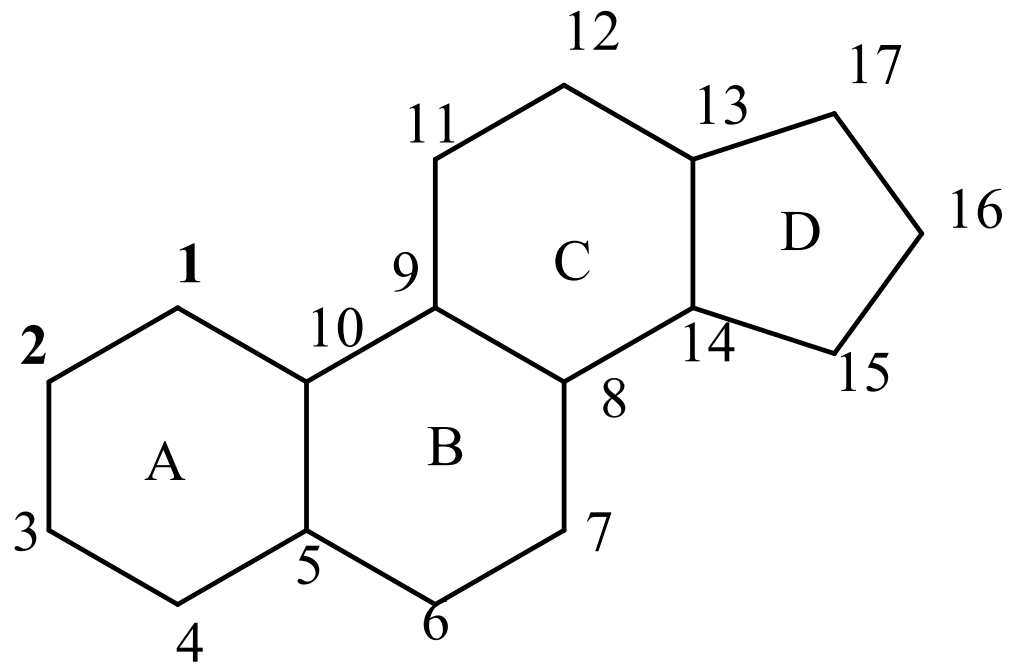


# STEROID HORMONES

**They contain sterane rings.**

**Sex hormones and related compounds,**

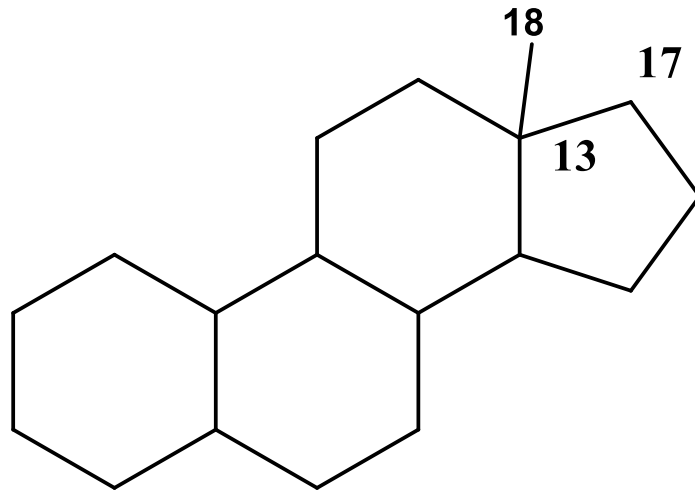
**It includes hormones and antagonists of the  
adrenal cortex.**



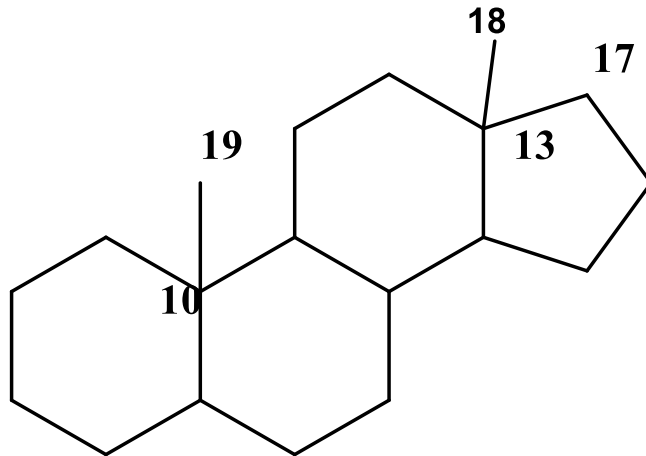
**Cyclopentanoperhydrophenanthrene)**

The sterane nucleus is not based on nomenclature.

