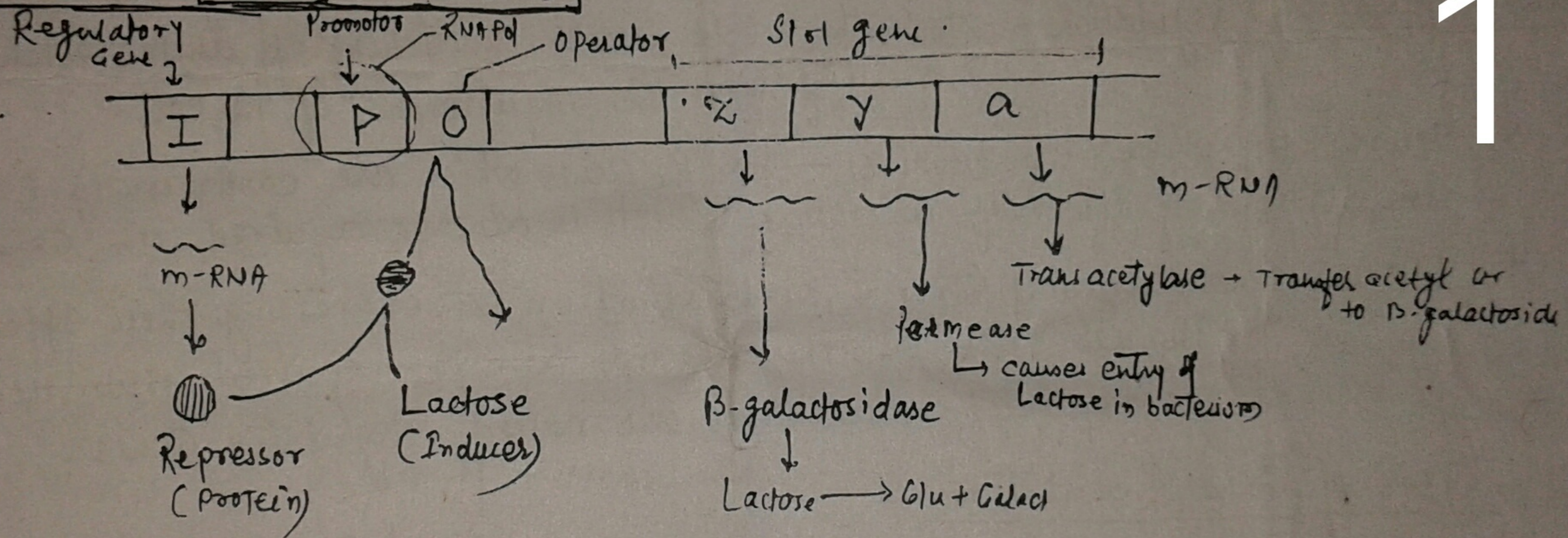


lac operon -¹ (Inducible operon) in *E. coli* that occurs in catabolic pathway

Jacob & Monod (1961) discovered the lac operon in Escherichia coli.

It is inducible operon system in which the *Str* genes remain switched off unless and until an inducer (Lactose, Allolactose) is present in the medium.

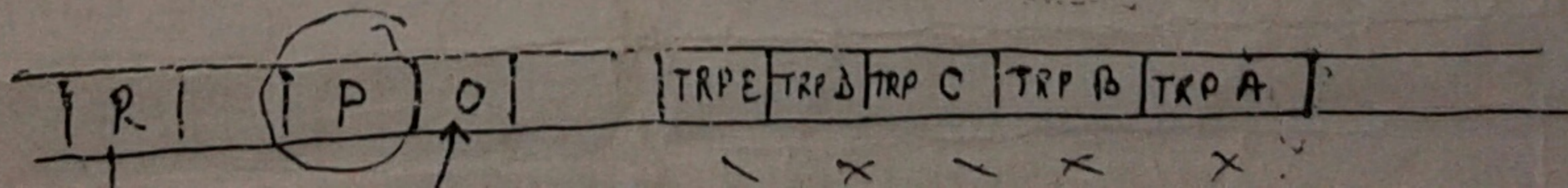
(1) When Lactose is present in Medium



(2) When Lactose is absent in medium, Repressor binds with O & blocks the path of RNA Pol & hence no enzyme is formed.

