

생유기화학  
(*Bioorganic Chemistry*)

Lipids and Detergents-III  
(지질과 세제-3)

Soonchunhyang University

Department of Chemical Engineering

Prof. Jungkyun Im

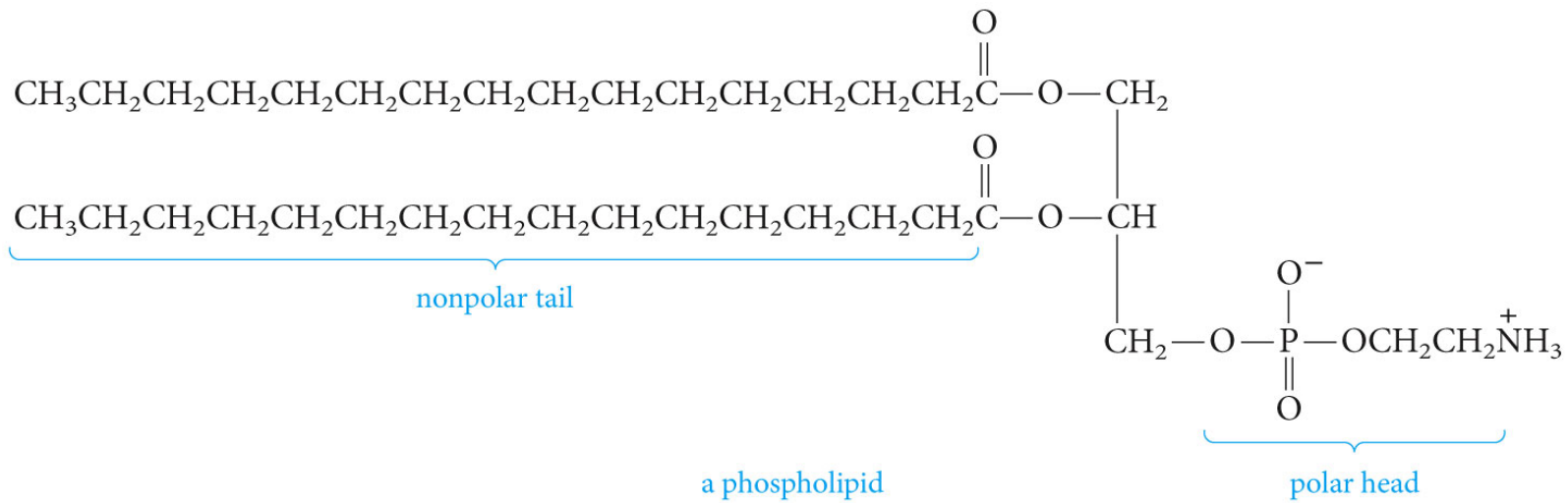
순천향대

나노화학공학과

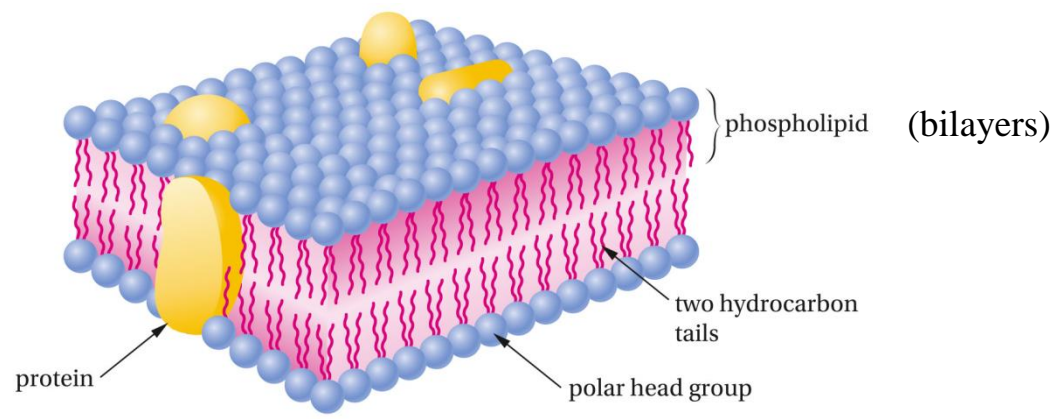
임정균 교수



## 6. Phospholipids

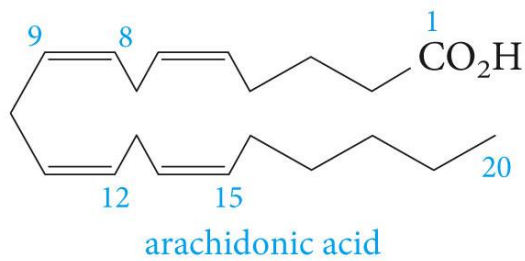


**Phospholipids:** like fats except that one ester group is replaced by a phosphatidylamine.  
 40% of cell membrane, the remaining 60% being proteins

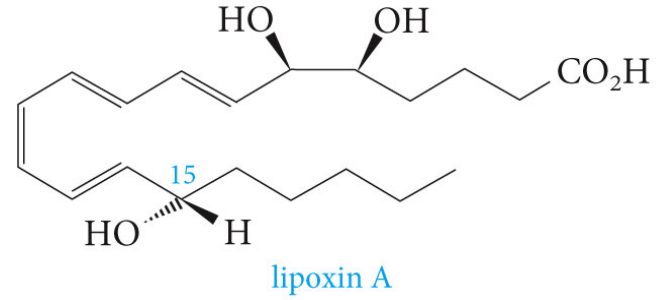