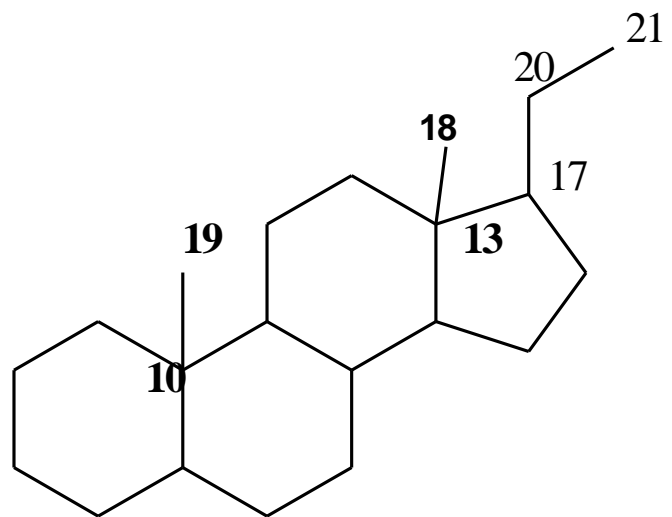
Some other basic compounds that carry the sterane nucleus are utilized.



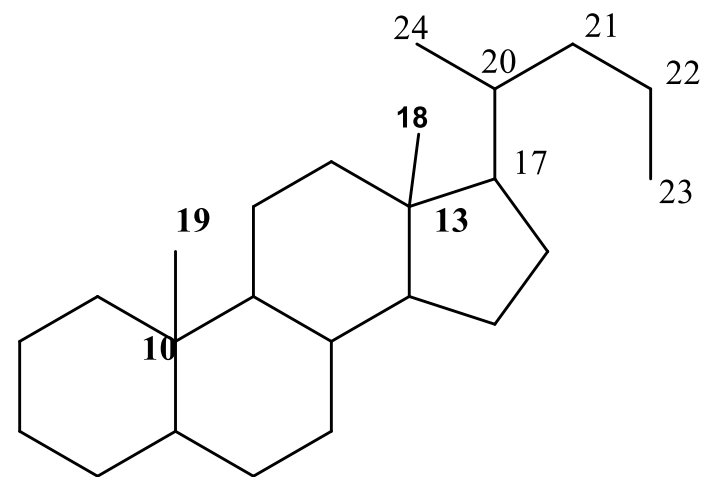
- If it is having Me group on C-13 position **estrane**



- If it is having Me groups both C-10 and C-13 positions **androstane**

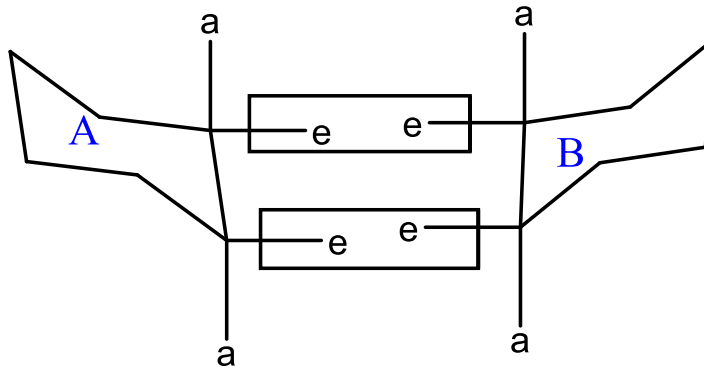


PREGNAN (21 C)

