The nontherapeutic use of antibiotics in food animals, particularly as feed additives to promote growth, has continued to draw scrutiny due to concerns about its contribution to widespread resistance to antibiotics. (Photo © Chris Dawson/Stockphoto.)

director of the Centers for Disease Control and Prevention. If nothing else, excerpts from the hearing reaffirm the sharp divide among members of Congress over antibiotics, particularly their use in agricultural settings.

For example, consider the following comments from Rep. Joseph Pitts (R-PA) and Rep. Jan Schakowsky (D-IL).

“I find the rampant use of antibiotics for nontherapeutic purposes... alarming,” Schakowsky said during the hearing. “Many factory farms give cows, chickens, and pigs antibiotics in their daily feed. They are not treating any known diseases. They are promoting growth and compensating for bad sanitation. When antibiotics are used in livestock populations, it gets into our food systems and into our water supply. Using highly potent medications for this type of use continues to contribute to the increasing prevalence of antibiotic-resistant infections.”

“I believe that the legitimate and the judicious use of antibiotics in animal agriculture has been unfairly attacked and demonized in recent years,” Pitts said during the same hearing. “While every possible cause of antibiotic resistance should be studied and explored, I would hope that this series of hearings would focus more on areas where the science has told us there is cause for concern—and that is not the antibiotic use in animals.”

Fauci and Frieden sometimes found themselves caught in the crossfire, peppered with questions and comments from subcommittee members who appeared at times to want nothing more than support for their own strong views about antibiotics.

“I am not aware of evidence in this country that has documented the spread from animals to humans, feed animals to humans,” said Frieden of CDC, responding to insistent questions on that question from Rep. John Dingell (D-MI). “We have of course seen spread from animal to humans in a wide variety of infections.”

“From your questions, Mr. Dingell, and the questions we have from the other members, there is no doubt in anyone’s mind that if you give antibiotics to anybody, any animal, and you do it chronically, that resistance to microbes will evolve,” Fauci said. “The question that people are struggling with is that, if you develop the antibiotic-resistant microbe in an animal... getting antibiotics as part of feed, is that a danger to the health of humans by transferring of that microbe to the humans? And there is some data that says that is the case; that is European data.”

Later, in response to similar questions from Rep. Schakowsky, Fauci said, “There is strong evidence from Europe that suggests that there is spread between feed animals and people in that environment and that restricting the use in that environment for that antibiotic resulted in a reduction in the amount of resistant organisms in the community.”

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Ant Composting Provides Fodder for Biofuels Research

Leafcutter ants operate two-stage plant biomass degradation systems, with the early phase dominated by gram-negative bacteria and the later phase enriched with gram-positives and obligate anaerobes, according to Cameron Currie from the University of Wisconsin (UW) in Madison. He likens ant composting to the human variety, and describes both as “processes whereby a complex community of microorganisms degrades organic material under controlled conditions.” However, ants appear especially adept at degrading tough plant materials, including lignin, which proves a major obstacle for researchers and companies trying to produce biofuels more efficiently.

Mature leafcutter ant colonies are among the largest and most complex of any social insect, housing up to 8 million workers in elaborate subterranean networks of interconnected chambers. Foraging workers harvest large amounts of fresh plant material, which they chew, mix with ant fecal
Noteworthy Gene Transfers involving Microbes, Parasites, Insects, Fish

Dogma to the contrary notwithstanding, pea aphids carry genes encoding enzymes that produce carotenoids, pigmented antioxidants that other animals cannot produce and thus acquire from their diets, according to Nancy Moran and Tyler Jarvik at the University of Arizona in Tucson. Moreover, according to their phylogenetic analyses, “these aphid genes are derived from fungal genes, which have been integrated into the [aphid] genome,” they say. Aphids not only “are animals that make their own carotenoids,” the insects apparently acquired that capacity via gene transfers. Details appear in the 30 April 2010 Science (328:624–627). Separately, an analysis of the genome of the lake sturgeon reveals that it contains trematode genes, according to Andrew DeWoody and Matthew C. Hale of Purdue University in West Lafayette, Indiana, and their collaborators. Thus, this fish species carries at least 15 genes that were acquired from Schistosoma, a parasitic worm—apparently as a result of lateral gene transfer, they report in the April 2010 Genetica (138:745–756).

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Collaborating Physicists and Microbiologists Seek Common Lingo

The American Physical Society (APS) annual meeting last March in Portland, Ore., featured more than 100 presentations touching on microbiology and many others on cell biology. Early in the 20th century, physicist Ernest