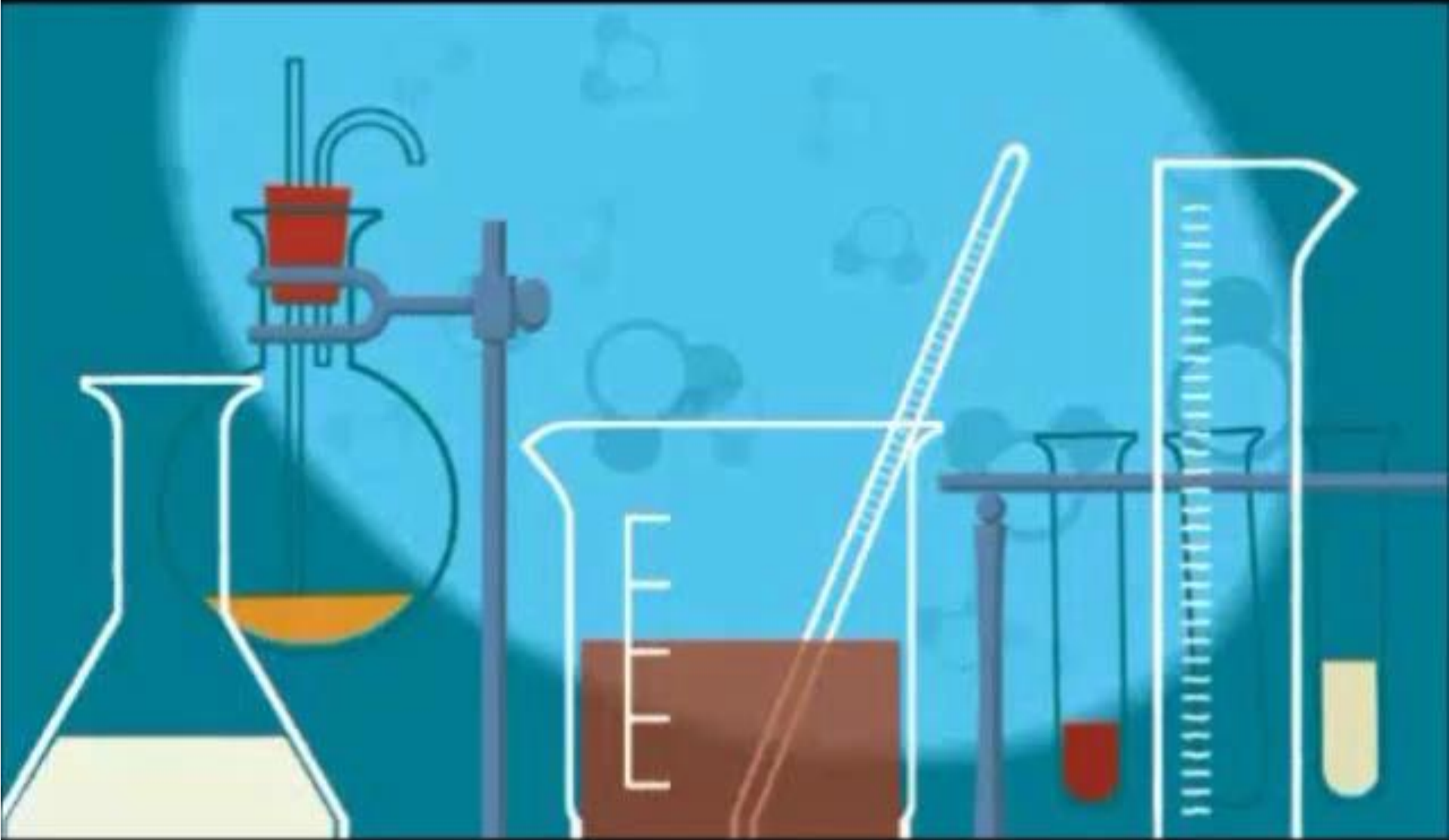
**Secondary Schools - HKUST Dual Program**