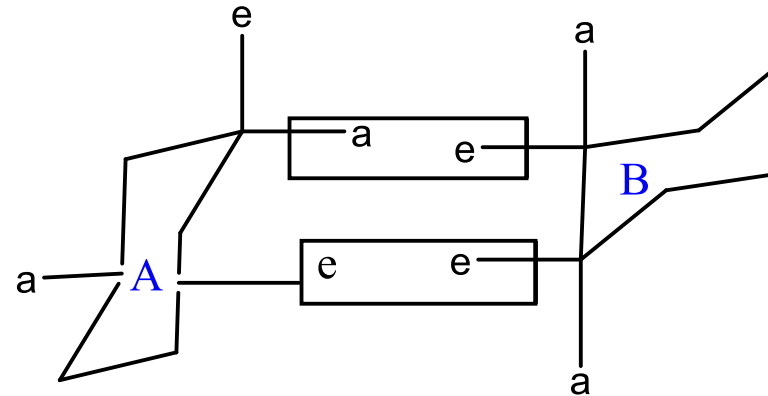


CHOLESTAN

- In steran formation, the cyclohexane rings are in the chair conformation.



Equatorial-equatorial  
(Trans incorporation)



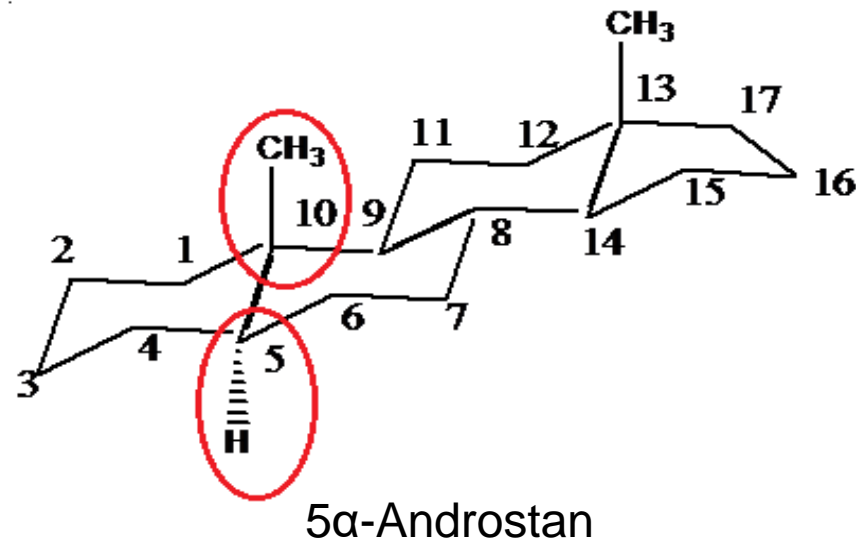
Axial-equatorial  
(Cis incorporation))

Incorporation of A ve B while are trans :

Group at 5th position is  $\alpha$

Group at 10th position is  $\beta$

It means only the combination of the two rings to say that the 5th position is  $\alpha$  or  $\beta$





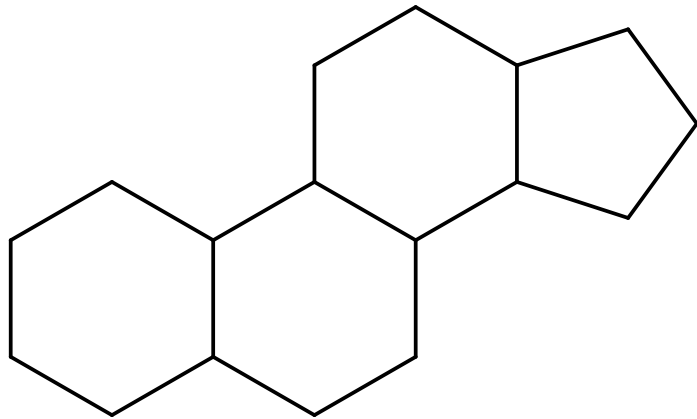
In some compounds, the group at 10th  
is substituted as  $\alpha$  : These  
compounds are known as :  
**Retro derivatives**

