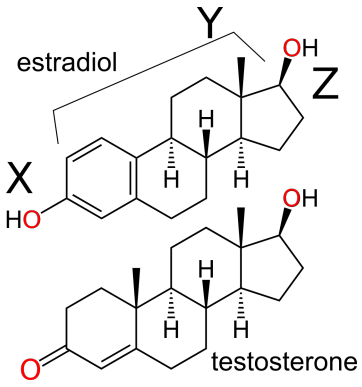
Estrogen and testosterone are recognized by different proteins: the "estrogen receptor" (ER) and "androgen receptor" (AR).

1. What sorts of amino acids might interact with the the regions labeled X, Y, and Z on the steroid below?

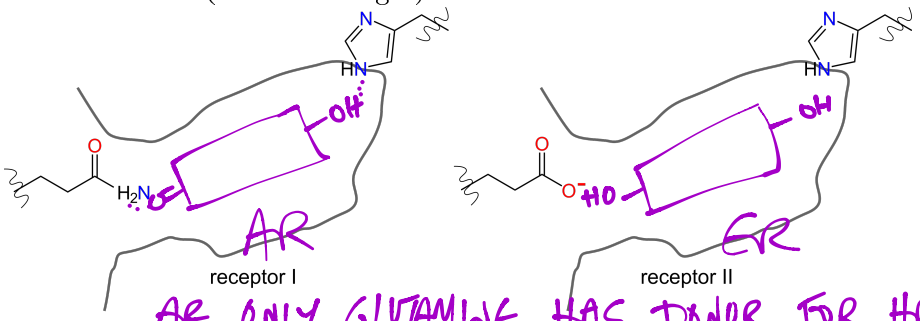
X: POLAR/CHARGED AA THAT CAN HBOND: SER, THR, GLN, ASN, ASP, GLU, HIS, LYS, ARG

Y: NONPOLAR AA: VAL, ALA, TRP TYR, LEU, ILE, MET

Z: POLAR/CHARGED



2. Schematic versions of the ER and AR binding pockets are drawn below. Sketch how you think the steroids might dock into these pockets. (In your sketch, you can exclude any details on the steroids that you think don't matter.) Can you guess which pocket is the AR (binds to testosterone) versus the ER (binds to estrogen)?



AR ONLY GLUTAMINE HAS DONOR FOR HBOND

3. What molecular interactions are important for binding? What molecular interactions are most important for *specificity*?

(1) POLAR AND HPHOBIC. HPHOBE WILL BE BIG B/C STEROID IS SO NONPOLAR.

(2) SPECIFICITY: PREFERING ONE STEROID OVER OTHER GLU VS. GLN POLAR INTERACT.

4. How might you test these predictions?

MEASURE BINDING WITH GLU → GLN MUTATION.