real reason for the split, say Jason members, was that the group had rejected three members proposed by DARPA whom Jason saw as unqualified. Stripped of its DARPA support, which constituted nearly half of its budget, Jason was forced to cancel its 2-week winter study. Members privately fumed that their specialty—inventing and advising on technological wizardry such as non–Global Positioning System methods of geolocation and counterterrorism devices—was particularly valuable in the current geopolitical situation.

DDR&E—the umbrella for all defense research, including DARPA and each military service—helped set up Jason, says Will Happer, a physicist at Princeton University and a former head of Jason. "So we're back to our roots," he says.

The contract is expected to be completed by 1 May, and DDR&E officials have declined to comment beforehand. But DDR&E is said to be willing to almost match DARPA's $1.5-million-a-year contribution and serve as a conduit through which Jason's other clients—including the Department of Energy and the intelligence community—can funnel money and requests for studies.

The nature of those studies is likely to remain technical, not policy-oriented. "We're not a policy organization," says Jason's chair, Steven Koonin of the California Institute of Technology in Pasadena, "we just ain't." But Happer and Gordon MacDonald, a Jason senior adviser, say Jason's new home might boost its visibility. "More of Jason's recommendations could get the Pentagon's serious attention," says MacDonald.

This weekend's spring planning meeting will take place as scheduled, MacDonald says, although members will have to pay some of their own expenses. Koonin also expects the 6-week summer study to proceed as planned. "We may have taken a little hit on our cohesion," he said, "and maybe we've lost a little momentum. But we've got a full plate of topics for the summer."

—ANN FINKBEINER

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GENETICS

One Gene Determines Bee Social Status

Taking a cue from their colleagues studying fruit flies, honey bee researchers have pinned down a gene responsible for a key aspect of the sophisticated lifestyle of this social insect. Although they lack the brainpower of higher animals, bees and other organisms nonetheless exhibit quite complex behaviors. In the hive, for example, honey bees divvy up work, with females assuming different roles as they age, first tending to the young as nurse bees and later heading out to gather nectar and pollen for the queen and their nestmates.

Gene Robinson, an entomologist at the University of Illinois, Urbana-Champaign, and his colleagues report on page 741 that stay-at-home bees turn into foragers when a gene called *for* turns on. The gene is best known for its role in mediating fruit fly behavior—specifically, how actively a fruit fly seeks out food. "It's pretty remarkable that the same basic gene influences honey bee behavior in the same way that it does in fruit flies," comments Fred Gould, an entomologist at North Carolina State University in Raleigh. But *for* plays a much more complex role in bees than in fruit flies, controlling behavior during their development and, consequently, influencing their place in the hive's hierarchy.

Lot in life. Whether a honey bee tends the hive or collects nectar depends on one gene's activity.

Co-author Marla Sokolowski, a behavioral geneticist at the University of Toronto, Ontario, was the first to track down *for*, doggedly pursuing it for 15 years after noticing that some fruit flies were consistently lazier than others. It joined several other genes known to affect behavior in the lab—and more importantly, with *for*, Sokolowski was the first to show a gene that influenced behavior in the wild as well. In the so-called sitters, she found, the gene is less active than it is in their more energetic colleagues. It may be that slight differences in the gene's sequence cause variations in its activity, Sokolowski suggests, resulting in behavior that varies from fly to fly (*Science*, 8 August 1997, p. 763).

To find out whether *for* might play a role in the bee's developmental change from nurse to forager, Yehuda Ben-Shahar, a graduate student in Robinson's group, isolated the bee version of the gene and checked for its activity in the brains of both stay-at-home and food-gatherer bees. His approach "is an example of how biologists starting at the behavioral level are working down to the level of activity in genes," says Thomas Seeley, a behavioral biologist at Cornell University in Ithaca, New York.

Ben-Shahar and his colleagues found that the gene was more active in forager bees, just as it is more active in wide-roaming fruit flies. And that enabled Robinson and colleagues "to test our hypothesis in a more rigorous way," he says.

One possibility, for example, could be that older bees simply express more *for*, and the gene has little to do with switching jobs. To test this scenario, the researchers made an artificial colony in which all the bees were just 1 day old. Because there were no older foragers, some of the young bees left the hive in search of food 2 weeks earlier than they would have if they lived in a natural colony. These precocious foragers showed greater *for* activity than their more sedentary peers, the team found. In other words, age doesn't matter.

The Illinois group also looked at protein activity. The *for* gene codes for a cell-signaling molecule called a cyclic GMP-dependent protein kinase (PKG). When Ben-Shahar and colleagues treated other young bees with a chemical that stimulated PKG activity—similar to what would happen if the gene became more active—the bees were much more likely than control bees to start foraging, they report. There was no change in behavior when the researchers treated bees with a similar chemical that did not affect the protein's activity.

"They've connected the [*for*] gene to one of the biggest questions in social insects: how the work is divided up," comments Jay Evans, an entomologist at the U.S. Department of Agriculture Bee Research Lab in Beltsville, Maryland. Given that the gene affects behavior similarly in both bees and fruit flies, the work "gives more support that evolution solves a problem and keeps that solution in a wide variety of species," says Charalambos Kyracou, a molecular neurogeneticist at the University of Leicester, U.K. He and others expect that researchers will intensify their study of *for* in other species. Gould thinks the work may have an even broader impact: "My sense is [the finding] is going to give people more optimism about finding more of these behavioral genes."

—ELIZABETH PENNISI

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