

## Bringing Biology Back to Croatia

Biologist Miroslav Radman dreamed of returning to his native Croatia to build a world-class life sciences institute. Then someone gave him a villa to put it in

PARIS—When Croatia’s independent radio station Radio 101 conducted a poll late last year to find out who was the most popular person in Croatia, President Stipe Mesic—the country’s first successor to nationalistic leader Franjo Tudjman—came out on top. No surprise there. The second-place finisher, however, was more of an eye opener: Just trailing the president, instead of a rock star or one of the handful of Croatian basketball players in the NBA, was biologist Miroslav “Miro” Radman.

Radman, a tall, 60-year-old, curly-haired fisher’s son, is perhaps best known among scientists for proposing, as a visionary 26-year-old, the existence of “SOS” repair, an alternative DNA synthesis mechanism that cells can use when damaged DNA halts the progress of the standard procedure. Others would argue that his finest hour was his role in uncovering the mismatch-repair system, a mechanism that detects and fixes incorrectly paired bases and so helps ensure that DNA replication is accurate. Radman also showed, in 1989, that the mismatch-repair machinery prevents recombination between chromosomes with similar, but not identical, DNA sequences and in that way deters genetic exchange between species.

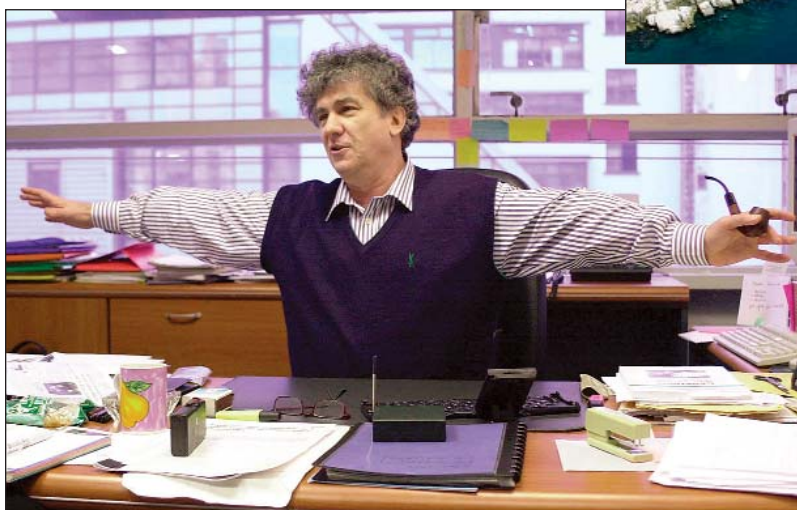
In Croatia, however, Radman enjoys another sort of celebrity. On his desk at the Necker Medical School in Paris, just next to his pipe, lies a high-tech cellular phone that links him directly to Croatian Prime Minister Ivo Sanader, for whom Radman serves as special science adviser. Croatian journalists never miss a chance to write about him, and he has also communicated directly with his compatriots through the “Laboratory of Miroslav Radman,” a column he used to write for the Croatian edition of *Playboy* magazine. “Miro has the ability to explain very complicated scientific issues in a sim-

ple way. He’s unique. He’s charming. People like him very much,” says Tanja Rudez, a science journalist at the Zagreb daily *Jutarnji list* and author of *Miroslav Radman, the Man Who Broke Down the Genetic Wall*.

Radman currently co-directs a 25-member lab at the Necker Medical School with former students François Taddei and Ivan Matic. He has followed up on his earlier work with a string of high-profile discoveries suggesting that mutation-prone bacteria—so-called mutator strains—play a key role in bacterial evolution. But he is now setting off on a new adventure that promises to make more scientific waves back home in Croatia. Last November, former Croatian science and technology minister Gvozden Flego handed Radman the keys to Villa Dalmatia, a seaside re-

wheeling “factory of ideas,” a modern-day Florentine academy, “boiling” with conferences, research courses, and high-risk, open-ended science. “Modern research is sometimes like a symphony orchestra,” Radman says, in which all the people know what to do and where they’re going. “I want instead a jazz band, where you don’t know what you are going to play and where each player stimulates the creativity of the others. You’d love to answer questions that you couldn’t even dream about. That’s real innovation.”

Radman takes his inspiration from Cold Spring Harbor Laboratory in the mid-20th century—when summer courses and symposia attracted many of the world’s molecular biology pioneers and helped launch the fledgling field—and also from Rockefeller University and the now-defunct Basel Institute



**Big plans.** Miro Radman’s dream of a biology hothouse on the Adriatic coast is turning into reality at the Villa Dalmatia complex.

treat of former Yugoslav leader Marshal Tito nestled among pine and cypress trees near the ancient Roman city of Split. Here, Radman will soon open the doors of the Mediterranean Institute for Life Sciences (MedILS), an independent, international, English-language research hub where, Radman hopes, young scientists will flock from far and wide to test their most ambitious and original hypotheses.

In an era dominated by big, conservative science, Radman dreams of creating a free-

for Immunology. He wants to foster the same kind of intellectually charged, free-spirited atmosphere in Split. The center would be home to a small core of established scientists who would act as mentors to a continual flow of young scientists from around the globe, as well as promising locals. Around 40 would be in residence at any one time. Eventually, Radman hopes to confer graduate degrees. “We’d like to create this atmosphere, this multidisciplinary milieu, where young scientists can grow their own scientific personalities,” he says.

The idea of creating an international research center on the Adriatic coast first arose more than 30 years ago at a 1971 meeting of the European Molecular Biology Organisation in Dubrovnik. Radman and microbiologist Marija Alacevic took up the cause. Cold Spring Harbor director James Watson offered to help finance the center with a “Milislav Demerec fund,” in memory of the late Croatian microbiologist and longtime Cold Spring Harbor director. But the project was ultimately quashed by Yugoslav

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politicians. “We had a legal structure, we even had an official seal. We spent a lot of energy and time, and we were very disappointed,” says Radman. “I said to myself, ‘Never again.’”