# NOMENCLATURE

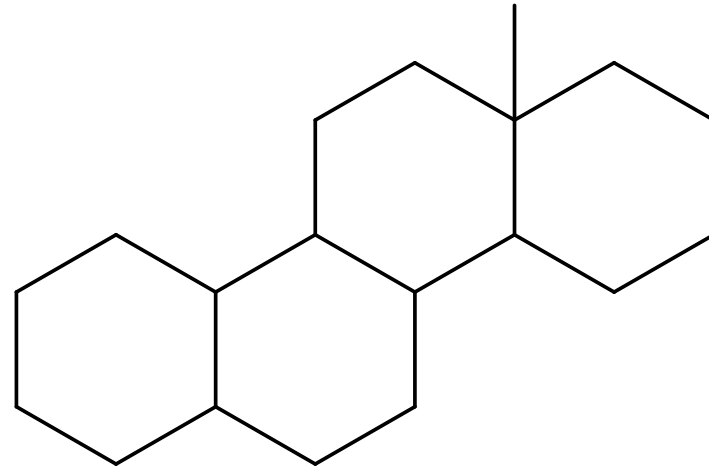
The name of main steroid nucleus are given and the position of the 5th substituent are explained whether it is alpha or beta

- When oxygenated group is removed from known compounds: -  
**desoxy or deoxy**  
When new double are created **dehydro**
- When double bond are saturated **dihydro** prefixes are used.

When one of the methyl group or ring members is reduced (the ring is diminished) or when a ring is completely removed—**nor**, any of the rings expands—**homo** prefix are used.



18-**nor**ostan



D-**homo**ostran

# BIOSYNTHESIS

The precursor of steroid hormones in humans is cholesterol.

Cholesterol; are synthesized in some glands as well as liver, intestines and arteries.

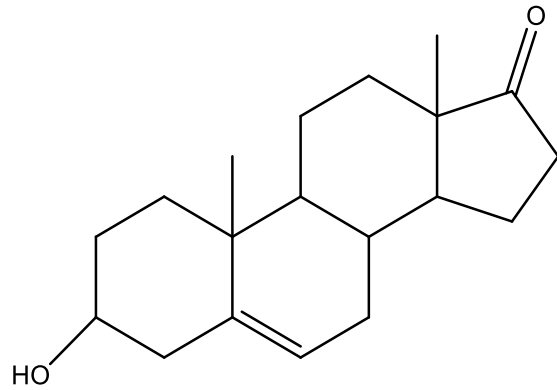
## FROM CHOLESTROL :

- Female sex hormones : **ostradiol**, **ostron** and **progesteron** are synthesized in the ovaries and placenta in women
- Male sex hormone **testosteron** are synthesized in testicles
- Adrenocorticoid hormones: **corticosteron**, **desoxycortico-steron**, **aldosteron**, **cortizon** and **hydrocortison** are synthesized in adrenal cortex in both sexes.

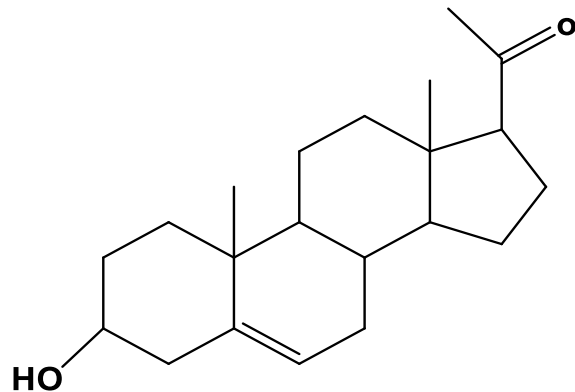
# SYNTHESIS

Steroid hormones were obtained in 1930s by extraction from cattle, pigs and horse ovaries, adrenal gland or urine, but since this method is expensive, semi-synthetic methods based on starting materials which can be obtained from natural sources easily and cheap are used today.

