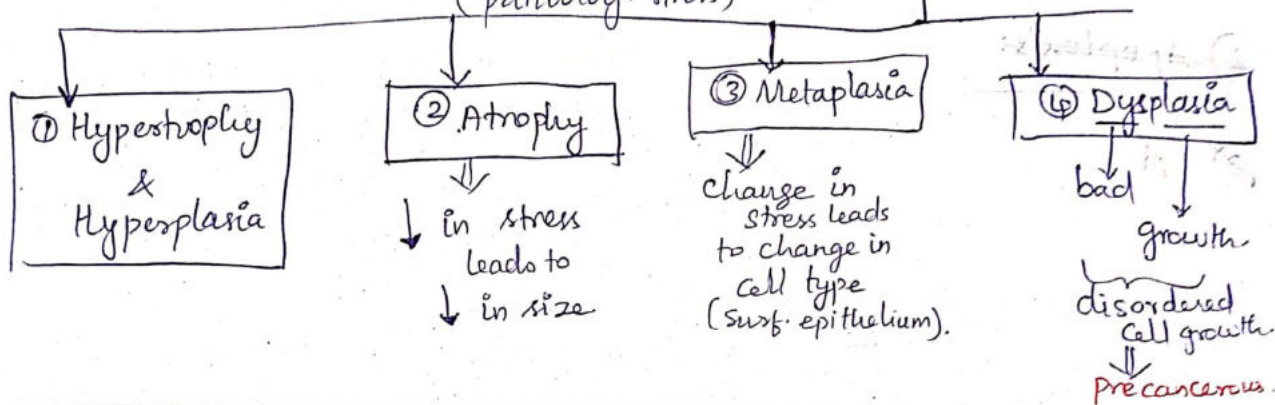
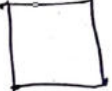


Basic principles:

Normal physio. conditions  $\Rightarrow$  organ is in Homeostasis

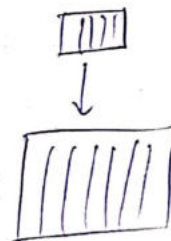
but when changes ( $\uparrow \downarrow$ ).  $\Rightarrow$  Growth Adaptations  
(physiolog. stress)  
(pathologic stress)



I) \* Hypertrophy   $\rightarrow$   ( $\uparrow$  cell size).

How? \* Gene  $\oplus \rightarrow \uparrow$  protein synthesis.  
 $\uparrow$  organelle syn.

\* Small cell  $\Rightarrow$  small cytoskeleton.  
large "  $\Rightarrow$  large "