But in early 2000, after a decade of war and Tudjman’s hard-line rule, voters elected to replace Tudjman’s Croatian Democratic Union party with a forward-looking, center-left coalition. After the election, the new science and technology minister, mathematics professor Hrvoje Kraljevic, used his first public appearance to declare that he would do everything in his power to revive Radman’s all-but-forgotten dream.

Four years later, the Croatian government has spent more than \$1.7 million renovating the dilapidated but splendid villa complex, particularly the cloisterlike soldiers’ barracks that will house the institute’s labs, and Prime Minister Sanader and new science minister Dragan Primorac have pledged continuing support, calling the project a national priority. The city of Split has set aside an area as a future academic campus that would encompass both MedILS and the nearby former workshop of famous Yugoslav sculptor Ivan Mestrovic. The center should be ready to host conferences, courses, and active research by early next year.

Radman still faces a big challenge: raising money to pay the institute’s running costs, which he estimates at \$10 million per year. He is making the rounds of various philanthropic agencies in the hope that one or more big spenders will help bring his dream to life. “This may all be naïve,” he admits. “Well, it is naïve, unless it works one day.”

A long list of Nobelists and other scientific luminaries have already signed up to endorse Radman’s vision. “Frankly, I think it’s a terrific idea,” says Richard Roberts, a 1993 Nobelist for his role in discovering RNA splicing and currently a research director at the Boston-area biotechnology company New England Biolabs. “And Radman has the ideal personality for the job: He’s outgoing, he’s flamboyant, and he has lots of charm.” Many, including Roberts and DNA repair expert Errol Friedberg of the University of Texas Southwestern Medical Center at Dallas, have offered active help.

Those who know him are not surprised that Radman is answering the call to return to Croatia. Although his career has earned him a secure spot at the top of the French scientific establishment, making him only the second Croatian ever accepted into the elite Académie des Sciences, Radman has always felt the tug of home. His office wall in Paris is adorned with a photograph of his seafaring father, who in his 90s still rows out to fish every morning. Radman “knows all the fishing spots of his islands and loves taking people there. And he knows the names of the fish

in every language,” says Taddei. “Returning to his native country has been Miro’s dream for many years,” says Friedberg. “He’s long had a joke about going home and creating a ‘Warm Spring Harbor.’”

Rudez says that the country is ready to host such an institute: “We are at the beginning stages of a democratic society, and we are fed up with war and other problems. We

are always looking for ways to live better.” For Radman, whose wife is Serbian born, the possibility of helping his troubled region heal its wounds is also a driving force behind his plans. “There were difficult times emotionally, during this horrible war, but if it’s not the scientists, who can look forward?” he says.

—PETER FOLLETTE

Peter Follette is a writer in Montpellier, France.

## Marine Science

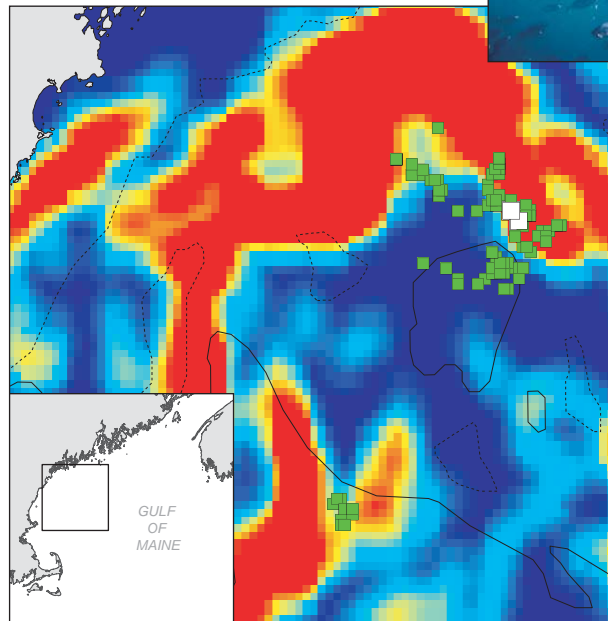
# New Tools Reveal Treasures at Ocean Hot Spots

Biologically rich ocean “fronts” attract marine life—and could be candidates for conservation, too

“There is nothing so desperately monotonous as the sea,” the 19th century poet James Russell Lowell once grumbled after a voyage far from familiar landmarks. But the bored bard might take heart from some new work by marine scientists that is vividly exposing hidden “hot spots” in the open ocean serving as magnets for marine life and potential targets for conservation.

“We know the ocean isn’t some uniform blue zone on a map,” says fisheries scientist Boris Worm of the Institute for Marine Science in Kiel, Germany, one of a growing group of marine hot-spot mappers. “But finding ways to visualize its structure has been a challenge.”

A wave of recent papers, however, is helping fill in the blanks. These papers highlight new techniques for merging information supplied by everything from orbiting satellites to tagged whales. The studies are helping researchers understand how some at-risk species, such as bluefin tuna and blue whales,



**Front-runners.** Bluefin tuna schools congregate near edges of cool and warm water masses that concentrate food, such as these in the Gulf of Maine.

congregate along oceanic “fronts” where cold and warm water masses collide.

A better understanding of these biologically rich areas, however, leads to some new questions. One paper finds that the typically ephemeral fronts can persist for unexpectedly long periods in certain parts of the ocean, creating wildlife-rich “meadows” that could be candidates for protective reserves. Yet, a related line of research suggests that pelagic (open ocean) refuges would have to be designed carefully to avoid doing more harm than good.

The findings provide “a better idea of how we can