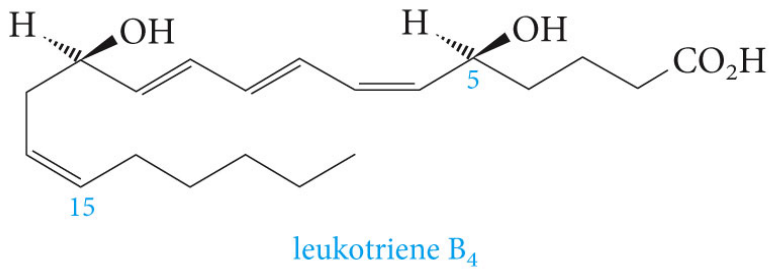
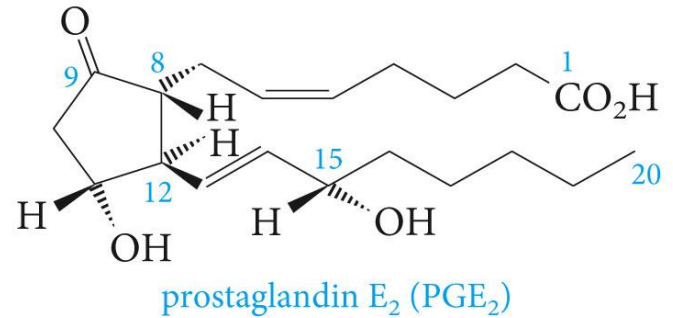




7. Prostaglandins, Leukotrienes, and Lipoxins

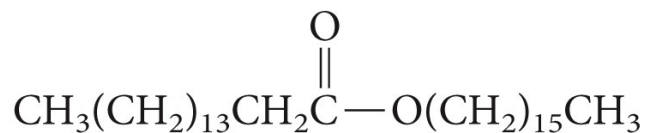


several steps, in a cell



## 8. Waxes

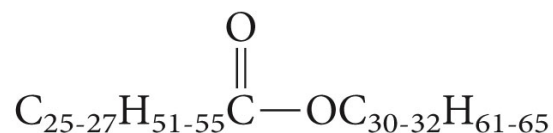
### monoesters



cetyl palmitate

(component of spermaceti,  
a wax in sperm whale oil)

(향유고래)



components of beeswax

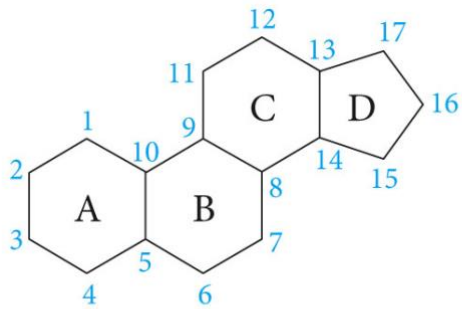
Waxes are more brittle, harder, and less greasy than fats.