**2024-2025**

**LEVEL 1**

**INTRODUCTORY  
CHEMISTRY**

***DEPT OF CHEMISTRY, HKUST***



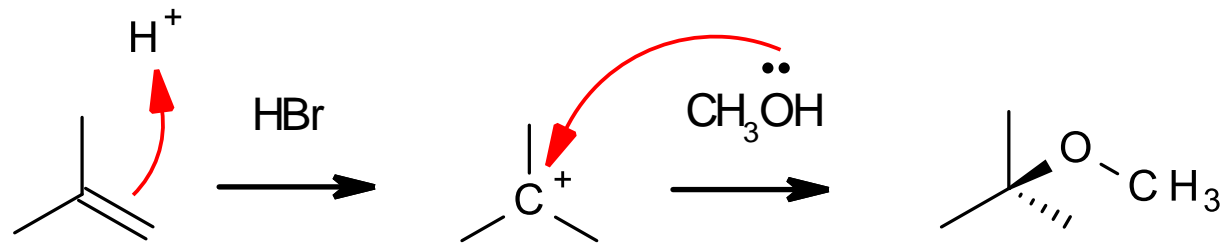
# LEARNING OBJECTIVES

- introductory course provided for students with limited background in chemistry. It covers *basic chemical concepts* and *core topics* for a solid foundation in chemistry.
- **course objectives:**
  - Introduce basic chemical concepts and historical development of chemistry.
  - Introduce essential principles and concepts in chemistry.
  - Explain the connection of chemistry with modern technology.
  - Explain the importance of chemistry in daily life.

# ACCELERATED & BRIDGING

- 1. An *accelerated curriculum* for gifted students
- 2. To help students become *literate in chemistry* (bridging for DP Level 2)
- 3. To build a *solid foundation* of knowledge in chemistry

# LANGUAGE OF CHEMISTRY



- **Chemistry**

- “as a second language”

- **Goal:**

- “be fluent in chemistry”

# DUAL PROGRAM LEVEL 1 INTRODUCTORY CHEMISTRY

lesson#	Topic
1	Introduction to Chemistry
2	Atoms & Atomic structure
3	Chemical Bonds (I)
4	Chemical Bonds (II)
5	The Mole Concept and Chemical Calculations
6	States of Matter and Intermolecular Forces
7	Acids and Bases
8	Redox and Electrochemistry (I)
9	Redox and Electrochemistry (II)
10	Organic Chemistry (I)
11	Organic Chemistry (II)
12	Polymers
13	Chemical Reactions and Energy
14	Reaction Kinetics
15	Chemical Equilibrium

# CHEMISTRY IN DAILY LIVES

## ORANGE-POWERED CLOCK??



## WATER-POWERED CLOCK??



# Photochromic glass

- Sunglasses - Protection from harmful UV rays. Eyeglasses with photochromic lenses eliminate the need for sunglasses.
- Ordinary glass – a matrix of silicates – transparent to visible lights

*Lenses are responsive to outside environment! How to achieve this?*





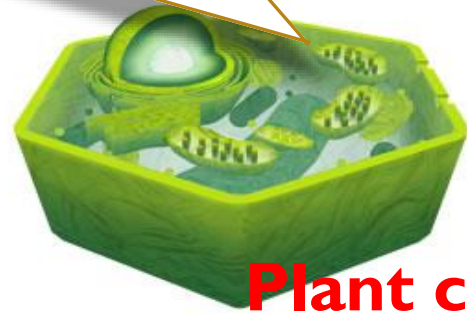
# CHEMISTRY IN DAILY LIVES

- Vegetables turn yellow after cooking.
- How can we keep it green?
  - Natural pigment in vegetables

