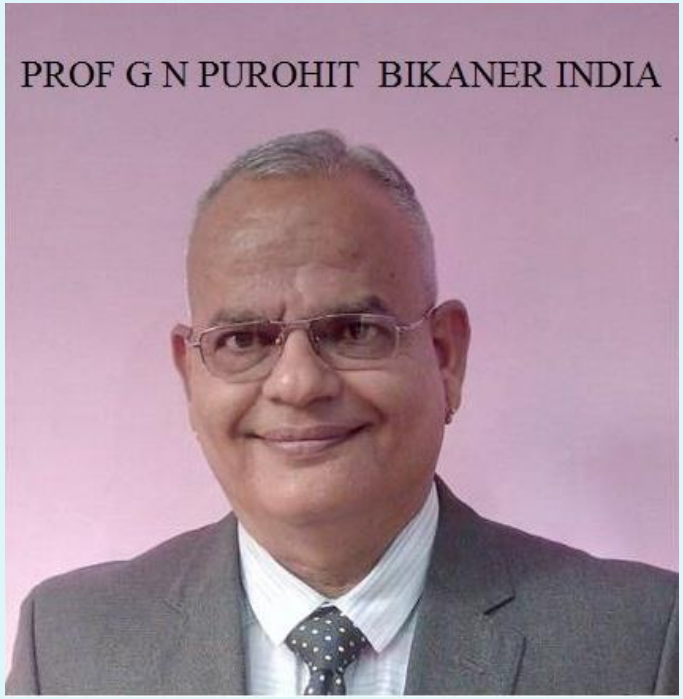
Hormones Basics



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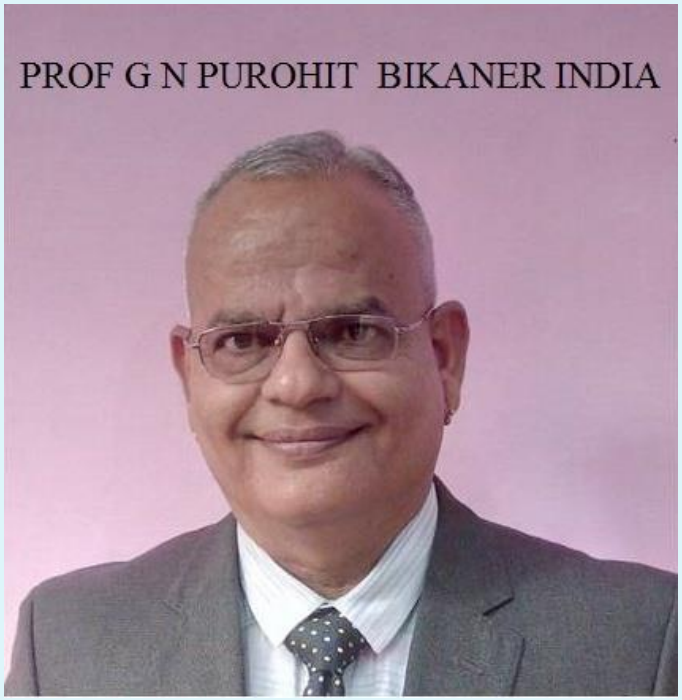
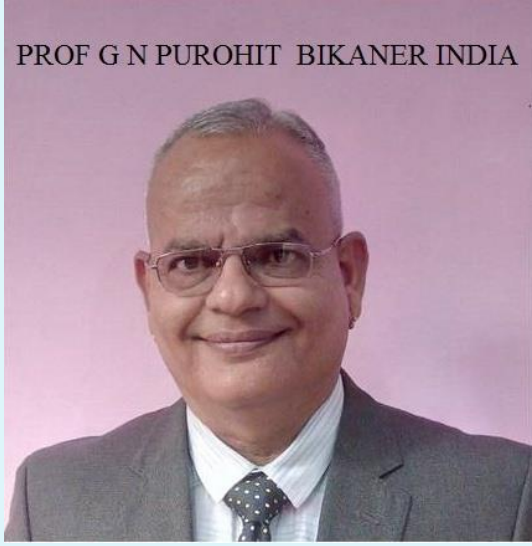
Hormones are chemical messengers that travel through blood to reach and affect target cells.