They are used to make polishes, cosmetics, ointments, and other pharmaceutical preparations, as well as candles and phonograph records.

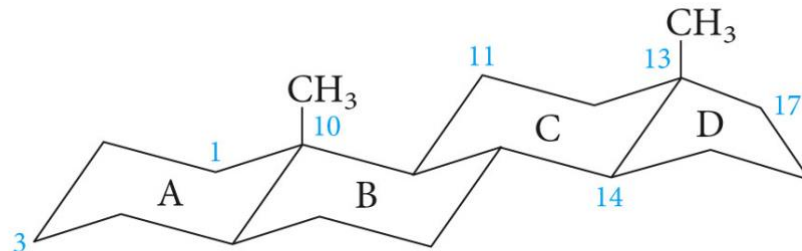
In nature, waxes coat the leaves and stems of plant, thus reducing evaporation.

Similarly, insects with a high surface-area-to-volume ratio often have a coating of a natural protective wax.

## 9. Terpenes and Steroids

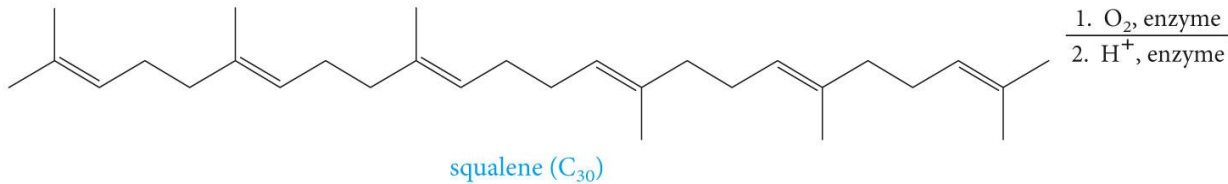


the steroid ring system,  
showing the numbering

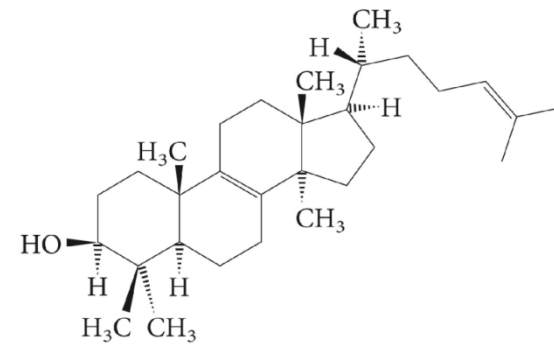


steroid shape, with chair cyclohexanes

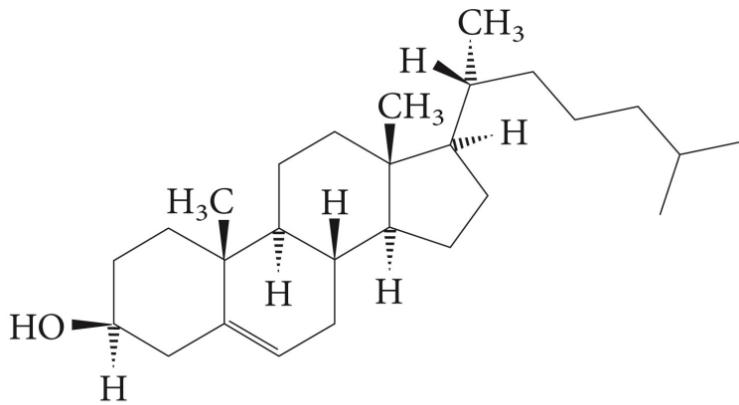
(tetracyclic lipid, four fused rings, 모든 ring들이 aromatic 하지는 않다.)



