RAMA UNIVERSITY

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FACULTY OF ENGINEERING &TECHNOLOGY

DEPARTMENT OF BIOTECHNOLOGY

Tryptophan Operon:

Discovered in 1953 by Jacques Monod and colleagues, the trp operon in E. coli was the first repressible operon to be discovered.

This operon contains five structural genes:

trp E,

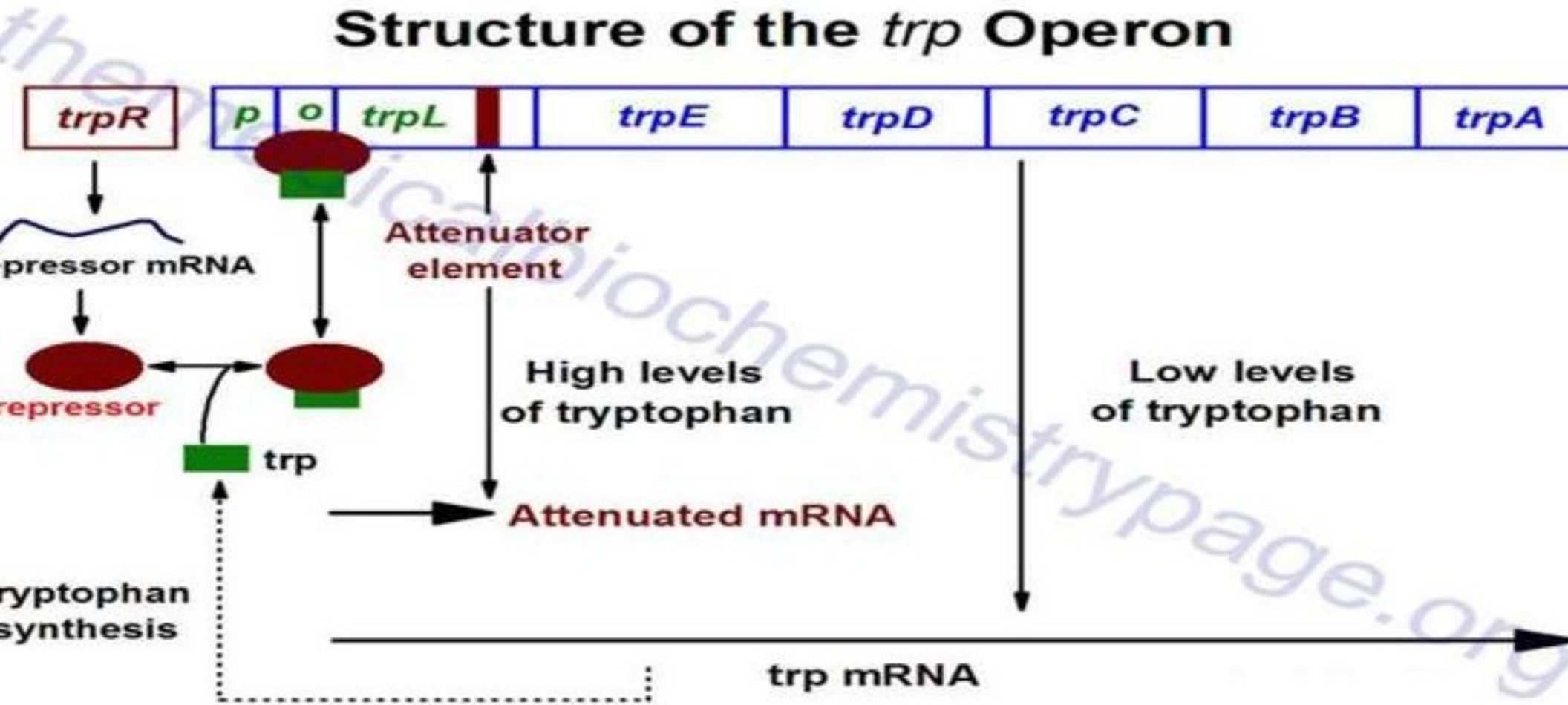
trp D,

trp C,