For this purpose **androst-en-3 $\beta$ -ol-17-on** (androst-5-en-3 $\beta$ -ol-17-on) and **pregn-en-3 $\beta$ -ol-20-on** (pregn-5-en-3 $\beta$ -ol-20-on) are used.



androst-en-3 $\beta$ -ol-17-on



pregn-en-3 $\beta$ -ol-20-on

## Androstenedione are used

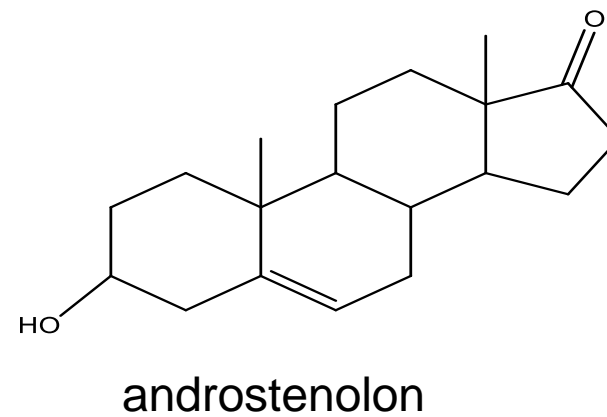
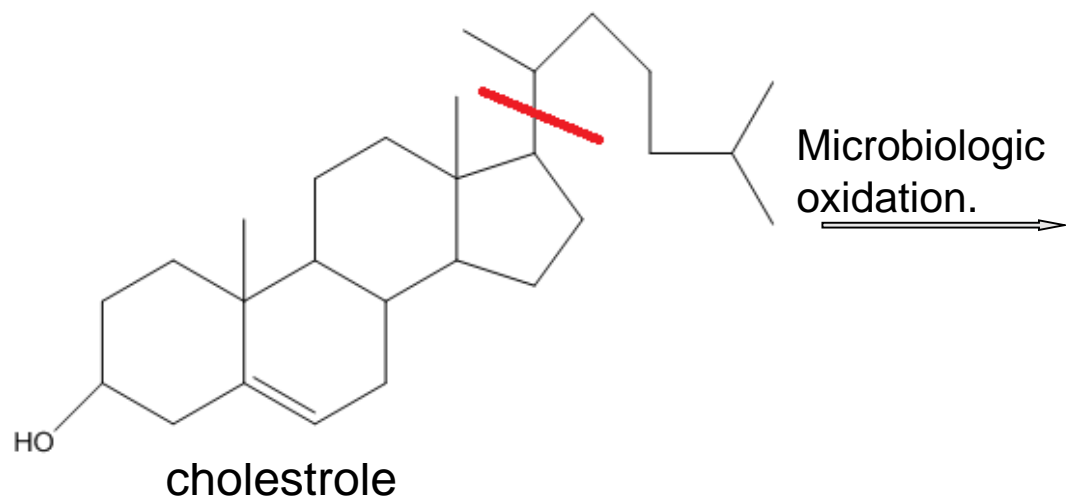
- for synthesis of androgenic hormones,
- for synthesis of some progestogens,
- for synthesis of some estrogenic hormones.