1. O<sub>2</sub>, enzyme  
2. H<sup>+</sup>, enzyme



lanosterol (C<sub>30</sub>)

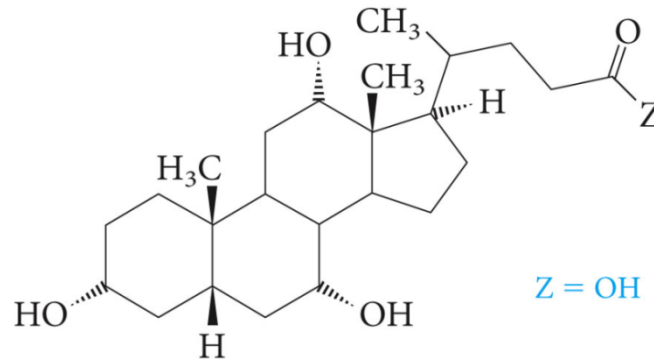


cholesterol (the best known steroid)



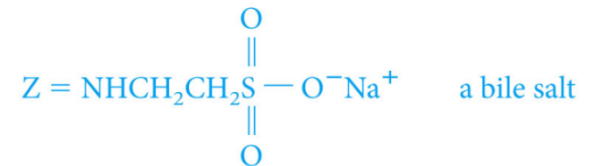
gallstone

- 모든 animal cell에 존재하며 특히 세포막에 다량 존재함.
- Total amount of cholesterol in human is about half a pound.
- 또한 담석(gallstone)의 주성분이다.
- 혈류를 타고 인체 내에서 순환하며 혈관을 막아 동맥경화 등의 원인이 됨.
- 섭취량이 하루에 280 mg/dL 이상은 매우 위험



Z = OH

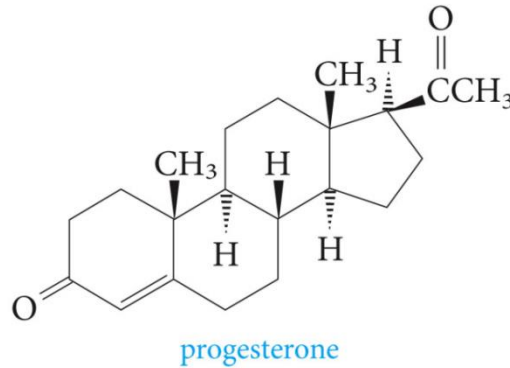
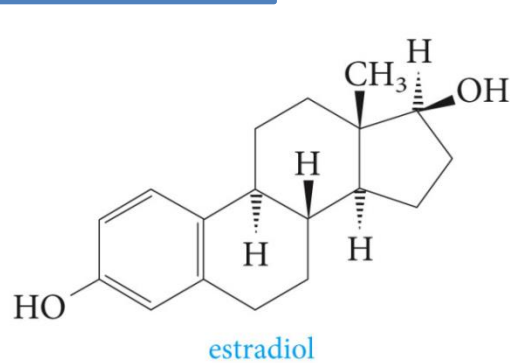
cholic acid



- Cholic acid(콜산)은 bile duct(담관)에서 발견됨.
- 화학구조에서 친수성과 소수성 부분이 공존하여 장에서 지방이 잘 흡수되도록 emulsifying agent 처럼 작용한다. 즉 비누처럼 계면활성제이다.