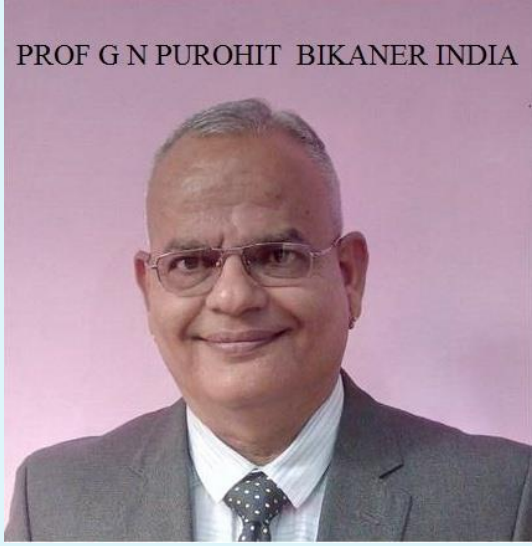


Classification of hormones

Based on Structure

Based on Solubility

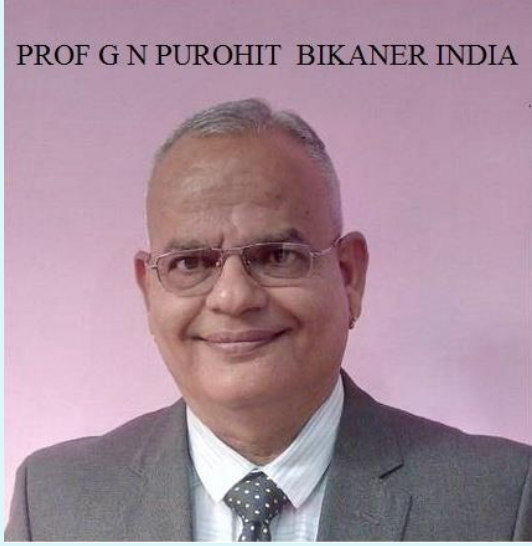
Based on distribution to sites of action



HORMONE SECRETION
Neural
Endocrinological
Biological
Environment and Photoperiod

PULSATILE AND SURGE LIKE RELEASE
Rate of production
Positive and Negative Feedback

HORMONE SYNTHESIS

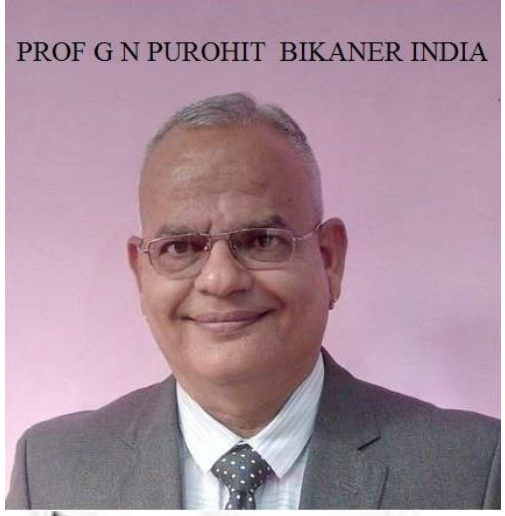


Proteins and peptides from amino acids according to mRNA transcripts

Steroids from cholesterol

Prostaglandins from arachidonic acid (Fatty acids)

Biosynthesis of Eicosanoids



Phospholipids
(cell membrane)