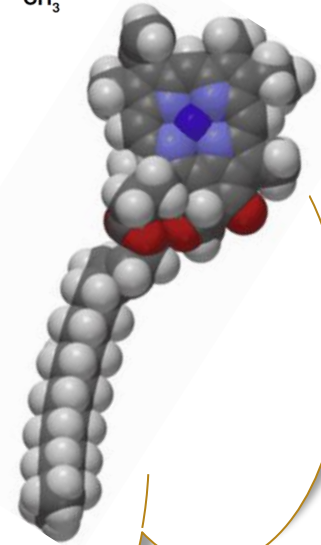
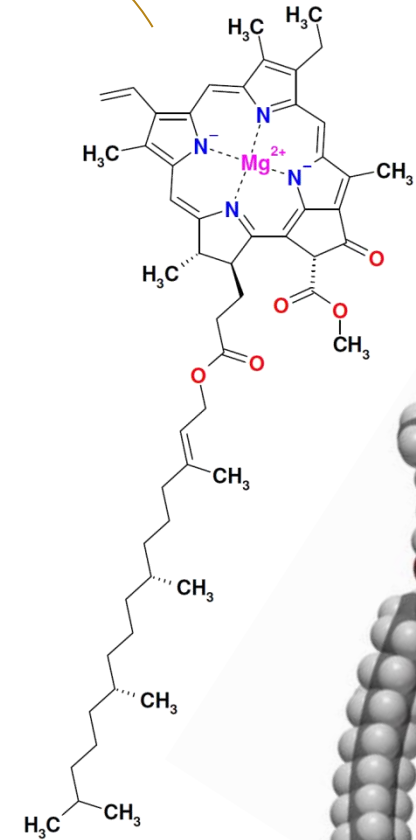


# CHLOROPHYLL IN GREEN VEGETABLE

- What is the chemical structure of chlorophyll?



