

6.4 THE TRP OPERON ③

Tryptophan is an essential amino acid in humans. It cannot be synthesized in the body but is taken as a supplement from human diet. Like us, bacteria such as *E. coli* also need amino acids to build protein for their survival. One of the amino acids they need is tryptophan. If tryptophan level is high in the environment, then bacteria do not need to synthesize it, so the genes in the tryptophan operon are switched "off". On the other hand, when tryptophan level is low in the environment then the bacteria need to synthesize it, so the transcription of genes in the Trp operon is switched "on".

6.5 STRUCTURE OF TRYPTOPHAN OPERON

Trp-operon consists of five structural genes Trp E, Trp D, Trp C, Trp B and Trp A. The operator gene (*O*) lies within the primary promoter (P_1) while weak promoter P_2 causes basal levels of constitutive transcriptions of Trp C, B and A genes. The Trp R gene which encodes repressor protein is present far away from the structural genes while on the right-side *t* and *t'* are present. They contain transcription termination sequences and are about 250 base pairs long in *E. coli*. Another important and specific gene sequence is Trp L, present after the promoter and operator region. This Trp L region specifies a 162-nucleotide long **m-RNA leader** that contains the **attenuator (*a*)**. Promoter 1 (P_1) extends about 18 bp into Trp L region.

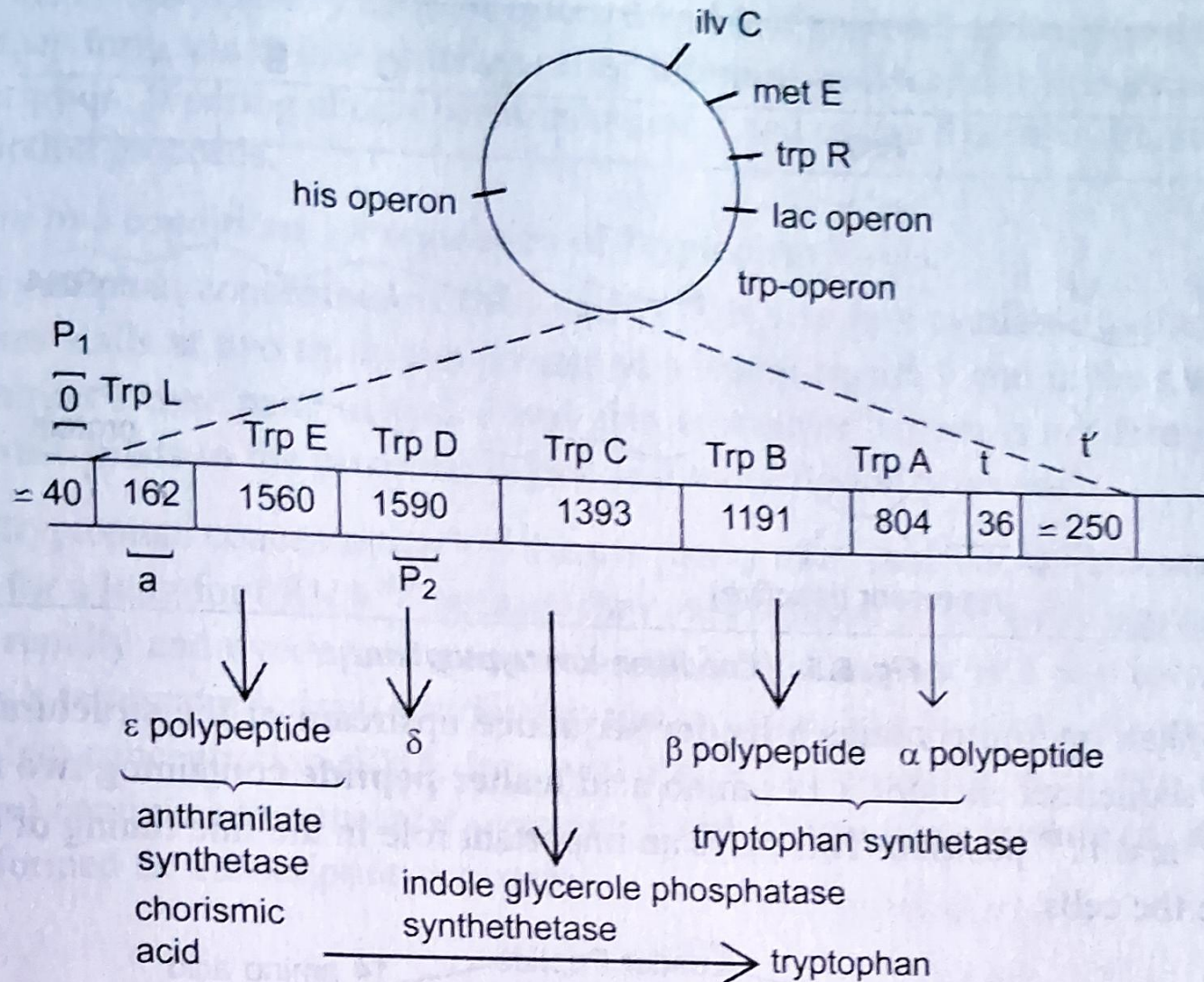


Fig. 6.4. Structure of *trp* operon.