

Models of cellular Processes - signalling

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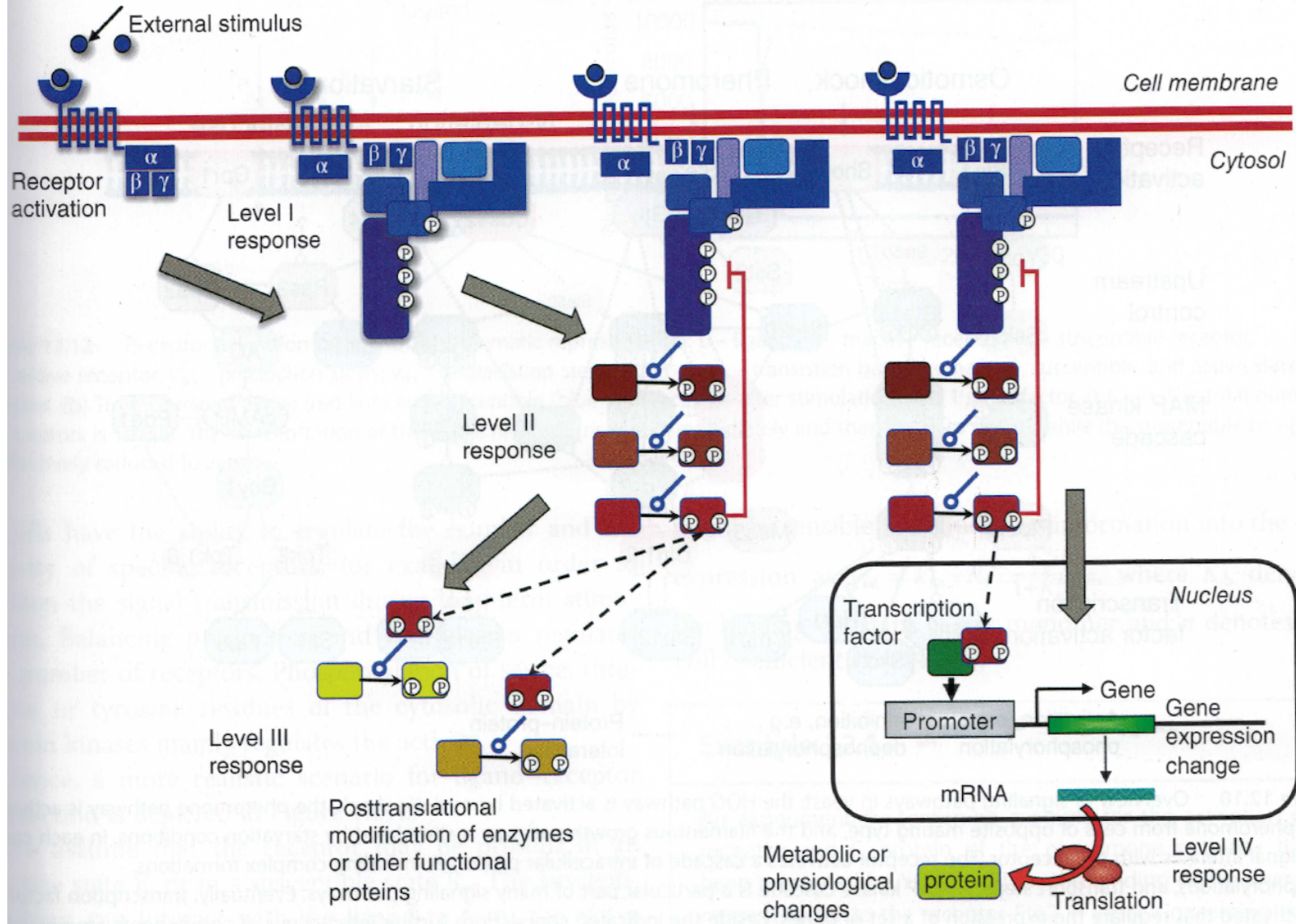
<https://mcp.readthedocs.io>