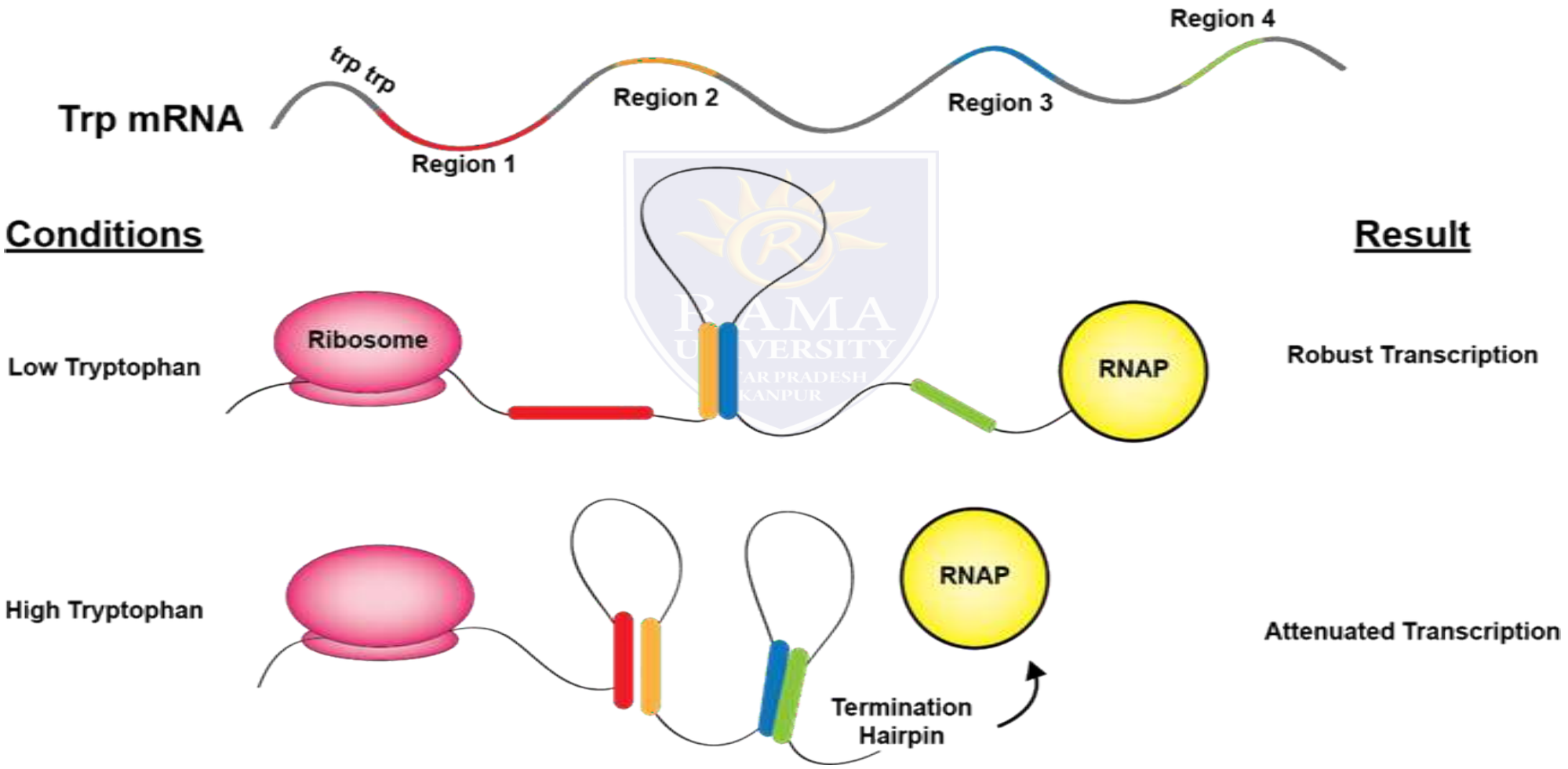
trp B, and

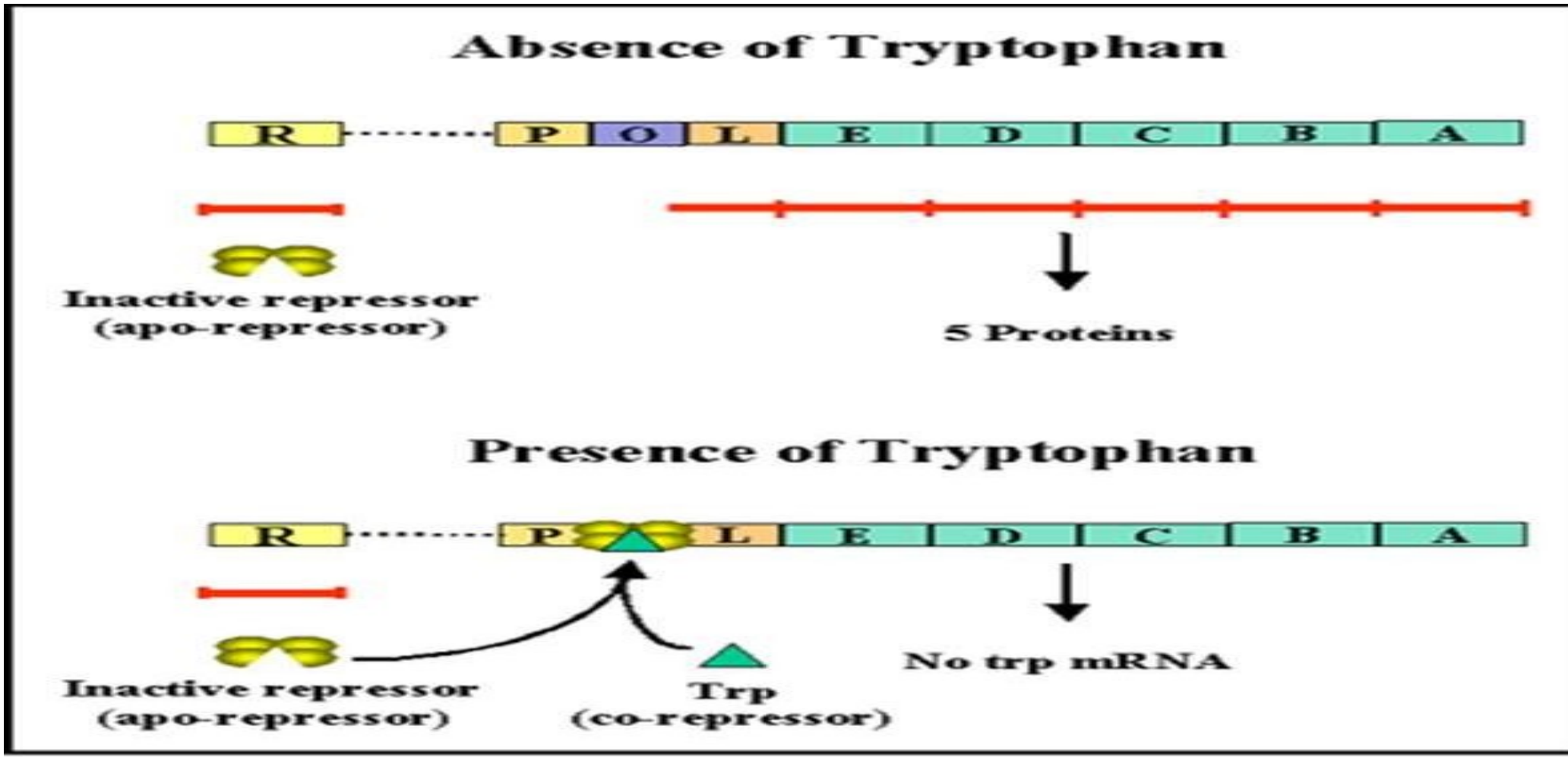
trp A, which encodes tryptophan synthetase.

It also contains a promoter which binds to RNA polymerase and an operator which blocks transcription when bound to the protein synthesized by the repressor gene (trp R) that binds to the operator


Structure of the trp Operon
trpR
p
o
trpL
trpE
trpD
trpC
trpB
trpA
pressor mRNA
Attenuator element
repressor
trp
High levels of tryptophan
Low levels of tryptophan
Attenuated mRNA
ryptophan synthesis
trp mRNA

Amount of trp operon affect transcription




Absence of Tryptophan
R
P
O
L
E
D
C
B
A
Inactive repressor
(apo-repressor)
5 Proteins
Presence of Tryptophan
R
P
L
E
D
C
B
A
No trp mRNA
Inactive repressor
(apo-repressor)
Trp
(co-repressor)