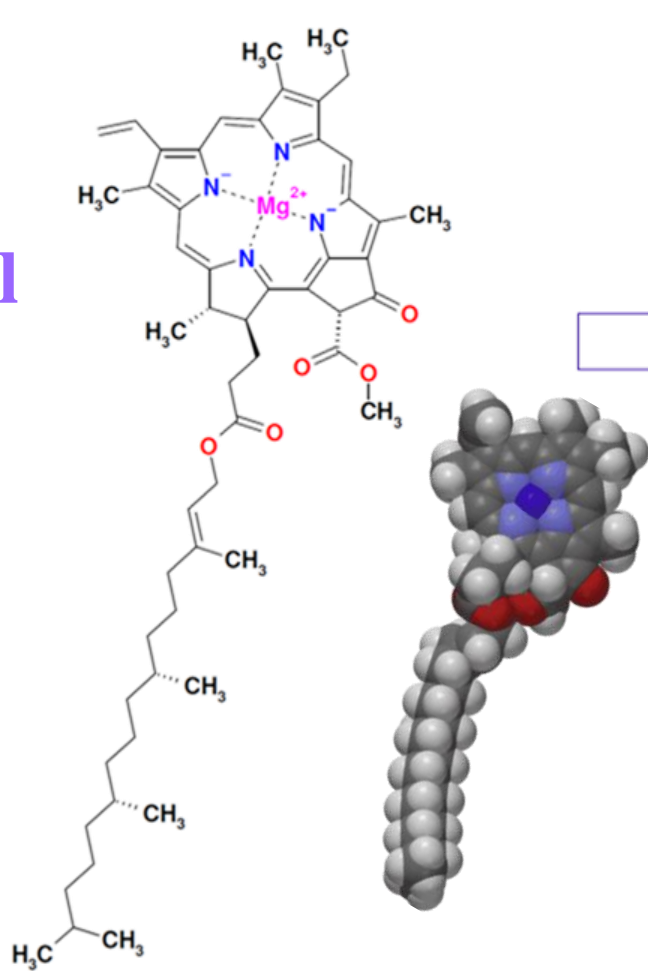
Plant cell



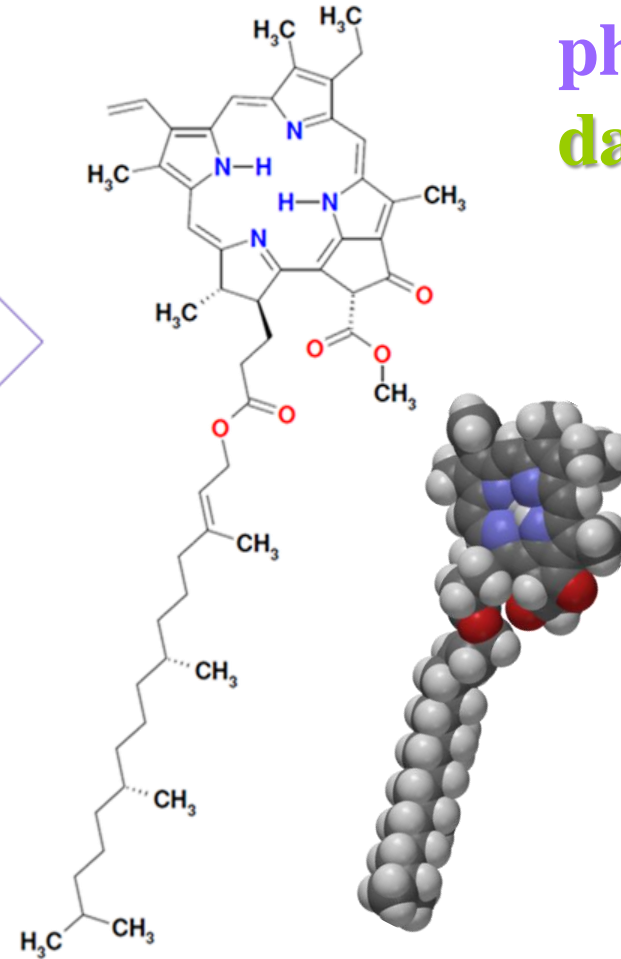
# Reactivity of chlorophyll

- What is the chemical property of chlorophyll?

