In collaboration with Todd R. Golub, an HHMI investigator at the Whitehead/Massachusetts Institute of Technology Center for Genome Research and Dana-Farber, the team has used DNA microarrays to demonstrate that in human tumors, the expression of the cell-death suppressor *Bcl-2* is tightly linked to MITF. These experiments reveal that the link is present in both normal melanocytes and in malignant melanoma cells. Specifically, when MITF is present, the researchers have observed a rise in the amount of BCL-2 protein and suppression of apoptosis.

The results reported in the *Cell* paper also describe attempts by McGill and his collaborators to inhibit the activity of MITF in normal and malignant cells. Blocking MITF by infecting the cells with genetically engineered adenoviruses, they succeeded in killing both healthy and cancerous melanocytes. At the same time, they demonstrated that the process works in reverse; cells in which the *Bcl-2* gene was naturally overexpressed were able to survive the researchers' attempts to induce apoptosis by blocking MITF.

Now that a link has been established between MITF and *Bcl-2*, some researchers believe that a new chapter in melanoma research—and skin biology in general—has been opened. The team's findings "really fill an important gap of knowledge," says Meenhard Herlyn, a researcher at The Wistar Institute in Philadelphia who studies the mechanisms behind the transformation of melanocytes into melanoma.

Earlier research showing that *Bcl-2* is a suppressor of cell death has already inspired drug developers to conduct clinical trials with agents that seek to shut down the gene in cancer cells. McGill points out, however, that because *Bcl-2* is expressed in every cell of the body, drugs that inhibit it could give rise to unwanted side effects. MITF, however, is present only in melanocytes and a very limited number of other cell types.

Researchers in the Fisher lab are working to find agents that block MITF or interfere with its interaction with *Bcl-2* expression. These would have potential as targeted therapies for malignant melanoma. The task, says Fisher, is to "understand where within the pathway [between MITF and *Bcl-2*] there might be drugable targets."

—CAMILLE MOJICA REY

Baseball's Biochemist

On June 4, 2002, Matthew McCarthy, a new graduate of Yale University who had majored in molecular biophysics and biochemistry, was drafted by baseball's Anaheim Angels for its farm-team system, step one for players with major-league promise. A month later, while the lefty pitcher was perfecting his curve ball in Provo, Utah, his first scientific paper was published in *The EMBO* (European Molecular Biology Organization) *Journal*.

Baseball was McCarthy's ticket to science. In 1998, the Orlando high school pitching star visited New Haven and was sold on Yale after meeting baseball coach John Stuper, who had pitched the St. Louis Cardinals to victory in game six of the 1982 World Series, enabling them to play and win game seven against the Milwaukee Brewers.

McCarthy eventually took a biochemistry course taught by HHMI investigator Joan A. Steitz. I didn't have a passion for science, or biochemistry, until I took Joan's course," McCarthy recalls. "It was the best course I took at Yale. She's top-notch as a professor and a researcher. And she was then nice enough to give me a chance in her lab." When McCarthy asked if he could perform original research in the summer of 2001, he applied for and received an HHMI summer undergraduate research fellowship. He started working in the Steitz lab immediately after the baseball season.

McCarthy studied gene expression as a function of two different entities that splice out portions of RNA so that it can get translated into the correct proteins—the U2-dependent spliceosome and the U12-dependent spliceosome. He helped show that the U12 is much less efficient than the more common U2. The guess is that U2 probably gets sent up to bat when feedback loops in the cell determine that less protein should be produced.

The third author on *The EMBO Journal* paper reporting this effort was M.D.-Ph.D. student Abhijit A. Patel. "Joan and Abhi were great," McCarthy says. "Abhi made me feel at home and took the time to explain how experiments worked. They didn't treat me as a jock or a dim undergraduate—they treated me as a fellow researcher." Then again, McCarthy earned such treatment. "Never before in 31 years of teaching at Yale have I had an undergraduate work in the lab for as short a period as six months and truly deserve coauthorship," says Steitz.

