This trend article about Pennsylvania State University, U.S., is an immediate alert from NewsRx to identify developing directions of research.

Study 1: A report, "Translation control of trpG from transcripts originating from the folate operon promoter of Bacillus subtilis is influenced by translation-mediated displacement of bound TRAP, while translation control of transcripts originating from a newly identified trpG promoter is not," is newly published data in Journal of Bacteriology. "Bacillus subtilis trpG encodes a glutamine amidotransferase subunit that participates in the biosynthesis of both tryptophan and folic acid. TRAP inhibits translation of trpG in response to tryptophan by binding to a site that overlaps the trpG Shine-Dalgarno sequence, thereby blocking ribosome binding," scientists in the United States report.

"Similar mechanisms regulate trpP and ycbK translation. The equilibrium binding constants of tryptophan-activated TRAP for the trpG, ycbK, and trpP transcripts were determined to be 8, 3, and 50 nM, respectively. Despite TRAP having a higher affinity for the trpG transcript, TRAP exhibited the least control of trpG expression. The trpG Shine-Dalgarno sequence overlaps the stop codon of the upstream pabB gene, while six of nine triplet repeats within the TRAP binding site are located upstream of the pabB stop codon. Thus, ribosomes translating the upstream pabB cistron could be capable of reducing TRAP-dependent control of TrpG synthesis by displacing bound TRAP." Expression studies using pabB-trpG-lacZ fusions in the presence or absence of an engineered stop codon within pabB suggest that translation-mediated displacement of bound TRAP reduces TRAP-dependent inhibition of TrpG synthesis from transcripts originating from the folate operon promoter (P(pabB)). A new trpG promoter (P(trpG)) was identified in the pabB coding sequence that makes a larger contribution to trpG expression than does P(pabB)," wrote H. Yakhrin and colleagues, Pennsylvania State University.

The researchers concluded: "We found that TRAP-dependent regulation of trpG expression is more extensive for a transcript originating from P(trpG) and that transcripts originating from P(trpG) are not subject to translation-mediated displacement of bound TRAP."

Yakhrin and colleagues published their study in the Journal of Bacteriology (Translation control of trpG from transcripts originating from the folate operon promoter of Bacillus subtilis is influenced by translation-mediated displacement of bound TRAP, while translation control of transcripts originating from a newly identified trpG promoter is not. Journal of Bacteriology, 2007;189(3):872-9).

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Study 2: After the corn harvest, whether for cattle feed or corn on the cob, farmers usually leave the stalks and stems in the field, but now, a team of Pennsylvania State University researchers think corn stover can be used not only to manufacture ethanol, but to generate electricity directly.

"People are looking at using cellulose to make ethanol," said Dr. Bruce E. Logan, the Kappe Professor of Environmental Engineering. "You can make ethanol from exploded corn stover, but once you have the sugars, you can make electricity directly."

Logan’s process uses a microbial fuel cell to convert organic material into electricity. Previous work has shown that these fuel cells can generate electricity from glucose and from municipal wastewater and that these cells can also directly generate hydrogen gas.

Corn stalks and leaves, amassing 250 million tons a year, make up a third of the total solid waste produced in the United States. Currently, 90% of corn stover is left unused in the field. Corn stover is about 70% cellulose or hemicellulose, complex carbohydrates that are locked in chains. A steam explosion process releases the organic sugars and other compounds in the corn waste and these compounds can be fed to microbial fuel cells.

The microbial fuel cells contain two electrodes and anaerobic bacteria - bacteria that do not need oxygen - that consume the sugars and other organic material and release electrons. These electrons travel to the anode and flow in a wire to the cathode, producing electrical current. The water in the fuel cell donates positive hydrogen atoms that combine with the electrons and oxygen to form water.

The microbial fuel cells were inoculated with domestic wastewater and a nutrient medium containing glucose, the researchers reported in the journal Energy and Fuels. Once established, the bacteria colonies were fed the sugary organic liquid obtained from steam exploding of corn stover.

The researchers, who include Logan, Yi Zuo, Penn State graduate student in environmental engineering, and Pin-Ching Maness, senior scientist, National Renewable Energy Laboratory, report that "the conversion of organic matter to electricity, on the basis of biological oxygen demand removal, was relatively high with greater than 93% of the biological oxygen demand removed."

In essence, there is no organic matter left to cause problems when disposing of the remaining liquid because there is nothing left to oxidize. The process converts all the available energy to electricity. The electrical production is about one watt for every square meter of surface area at about 0.5 volts. A typical light bulb uses 60 watts. To increase wattage, the surface area needs to increase. To increase voltage, fuel cells can be linked in series.

Study 3: Providing nutritional information with high school cafeteria lunch choices not only helps students to make better food choices, but also improves the students’ satisfaction with school lunch programs and dining room staff, according to a Pennsylvania State University study.

Unfortunately, the additional information does not improve opinions about dining ambiance or cost.

"Findings from this study illustrate the value of informed choice in yielding greater customer satisfaction with dining occasions," the researchers report in a recent issue of the Journal of Child Nutrition and Management. "Providing nutritional information at the point of service increased the student ratings of school nutrition programs that al-
ready were rated above average, especially in food quality."

While the researchers - David Cranage, associate professor of hospitality management, Martha T. Conklin, associate professor of hospitality management and Carolyn U. Lambert, associate professor of food systems management, all in Penn State's School of Hospitality Management - agree that more research is necessary to expand their findings outside the northeastern United States, they note that their findings mirror previous studies with adults.

The study looked at six schools in four school districts in Pennsylvania. In those districts where there were two high schools, one school was designated a control and the researchers asked the cafeteria personnel to do nothing unusual. In the other schools, the food services posted information, in the standard U.S. Food and Drug Administration's style for Nutrition Facts Labels found on all packaged foods, at the point where students had to choose between entrees. No other changes in food service were made from the previous six weeks.

Before the study began, students were asked to fill out a survey assessing their satisfaction level with the school nutrition program. After six weeks of nutrition information, the students were again given the survey assessing their satisfaction level with the school nutrition program.

A previous paper by the researchers showed that the nutrition information did, in fact, improve the healthy choices made by students.

The satisfaction survey showed that the student were also more satisfied with food quality and service quality. Even though the food did not change and one would expect the students' satisfaction with the cafeteria food to deteriorate over time and repetition, the survey found that "the students consistently rated appearance and quality of food higher."

In the control schools, the overall satisfaction with the food and service decreased.

The researchers also found that providing point of service nutritional information seemed to increase satisfaction with the service of the food, especially with the friendliness ratings of the foodservice staff, even though the staff was not supposed to change anything and was not to refer to the nutritional information signs.

"Giving students both choice and the information to help make the choice, gives students feelings of empowerment and self-determination," said Cranage. "This makes them feel good about the foodservice staff who supplied the choice and information."

The Penn State researchers do report that "nutrition information is not a panacea that creates a halo effect over the entire school nutrition program . . . nutrition information had no effect on student ratings of pricing, dining room ambiance or perceptions of menu variety." They note that this was expected as nutrition information would not influence perceptions of noise, temperature or cleanliness.

This article was prepared by Hospital Business Week editors from staff and other reports.