(2) Tryptophan operon (Repressible operon) — in *E. coli* occurs in Anabolic pathways i.e. Tryptophan synthesis

(1) When Tryptophan (Corepressor) Present — Regulator gene produces Aporepressor that alone cannot bind with O. When Aporepressor + Corepressor → Repressor that binds with O & blocks the formation of enzyme for Trp synthesis

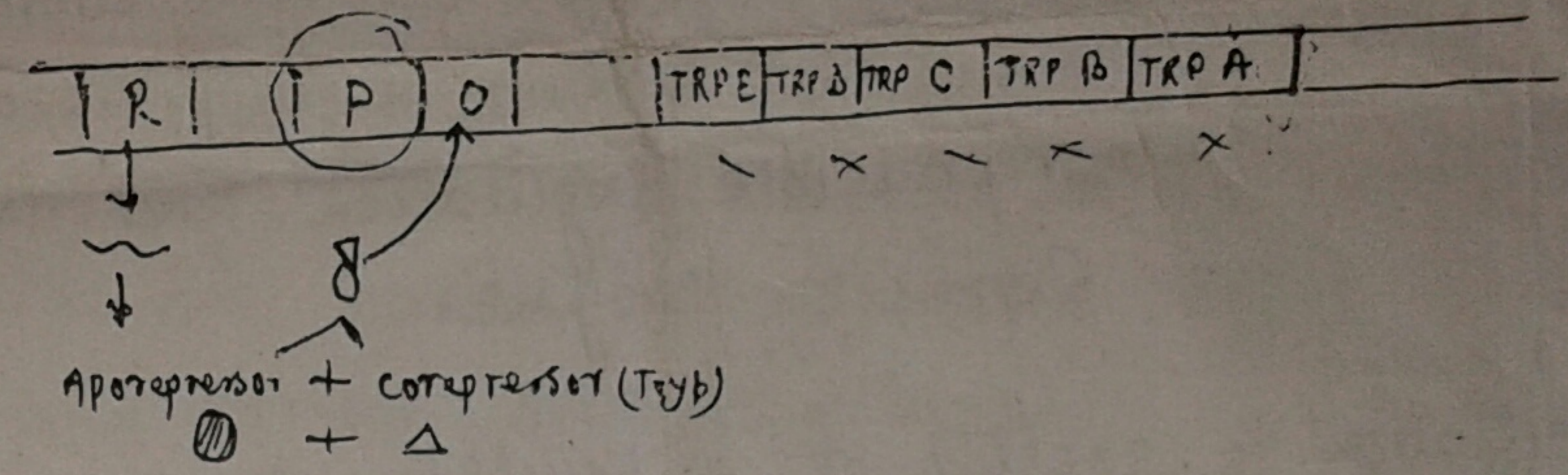


No enzyme is formed.

3) Tryptophan operon (Repressible operon) — in E. coli occurs in Anabolic pathways i.e. Tryptophan synthesis

(1) When Tryptophan (corepressor) Present — regulator gene produces Aporepressor that alone cannot bind with O. When Aporepressor + corepressor \rightarrow Repressor that binds with O & blocks the formation of enzyme for Tryptophan synthesis.

2



Inducible operon

- 1) Normally remain switched off
- 2) Switched on by inducer
- 3) Regulator gene produces complete repressor
- 4) Fuel in catabolic pathway
- 5) Induction is caused by new metabolite
- 6) Induction starts transcription & translation

Repressible operon

- 1) On
- 2) With the help of corepressor
- 3) Only a part of repressor called Aporepressor
- 4) Anabolic pathway
- 5) repression due to excess of an existing molecule.
- 6) Repression stop.

Importance of Gene Regulation

- (1) All genes are not required by all the cell.
- (2) Development of org occurs in many steps & each controlled by a separate set of gene. So only those should be allowed that are required.
- (3) Helps in production of specific chemicals by specific cell.