chlorophyll  
green



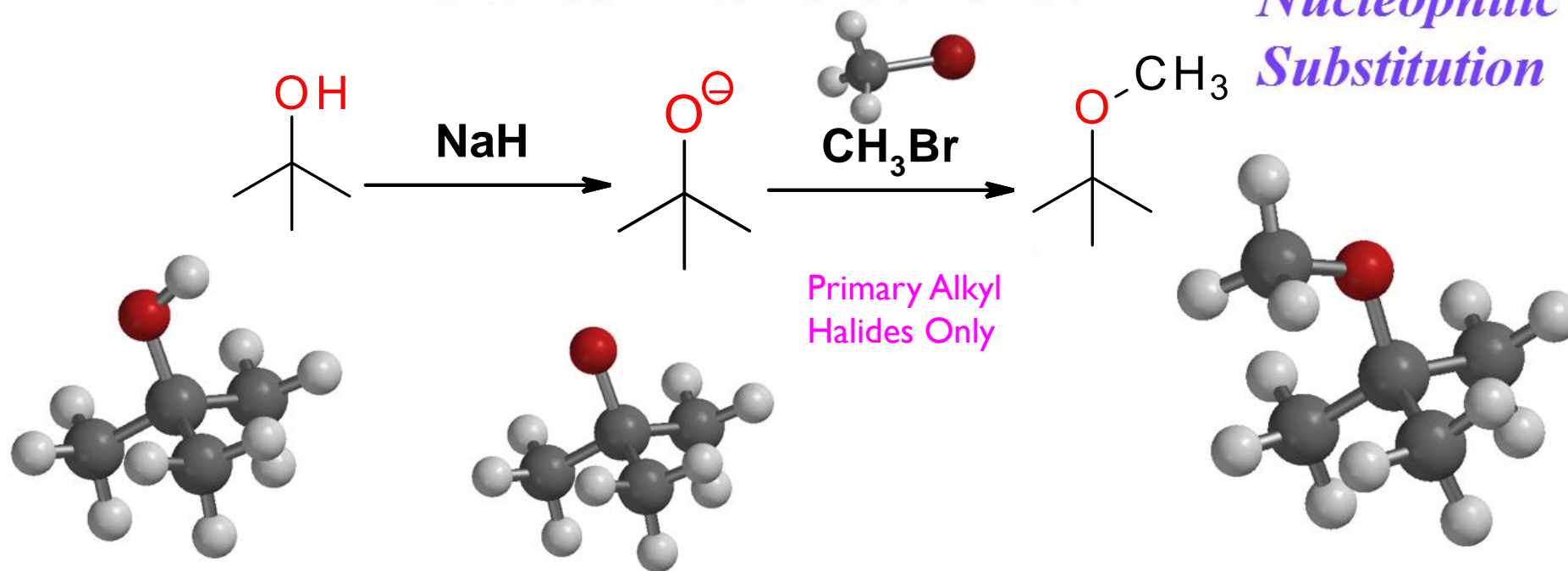
pheophytin  
dark-green



# APPLICATIONS OF ETHERS

- Methyl *tert*-butyl ether,  $\text{CH}_3\text{OC}(\text{CH}_3)_3$  was added to gasoline as an antiknock agent.