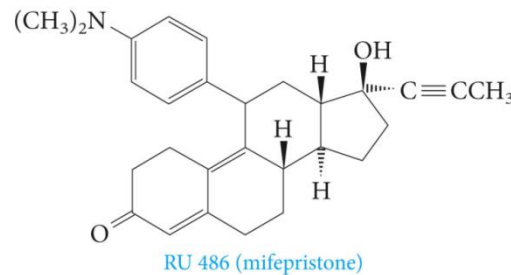
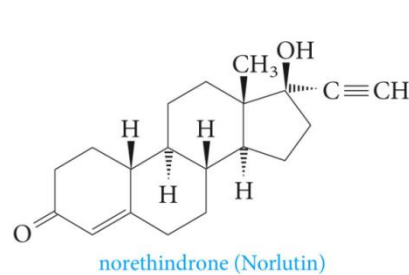
두 가지 스테로이드계 성호르몬

호르몬은 steroid계 호르몬, 단백질계 호르몬으로 나뉜다.



**Estradiol:** 에스트로겐(estrogen)의 대표적인 물질로서 월경 주기 중에 몸의 변화를 일으키며, 여성의 2차 성징을 발달하게 한다.

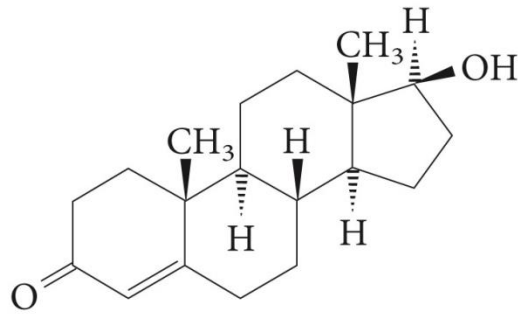
**Progesterone:** 임신을 유지하고 이 기간 중에 더 이상 배란이 되는 것을 차단한다. 어렵게 임신한 경우 유산을 막기 위해 처방을 받기도 한다. Estradiol과 구조에서 A고리가 방향족성이 아니다.



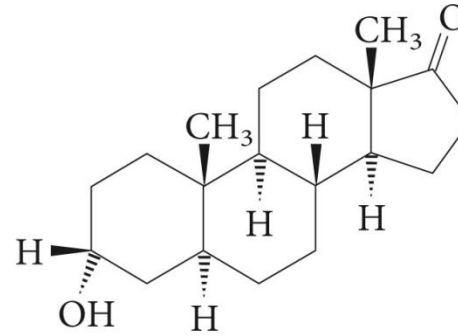
유산약이라고 부르는 경구 피임약은 프로게스테론과 유사한 구조를 가짐.

RU486 interferes with gestation of a fertilized ovum and, if taken in conjunction with prostaglandins, terminates a pregnancy within the first nine weeks of gestation more effectively and safely than surgical methods. It was discovered in France and its use in the United States has only recently been approved.



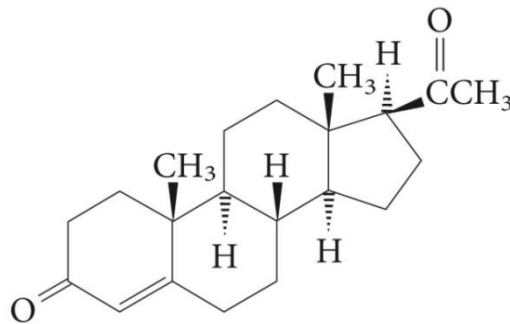


testosterone

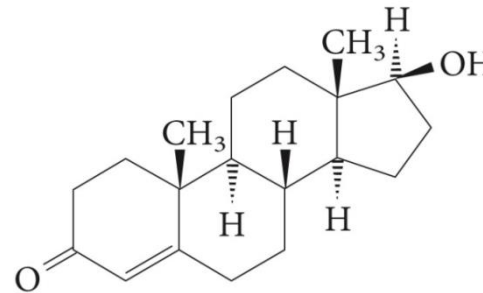


androsterone

**Testosterone and Androsterone:** 대표적인 남성 호르몬, 남성의 2차성징을 나타냄, 때때로 사람들의 근육이 약해지는 것을 방지하기 위해서 투여하기도 함. 약이 근육 강화제로서 운동선수나 경주말에게 불법 투여되기도 한다.



