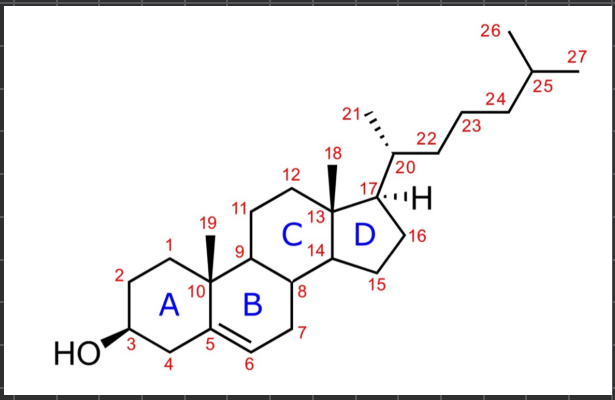
*Numbering system of Cholesterol



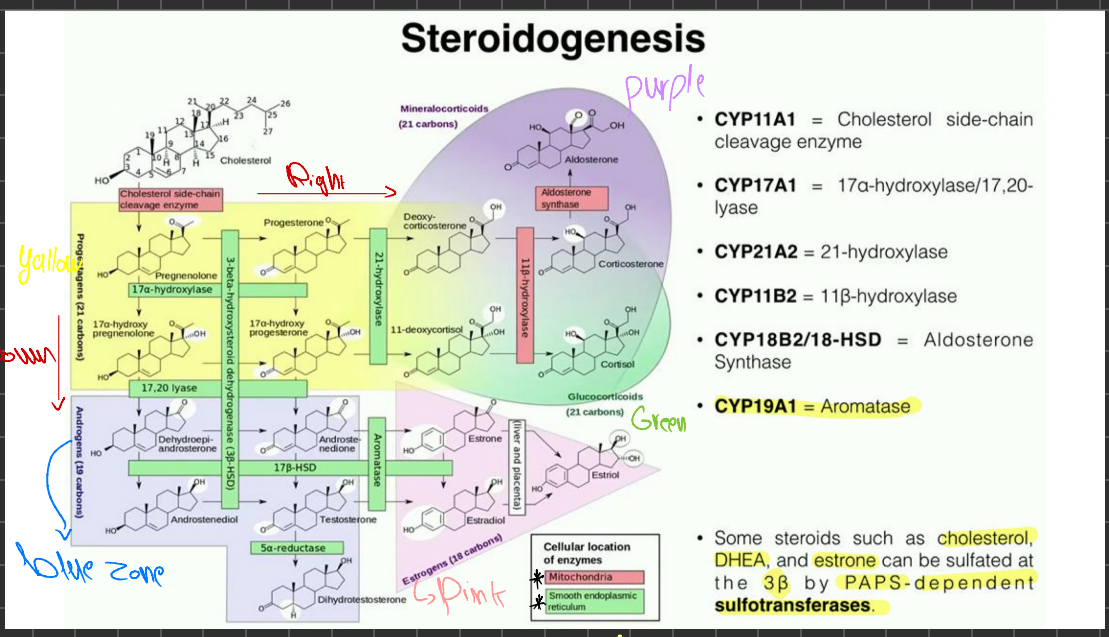
1) the site of OH (C_3)

2) where the tail begin. (22-27)

3) 4 rings (3 six membered rings and 1 five mem. ring)

4) the site of Double bond.

*based on this system, the enzymes took their names



* The Zones * The type of enzymes * The directions

- The 1st step (remove the tail) ⇝ the tail isocarboxaldehyde and Pregnenolone is Keton. (the parent steroid).

- 17 α hydroxylase ⟶ hydroxylate C 17.

- 3 beta hydroxy steroid dehydrogenase (Pregnenolone → progesteron)

oxidation of C_3 — isomerization of double bound $5=6 \Rightarrow 4=5$

- Progesteron can act independently

* Convert progesteron to cortisol ⇒ 1) 17α hydroxylase.

hydroxylate C_{12} ← 2) 21 hydroxylase produces
- a) deoxycorticosteron
- b) 11-deoxycortisol

must be transported to mitochondria ← by simple diffusion.

