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**Title: Regulation of pentose metabolism: elucidating the roles of catabolite repression, transport, and efflux.**

**Abstract:** The hydrolysis of lignocellulose yields a sugar mixture consisting primarily of glucose, arabinose, and xylose. A key step, therefore, in producing various chemicals and fuels from plant biomass will be to engineer microbial strains capable of efficiently fermenting these three sugars. However, one challenge concerns catabolite repression, which prevents microorganisms from fermenting these three sugars simultaneously. While much is known about glucose catabolite repression, far less is known about catabolite repression involving other sugars.

I will discuss some of our recent work investigating how the arabinose and xylose metabolic pathways are jointly regulated in *Escherichia coli*. During the course of these investigations, we systematically investigated the role of transport on pentose metabolism. One of our more interesting discoveries is that pentose sugars are actively effluxed from cells. These results will also be discussed in the context of metabolism and their role in the general stress response of cells.