## Pregnenolone are used as precursor

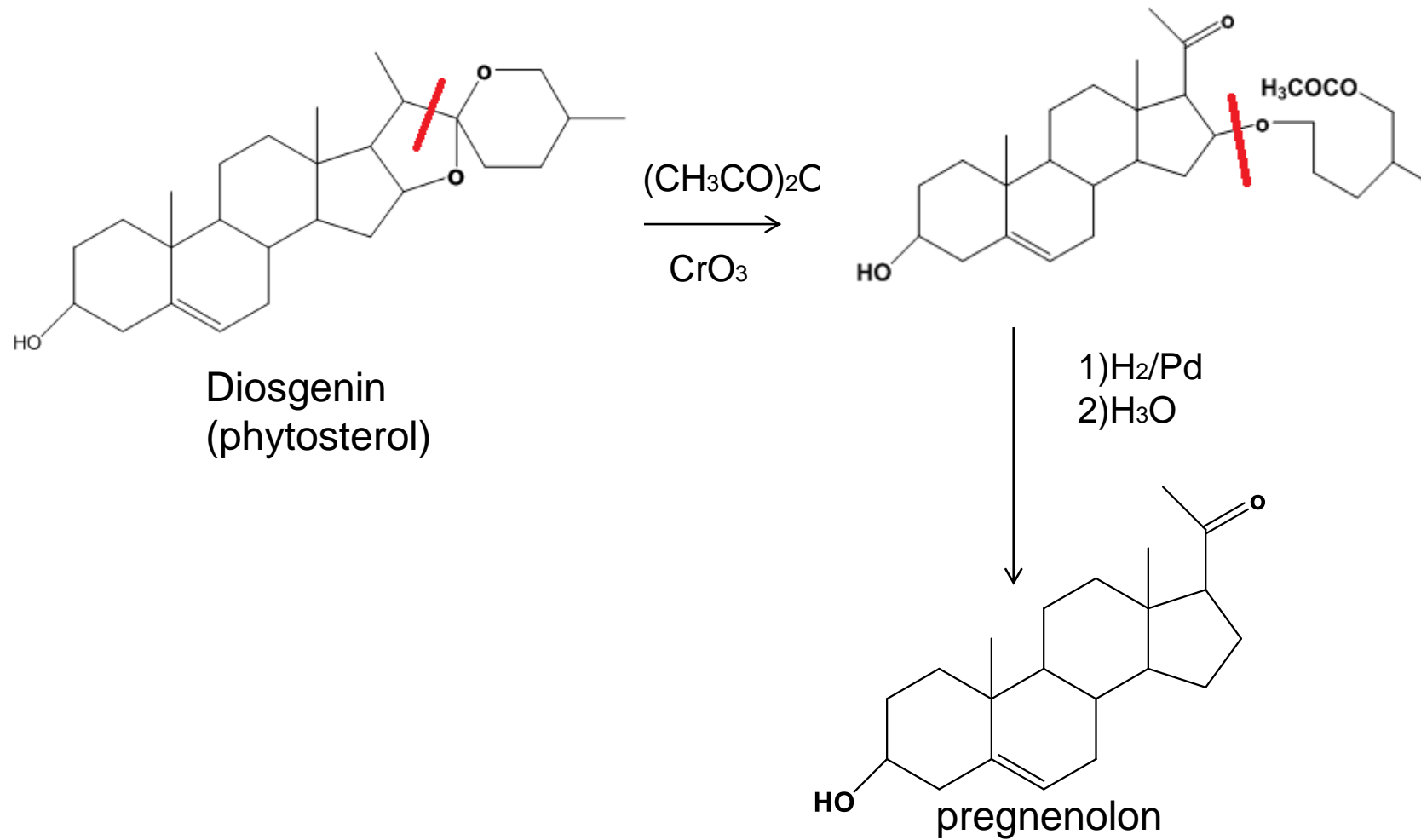
- for synthesis of progesterone,
- for synthesis of adrenocorticoids