3) 11-β hydroxylase produces
- a) corticosteron
- b) cortisol (glucocorticoid)

- hydroxylate C_{11}
- mitochondrial enzyme.

* Aldosteron synthesis: Corticosteron → Aldosteron

Aldosteron synthase
1) hydroxylation of C_{18}
2) oxydation of C_{18}
end with aldehyde

* Cortisol and aldosteron are Deadend.

act independently on their receptors

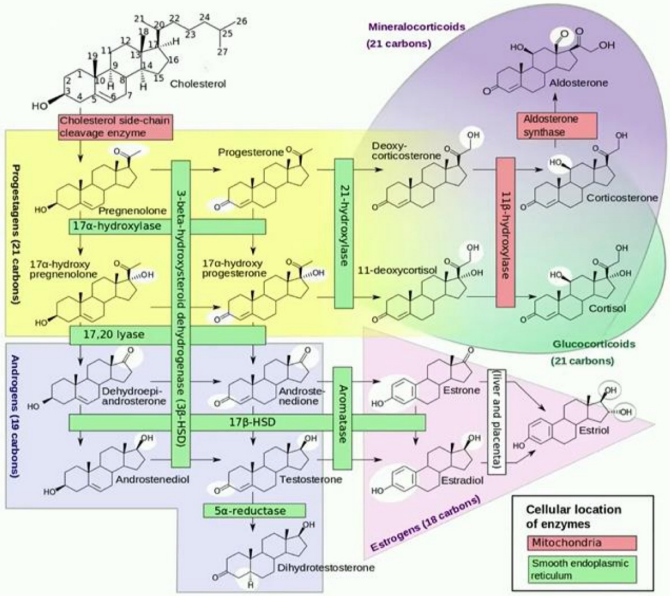
metabolize in liver.

* Development of sex hormons.

1) we need two progestron (17α hydroxy progesterone and 17α hydroxy pregnenolone).

2) 17-20 lyase use the OH group on C_{17} to remove the keton group attached to the C_{17} (this enzyme has activity like 17α-hydroxylase) to produce DHEA and androstenedione) the 1st two androgens.

Steroidogenesis



- **CYP11A1** = Cholesterol side-chain cleavage enzyme
- **CYP17A1** = 17α-hydroxylase/17,20-lyase
- **CYP21A2** = 21-hydroxylase
- **CYP11B2** = 11β-hydroxylase
- **CYP18B2/18-HSD** = Aldosterone Synthase
- **CYP19A1** = Aromatase

- Some steroids such as cholesterol, DHEA, and estrone can be sulfated at the 3β by PAPS-dependent **sulfotransferases**.

* In progestrion → ketone tail on C_{17}, in androgens → No !!

3) 3βHSD which will oxidize 1) DHEA into androstenedione
2) androstenediol into testosteron.

4) 17βHD 1) androstenedione from testesteron
2) DHEA from androsenediol.

5) 5α reductase testesteron —reduction→ Dihydrotestesteron

- H on C_5
- use NADPH
- removing of (=)

most potent androgen !!

↳ this process increase the potent from 20-100 folds

* Estrogen Synthesis

- Aromatase (hydroxylation of the C_3, convert A ring to Aromatic)

1) androstenedione → estrone (less active estrogen)

2) testosterone → estradiol (primary estrogen).

↳ both metabolized in liver and placenta to be estriol

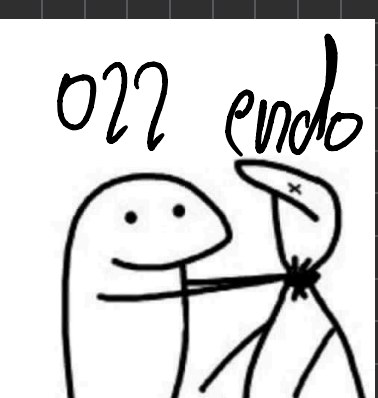
* estradiol —16-hydroxylase→ estriol

* estrone —1) 17 β HSD 2) 16-hydroxylase→ estriol

* 16-hydroxylase ⇝ hydroxylase C16

* 17 β HSD → reduce ketone group into OH group.

— By Lylain Alhmad



Good luck ✨