livermetabolism.com

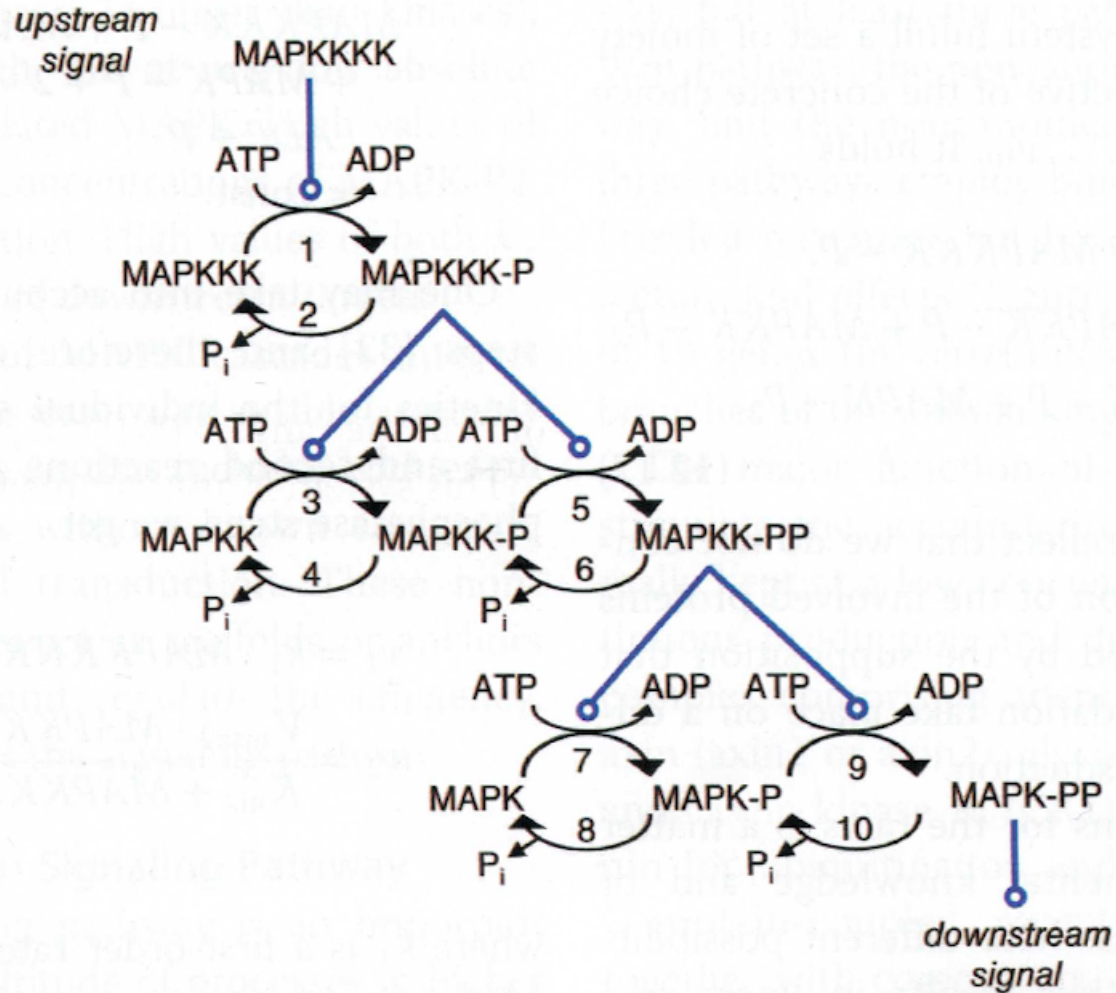


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Signaling paradigm



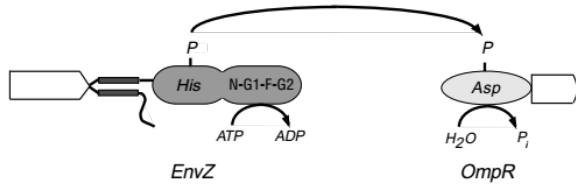
MAP kinase cascade



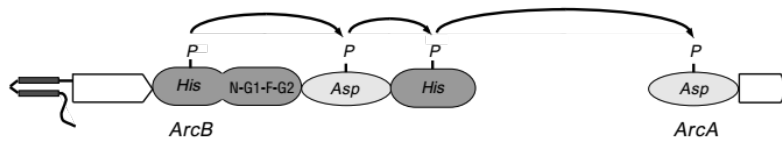
Histidine Kinase

Response Regulator

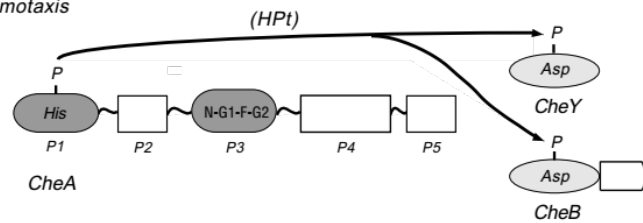
a) *E. coli* Osmoregulation



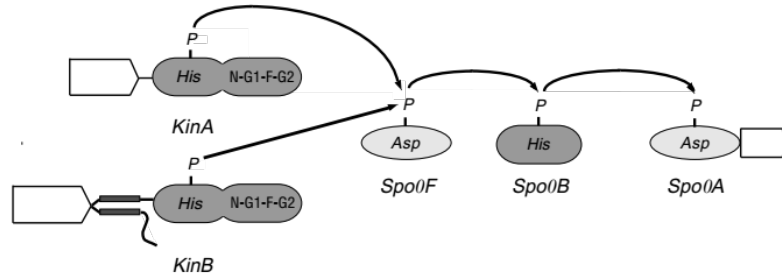
b) *E. coli* Anoxic Redox Control



c) *E. coli* Chemotaxis



d) *B. subtilis* Sporulation Control



Two-component system

Figure 1 Schematic diagram depicting the modular organization of representative two-component systems. Asp-containing domains are colored *dark gray*, His-containing domains are colored *light gray*, and variable auxiliary domains are colored *white*. (a) The prototypical two-component pathway exemplified by the *E. coli* osmoregulatory system uses a single phosphoryl transfer event between the orthodox histidine protein kinase (HK) EnvZ and its cognate response regulator protein (RR) OmpR. (b) The *E. coli* Arc system illustrates a phosphorelay involving the hybrid HK ArcB. Depending on aerobic conditions, ArcA is capable of receiving a phosphoryl group from either the catalytic core or the His-containing phosphotransfer (HPT) domain of ArcB. (c) The *E. coli* chemotaxis pathway involves an atypical soluble HK CheA that phosphorylates either of two RRs, the single domain RR CheY and the methyl-ersterase CheB. (d) The *B. subtilis* sporulation control system is a multicomponent His-Asp-His-Asp phosphorelay system in which all of the signaling domains are independent proteins. Spo0F receives a phosphoryl moiety from either KinA or KinB and subsequently transfers it to the HPT Spo0B, which then phosphorylates the terminal RR Spo0A.

Stock, Ann M., Victoria L. Robinson, and Paul N. Goudreau. "Two-component signal transduction." Annual review of biochemistry 69.1 (2000): 183-215.