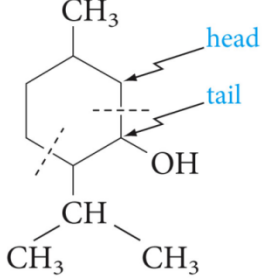
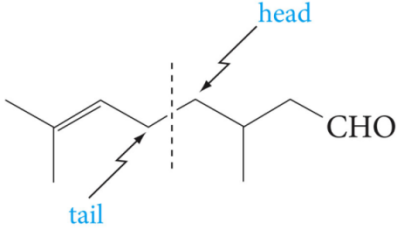
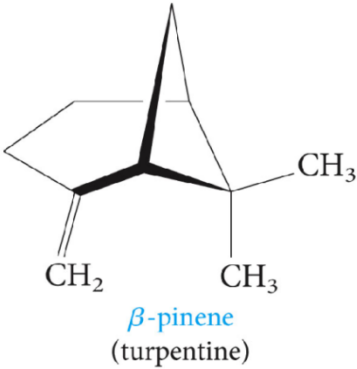
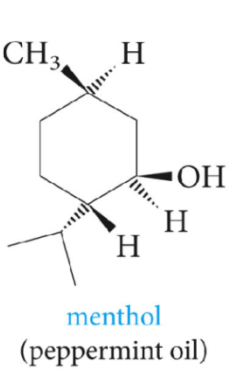
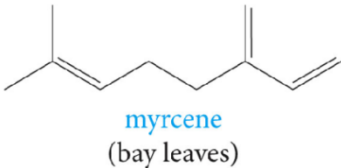
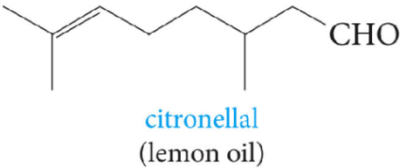
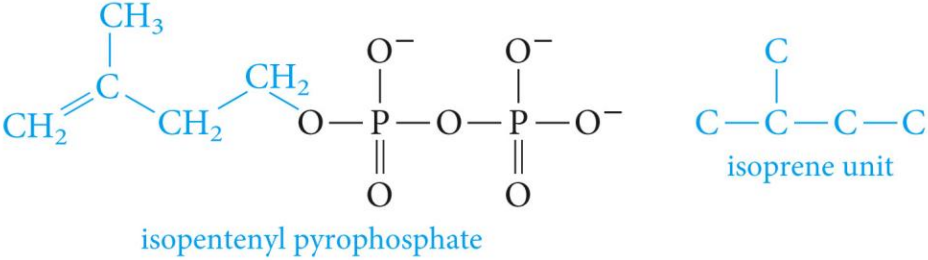
progesterone

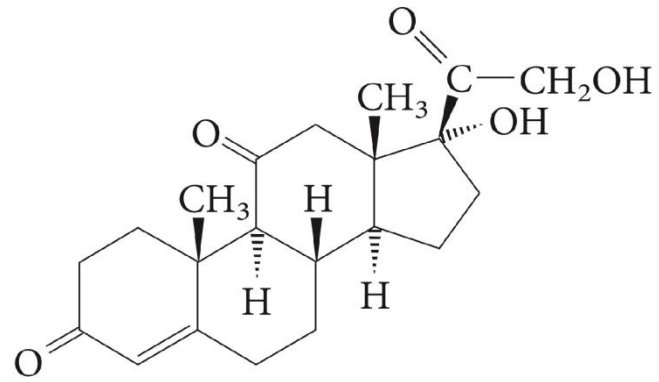


testosterone

progesterone과 testosterone의 화학구조의 차이는 D ring에 acetyl의 유무이다. 이러한 미세한 구조적 차이가 서로 다른 생리활성을 부여한다. 호르몬과 반응하는 receptor의 차이 때문이다.

# 15.9 Terpenes and Steroids





cortisone