



Where is CYP11A1 present in the body?

CYP11A1 is a mitochondrial enzyme found mainly in steroid-producing cells throughout the body. It initiates steroid and some secosteroid (vitamin D-related) synthesis by converting cholesterol to pregnenolone.^{[1] [2] [3]}

Major steroidogenic organs

- Adrenal cortex (all zones: glomerulosa, fasciculata, reticularis) shows high CYP11A1 expression and is a primary site of steroid hormone synthesis.^{[2] [1]}
- Gonads (Leydig cells in testis, theca and luteal cells in ovary) also express CYP11A1 at high levels for sex steroid production.^{[4] [1]}
- Placenta expresses substantial CYP11A1 during pregnancy to support progesterone and other steroid production.^{[1] [2]}

Other tissues with CYP11A1

- Brain expresses CYP11A1 at lower levels and uses it for local (neurosteroid) synthesis in select neural cell populations.^{[5] [1]}
- Gastrointestinal tract and components of the immune system express CYP11A1, supporting local steroid and secosteroid generation.^{[6] [1]}
- Skin (epidermis and skin appendages) has functionally active CYP11A1 that contributes to local steroidogenesis and vitamin D-related secosteroid production.^{[7] [6] [1]}

Cellular and subcellular location

- CYP11A1 is predominantly expressed in steroidogenic cells within these tissues rather than uniformly in all cell types.^{[8] [1]}
- Within cells, CYP11A1 is located in the inner mitochondrial membrane, where it forms part of the cholesterol side-chain cleavage system.^{[9] [8] [1]}



1. <https://pmc.ncbi.nlm.nih.gov/articles/PMC8205265/>
2. <https://www.frontiersin.org/journals/molecular-biosciences/articles/10.3389/fmolb.2020.608447/full>
3. <https://www.uniprot.org/uniprotkb/P05108/entry>
4. https://en.wikipedia.org/wiki/Cholesterol_side-chain_cleavage_enzyme
5. <https://www.sciencedirect.com/science/article/abs/pii/S0091302221000273>
6. <https://www.sciencedirect.com/science/article/abs/pii/S0303720721000824>

7. <https://www.nature.com/articles/srep14875>
8. <https://pmc.ncbi.nlm.nih.gov/articles/PMC9386925/>
9. <https://selfdecode.com/en/gene/CYP11A1/>
10. <https://onlinelibrary.wiley.com/doi/full/10.1002/mgg3.322>
11. <https://www.proteinatlas.org/ENSG00000140459-CYP11A1>
12. <https://www.ncbi.nlm.nih.gov/gene/13070>
13. <https://www.rcsb.org/structure/3MZS>