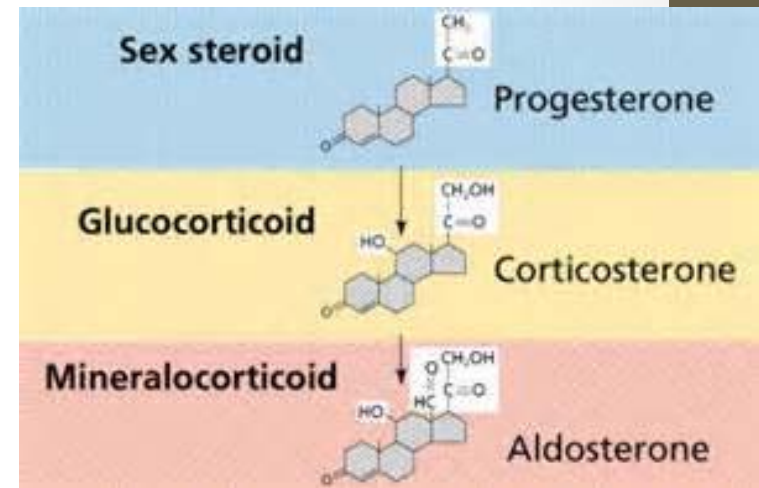


# Chemical Signals: Steroid and Protein Hormones

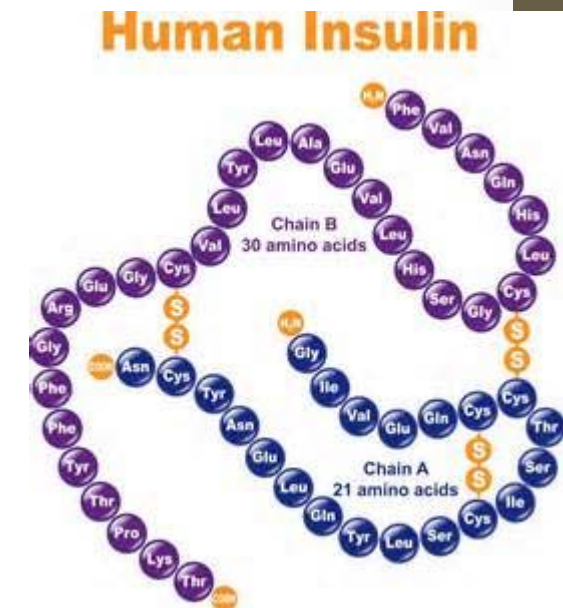
- **Steroid Hormones**

- Made from cholesterol.
- Fat soluble.
- E.g., sex hormones & cortisol.



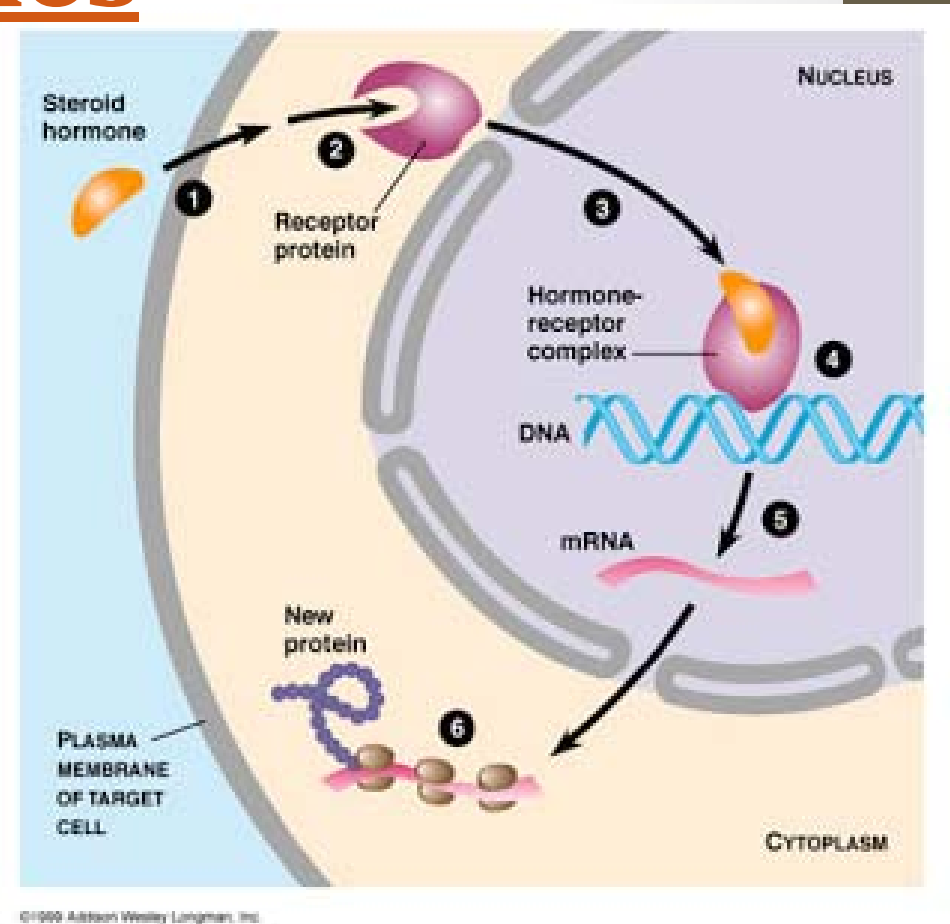
- **Protein Hormones**

- Made from amino acids.
- Water soluble
- E.g., insulin and growth hormones.



# Steroid Hormones

1. Diffuse out of capillaries into target cell
2. Combine with receptors in cytoplasm **or** nucleus
3. Receptor-hormone complex binds to specific gene(s)
  - Hormone response elements
4. Transcription occurs
5. mRNA exits nucleus
6. Translation occurs & proteins synthesized



# Protein Hormones

## Second messenger system

1. Diffuse out of capillaries
2. Combine with receptors in cell membrane
3. Activates G protein
4. Stimulates adenylyl cyclase to produce **cyclic AMP** (adenosine monophosphate) from ATP
5. cAMP activates target protein to phosphorylate specific proteins