# Synthesis of Androstenolon



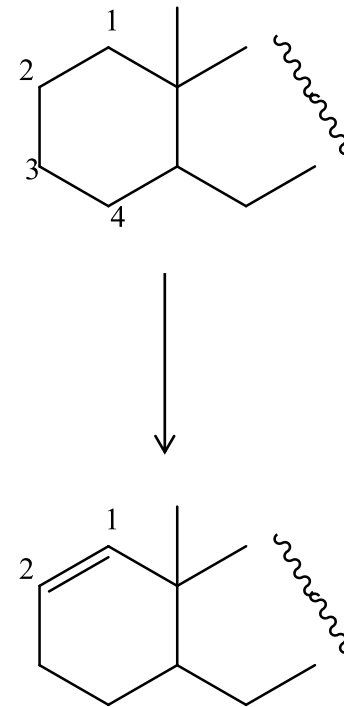
# Synthesis of Pregnenolon



# The name microorganisms used in industry for synthesis of steroid hormones and their use

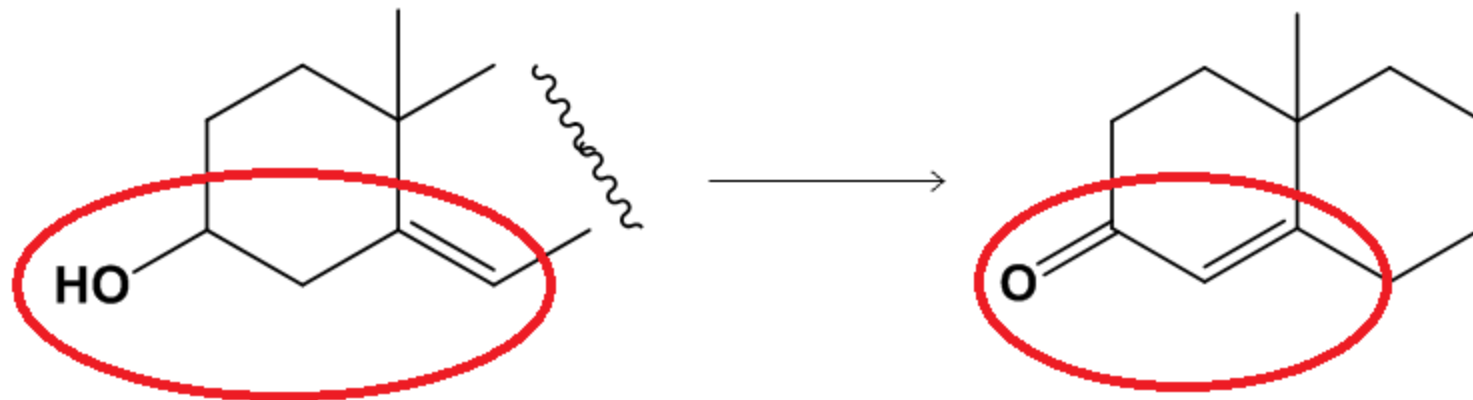
- 1,2-desaturation

*Bacillus sphaericus*,  
*Corynebacterium simplex*

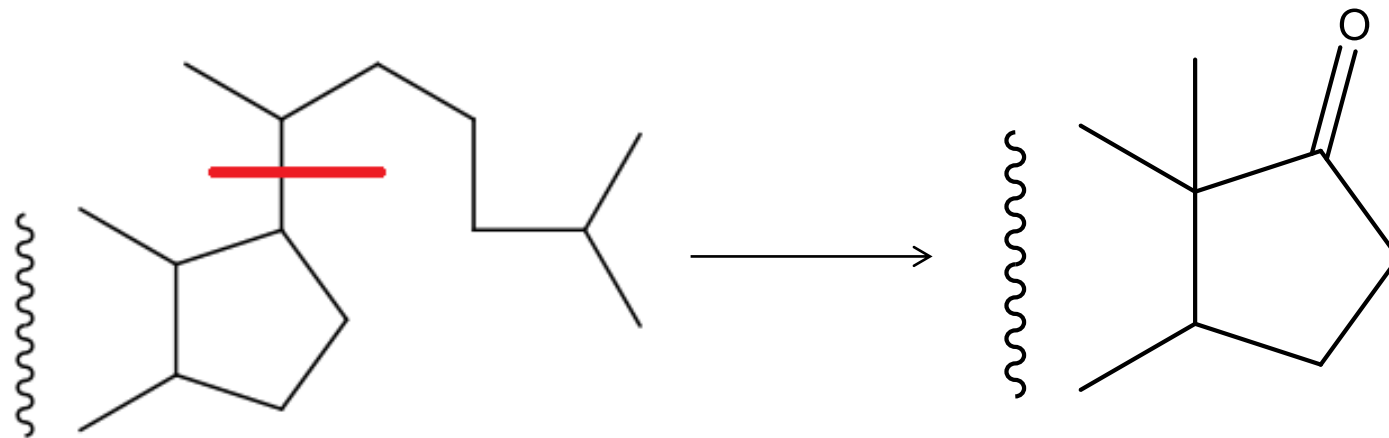


- Oppenauer Oxidation

*Flavobacterium dehydrogenans*



- 17-Alkyl chain oxidation  
*Mycobacterium* NRR



•11- $\alpha$  hydroxylation

*Rhizopus nigricans*, *Curvularia lunata*