## How to make ethers?



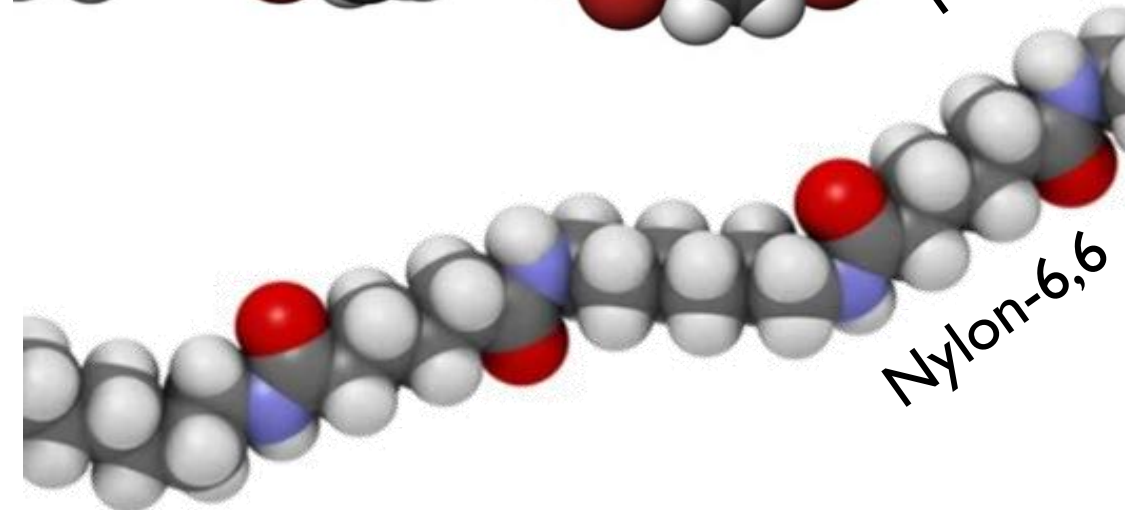
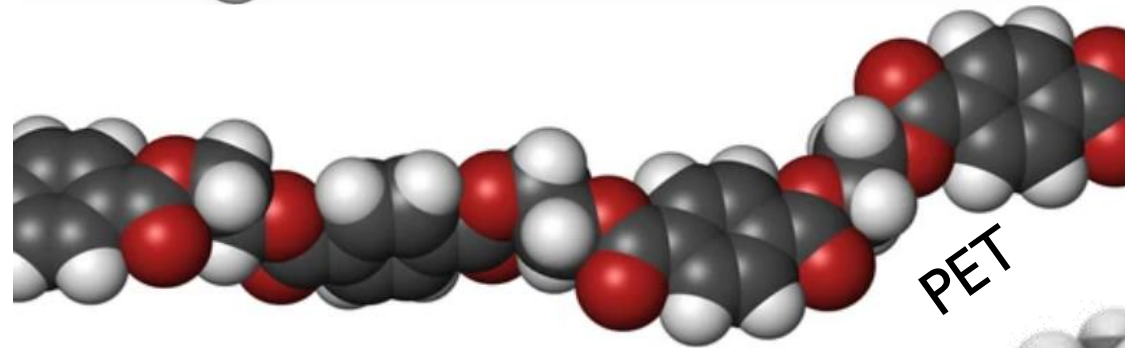
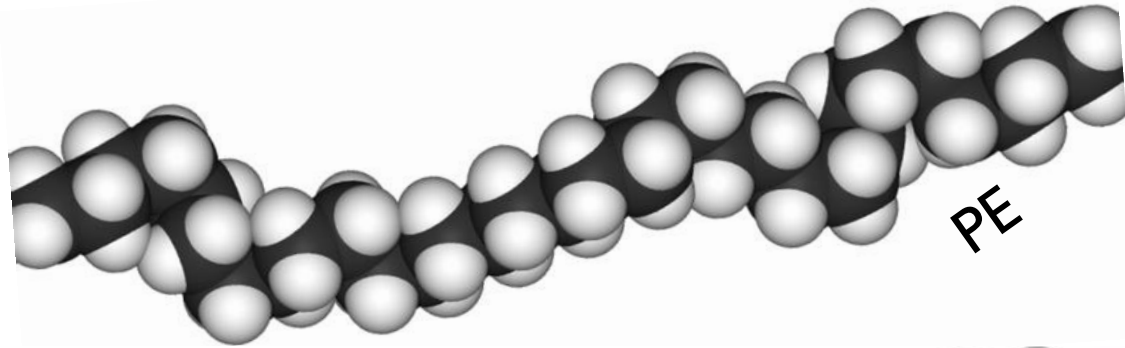
**DO YOU WANT TO EXPLORE MORE  
ABOUT CHEMISTRY?**