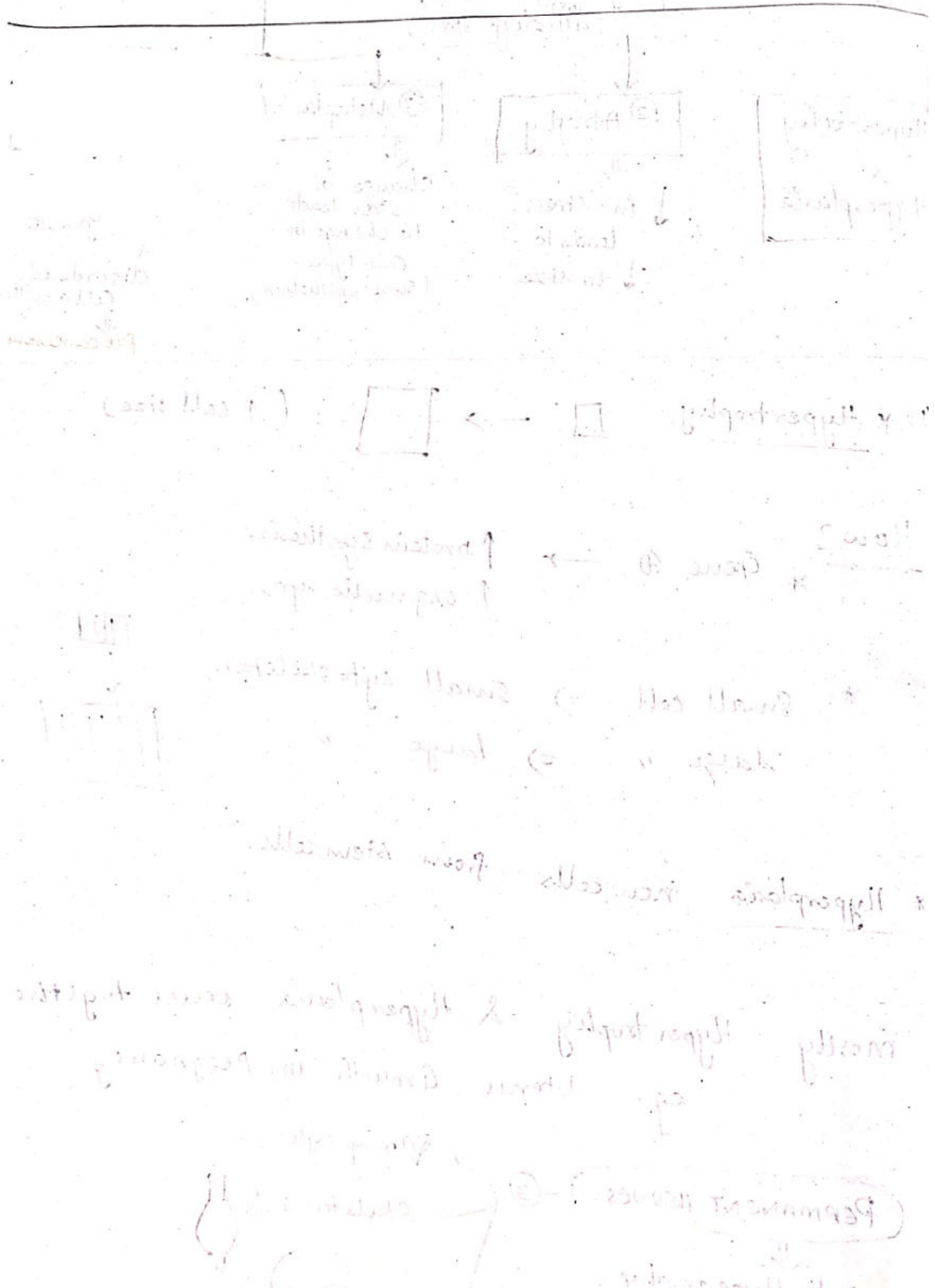


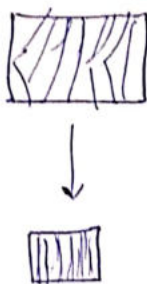
\* Hyperplasia new cells from stem cells.

\* mostly Hypertrophy & Hyperplasia occur together  
eg: Uterus Growth in pregnancy

\* PERMANENT TISSUES. ③  $\rightarrow$  myocytes.  
Skeletal m/s  
Nerve  
 $\downarrow$   
only Hypertrophy  
why? No stem cells.

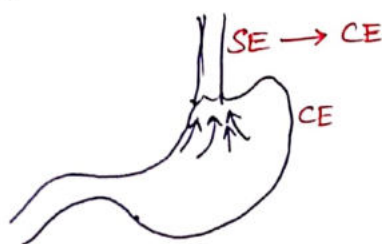
eg: endometrial hyperplasia  
exception benign prostatic hyperplasia.  
due to long exposure of estrogen.





③ Metaplasia  
metaplastic cells are better in handling stress.

metaplastic cells are better in handling stress.



Barret esophagus

columnar, non-ciliated  
Goblets ← mucinous epithelium  
(instead of squamous, ciliated  
non mucinous epithelium)

Mechanism: Reprogramming of stem cells.

\* reversible. with removal of driving stressor.

eg: Treatment of GERD

Clinical: (i) Metaplasia  $\xrightarrow[\text{to}]{\text{can progress}}$  Dysplasia & cancer (ii)

eg: Barrett's esophagus.

exception

Apocrine metaplasia

(iii)

Vit. A deficiency can also cause metaplasia  
eg: Keratomalacia

Blast stage  $\xrightarrow[\text{Receptor mutation in PML}]{\text{Vit A}}$  mature stage

Can ↑  
risk of  
Breast Ca

Seen in association with fibrocystic changes in breast.

But ~~this~~  doesn't ↑ risk  
of breast cancer



Thin delicate  
memb. which is normally  
Transparent but  
Inflammed (Redness) during  
Common cold.

Vit. A def. leads to  
Keratomalacia.

eg: Myositis Ossificans.

↓  
m/s.

↓  
inflamed

↓  
metaplasted  
to form  
bone

} Confused with  
osteosarcoma  
but can be differentiated  
by (i) Bone will be normal  
in M.O.  
(ii) clear boundary  
b/w bone & m/s.

#### ④ Dysplasia

\* Disordered cell growth

\* Refers to proliferation of pre-cancerous cells.

eg: CIN. (Cervical Intraepithelial Neoplasia).



\* originates from long standing pathologic

↓  
Hyperplasia

eg: endometrial Hyperplasia

↓ if chronic (becomes dysplastic).

↓  
endometrial cancer

↓  
Metaplasia

eg: metaplasia

Barrett's esophagus.

↓ if chronic.

↓  
Adenocarcinoma  
of esophagus.

Good news: Dysplasia is reversible but if stress  
persists, dysplasia progresses to Ca. (irreversible).

⑤ Aplasia failure of cell prod<sup>n</sup> in embryogenesis.  
eg: U/L Renal agenesis.

⑥ Hypoplasia ↓ cell prod<sup>n</sup> in embryogenesis. which leads to  
Relatively SMALL ORGAN.

eg: Streak Ovary in Turner's Syndrome.