

REGULASI INDUKSI DAN INHIBISI EKSPRESI GEN (PRODUKSI METABOLIT) DAN PERBAIKAN SIFAT GENETIK AGEN BIOLOGI

Kuliah TF ke 7

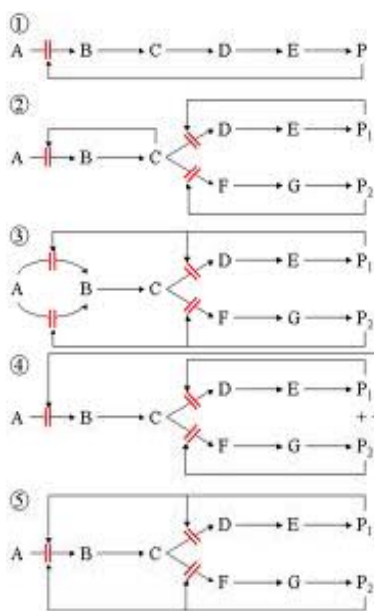
Dr. oec. troph. Ir. Krishna Purnawan Candra
Fakultas Pertanian Universitas Mulawarman

PS Teknologi Hasil Pertanian

September 2011

KETERATURAN BIOSINTESA METABOLIT PRIMER

Feedback Inhibition Mechanism



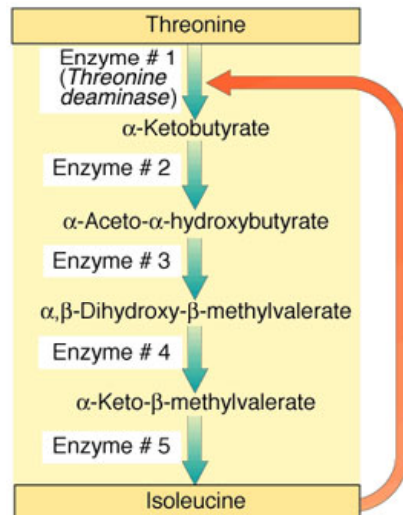
- (1) Basic feedback inhibition. The product (P) inhibits the committed step (A → B).
- (2) Sequential feedback inhibition. The end products P₁ and P₂ inhibit the first committed step of their individual pathway (C → D or C → F). If both products are present in abundance, all pathways from C are blocked. This leads to a buildup of C, which in turn inhibits the first common committed step A → B.
- (3) Enzyme multiplicity. Each end product inhibits both the first individual committed step and one of the enzymes performing the first common committed step.
- (4) Concerted feedback inhibition. Each end product inhibits the first individual committed step. Together, they inhibit the first common committed step.
- (5) Cumulative feedback inhibition. Each end product inhibits the first individual committed step. Also, each end product partially inhibits the first common committed step.

<http://www.chemistrydaily.com/chemistry/Enzyme>

Dr. Krishna P. Candra / Sept 2011

Contoh Feedback Inhibition

Isoleucine feedback inhibitor



REGULATING ENZYMES: FEEDBACK INHIBITION

Enzymes often function in a metabolic pathway, a series of chemical reactions where the products of one reaction become the reactants (substrate) for the next reaction. A different enzyme catalyzes each step.

In feedback inhibition, the final product of the metabolic pathway inhibits an earlier reaction in the sequence

Feedback inhibition

(Isoleucine inhibits enzyme #1)

MODIFIKASI METABOLISME

- Modifikasi Lingkungan Metabolisme
- Modifikasi Genetika
 - Mutasi
 - Mutan untuk memproduksi metabolit primer
 - Modifikasi permeabilitas
 - Tidak membentuk inhibitor atau represor
 - Tahan terhadap inhibitor atau represor
 - Mutan untuk memproduksi metabolit sekunder
 - Mutan auksotropik
 - Resistant mutan
 - Revertan mutan
 - Mutan untuk memproduksi enzim
 - Enzim biosintetik
 - Enzim katabolik
 - Rekombinasi Genetika (Rekayasa Genetika)

Contoh modifikasi lingkungan

- http://www.license.umn.edu/Products/E-Coli-Fermentation-of-Glycerol-from-Biodiesel-Waste-into-Ethanol_Z09192.aspx
- http://www.license.umn.edu/Products/E-Coli-Fermentation-of-Glycerol-from-Biodiesel-Waste-into-Ethanol_Z09192.aspx (dari file)

Modifikasi agen biologi

- Modifikasi permeabilitas
Produksi asam glutamat dari *Corynebacterium glutamicum* melalui konsentrasi biotin
 - Konsentrasi biotin 1-5 ug, menghasilkan asam glutamat 50 g/L medium
 - Konsentrasi biotin tinggi, tidak diproduksi asam glutamat (25-30 ug per berat kering sel) melainkan asam laktat