Phospholipase A_2

Arachidonic acid

Lipooxygenases

Cyclooxygenase
Cox1 and Cox 2

12-HETE
15-HETE
LTA_4

PGH_2

LTB_4 LTC_4 LTD_4 LTE_4

Leukotrienes

PGD_2 PGE_2 $PGF_{2\alpha}$ PGI_2 TXA_2

Prostaglandins

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CHOLESTEROL

P450 SCC

Pregnenolone

3 β-OH-Dehydrogenase
$\Delta^5\Delta^4$ Isomerase

Progesterone

P450 17-α-OH

17–α Hydroxypregnenolone

P450 17-α-OH

17–α Hydroxyprogesterone

P450 17-α-OH

Dehydroepiandrostenedione

P450 17-α-OH

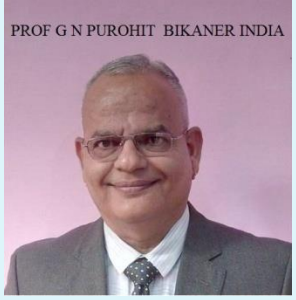
Androstenedione

17 β-OH-Dehydrogenase

Testosterone

Aromatase

Estradiol



Hormone transport

Endocrine hormones →Blood →Cell

Steroids, thyroid hormones, androgens and estrogens →Bound to SHGB

Progesterone, cortisol and Corticosteroids → Bound to transcortin

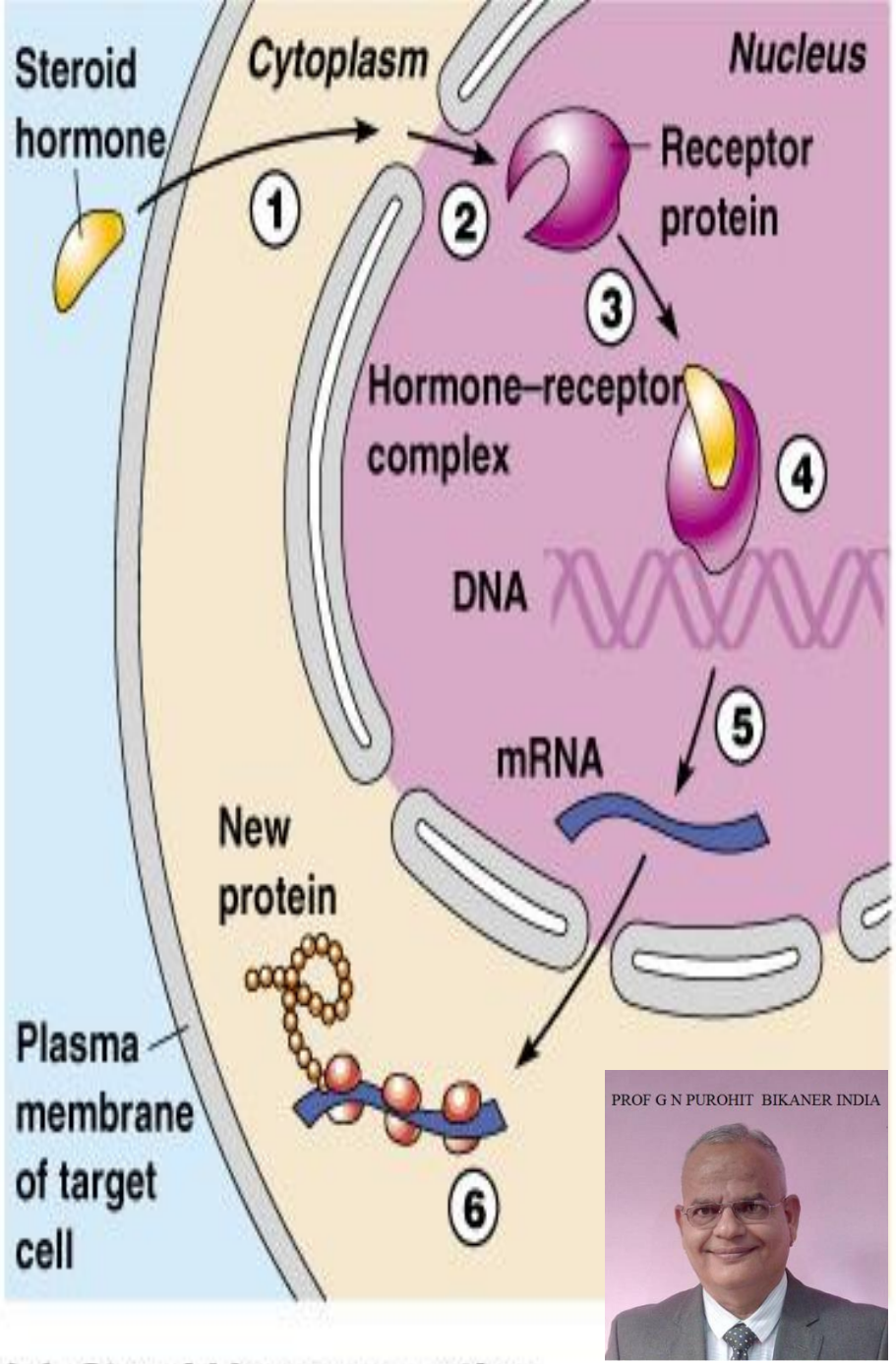
Corticoids → Bound to CBG

Mechanism of action of hormones

The hormones bind to their receptors on or within the cell.

Hormone receptors might be located:

1. In or on the surface of cell membrane, e.g. **protein** or **peptide** hormones and catecholamines.
2. In the cytoplasm, e.g. **steroid hormones.**
3. In the cell nucleus, e.g. **thyroxine**.



(a) Steroid hormone action

(b) Nonsteroid hormone action

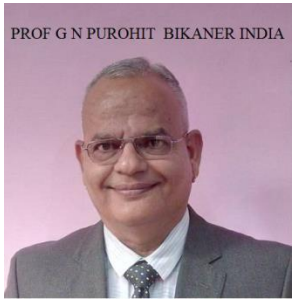
HORMONE METABOLISM

PEPTIDES AND PROTEINS ⇨ LIVER AND KIDNEYS — BROKEN TO AMINO ACIDS

GnRH ⟹ BROKEN DOWN BY PEPTIDASES

STEROIDS ⇨ LIVER — HYDROXYLATED AND CONJUGATED WITH GLUCURONIC OR SULFURIC ACID

REDUCED BINDING TO CARRIER PROTEINS AND INCREASED URINARY AND FECAL EXCRETION



PROSTAGLANDINS — INACTIVATED AT SITE

PROSTAGLANDINS — CIRCULATION — METABOLIZED AND REMOVED BY LUNGS AND LIVER

- The above lectures are also explained in video lectures at my YouTube Channel Govind Narayan Purohit

- Kindly share the videos and subscribe to my channel if you like them

- THANKS