# Chemistry in our Everyday life



# CHEMISTRY





# CHEMISTRY?

## Hong Kong watchdog: mercury, worms in sashimi

In 10 of 19 tuna samples, the amount of mercury was nearly double the safe limit.

The Hong Kong Consumer Council has announced in a press release that 49 out of 50 samples of sashimi (raw fish) it tested were contaminated with sometimes excessive amounts of mercury.

APRIL 16, 2019



<https://asiatimes.com/2019/04/hong-kong-watchdog-mercury-worms-in-sashimi/>

## 飲「五指毛桃」湯後疑中毒 一家三口入院

一個家庭懷疑飲用含「五指毛桃」的湯水後中毒，出現暈眩、惡心及嘔吐等徵狀，須入院治療。衛生防護中心呼籲市民不要自行採摘、購買或服用來歷不明的藥用植物。



[http://hk.on.cc/hk/bkn/cnt/news/20180723/bkn-20180723193808528-0723\\_00822\\_001.html](http://hk.on.cc/hk/bkn/cnt/news/20180723/bkn-20180723193808528-0723_00822_001.html)

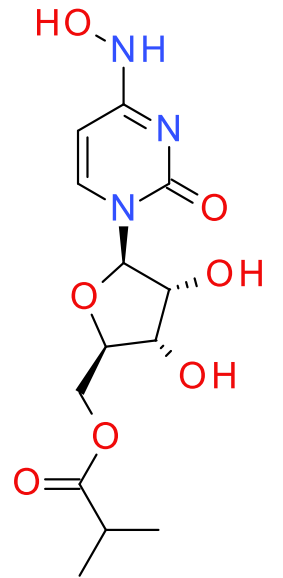
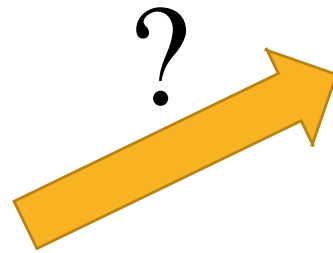
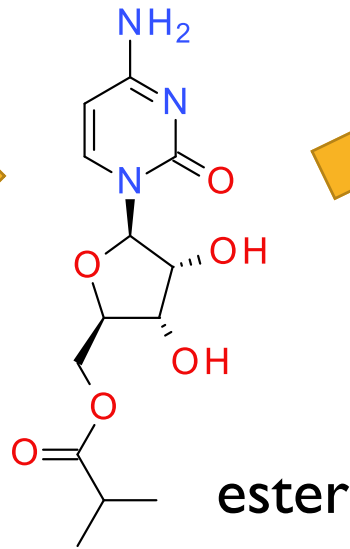
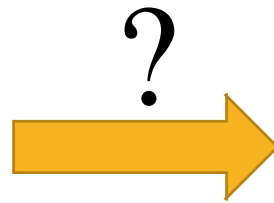
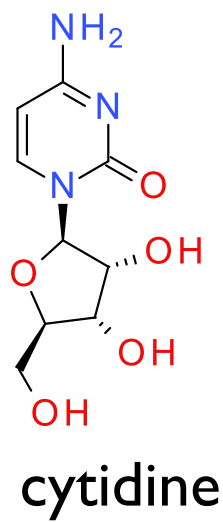
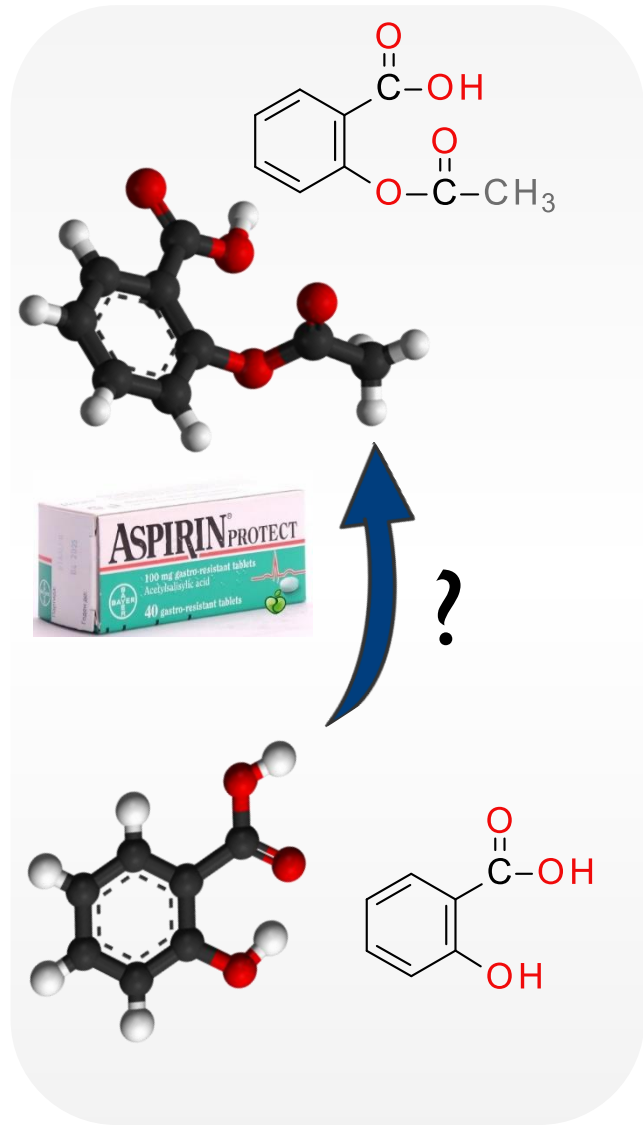
2018年07月23日(一)



# CHEMISTRY?



'Covid-19 pills'



默沙東口服藥：  
Molnupiravir

# CHEMISTRY?



**DO YOU WANT TO EXPLORE MORE  
ABOUT CHEMISTRY?**