Matthew McCarthy's baseball card lists his earned run average, strikeouts and other stats, but no mention of his published scientific paper.

While such praise is heartfelt, Steitz admits to having a soft spot for ballplayers. She and her husband, fellow Yale faculty member and HHMI investigator Thomas A. Steitz, are the parents of another recent Yale molecular biophysics and biochemistry graduate and pitcher, Jon, a top draft

pick by Milwaukee in 2001 and currently in the Brewers' minor-league system. Craig Breslow, yet another student in the same program, also became a Brewers' farmhand. (Apparently, understanding the biochemistry of anabolic steroids actually beats taking them.)

Most people probably don't think of Yale as a brimming source of baseball talent, but 17 players have signed professional contracts since Stuper took over the team in 1993. Going back further, major leaguers from Yale include pitcher Ron Darling, a member of the 1986 World Series-winning New York Mets, and original 1962 Mets player Ken MacKenzie, who returned to Yale to coach baseball in 1969.

Although fans may assume that professional ballplayers are all millionaires traveling to games in private jets, the minor leagues are called the "bus" leagues for a reason. "We traveled 17 hours to play a team in Canada and 14 hours to get to Billings [Montana]," McCarthy says. "We have 12-hour days—running, lifting weights, playing the games. It's definitely not as glamorous as you'd think. We stay in lots of crummy motels. But we are playing baseball for a living, and that's great."

While McCarthy is on the road, the Angels organization is focused on refining his talent. "They're making mechanical adjustments in my delivery, so my velocity is down a bit and at times it's hard to hit spots, especially when facing good competition like Prince Fielder." Fielder's dad is former major-league slugger Cecil Fielder, a genetic legacy McCarthy and his biochemistry buddies can no doubt appreciate more than most other minor leaguers.

Despite McCarthy's athletic promise, "I predict that Matt will leave his mark in the field of medicine," Joan Steitz wrote in a reference letter for McCarthy. The 22-year-old's experiment with baseball, however, will make medicine wait. He's put off applying to medical schools. First, he hopes to move up the Angels' minor-league ladder in 2003 and play for the Cedar Rapids Kernels.

Dwight Gooden was called "Doc" when he pitched for the Mets. Perhaps pitcher Matthew McCarthy will take the mound one day having truly earned the nickname.

—STEVE MIRSKY

Aquariums Teach Ecology and Local History

Christina Langbecker's 3rd-grade social studies class at the Side by Side Community School of South Norwalk, Connecticut, is preparing for a field trip to the nearby shore. But first, they have to find their way.

With compass and city map, the students chart their course to the local beach, where each is responsible for finding an animal—a blue crab or an oyster, for example—in its natural environment. Some students search the sandy shore while others investigate a rock jetty or a salt marsh—the three major habitats of the Long Island Sound. They are trying to understand why some animals prefer one kind of home and others favor entirely different conditions.

Why study marine science in a social studies class? Because, as the students discover, the ecology of Long Island Sound and its various types of marine life and habitat are intricately linked with the history of the people who live and work there. Oyster harvesting, for example, is a centuries-old way of life along the Connecticut coast.

"This is like the Berlitz Method of learning science: total immersion," says Marie Iannazzi, interim director of the Side by Side school. After Langbecker's 3rd-graders finish their marine-animal scavenger hunt, for example, they discuss the relationships between the plants and animals of the sound and their habitats, they compare animals in the aquarium and those in their natural environments, they investigate the kinds of industries along the shore and how they might affect marine life and they design and carry out experiments. The students also paint murals of the sound's plants and animals.

At the end of their projects, each 3rd-

Rick Sigmund, an educator at Norwalk, Connecticut's Maritime Aquarium, helps 3rd graders from the Side by Side Community School explore local marine life at nearby Calf Pasture Park.