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by Scott Huler

NEWS

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# Hanging On To A Research Grant For Decades: What's The Secret?

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Wisconsin  
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Oliver Nelson:  
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Scan the lists of grants awarded by the National Institutes of Health or the National Science Foundation and you'll find that there are several hundred scientists who seem to have the knack of finding a funding source and keeping it -- not for the one or two renewals that most scientists consider the answer to a prayer, but for two or three decades. How do they manage this?

Scientists whose research has earned them decades-long stretches of government funding deny that there is anything special about their work -- and some funding agency officials agree.

"I'm not sure there's a formula except doing good science," says Anne Dieffenbach of the Office of Research Reports at NIH's National Institute of General Medical Sciences.

Nonetheless, says Bruce Umminger, division director of the NSF division of integrative biology and neuroscience, "I think there are certain characteristics these scientists share."

Indeed, the scientists interviewed for this article have certain traits in common that, while not a guarantee of 40 consecutive years of support, can function almost as a how-to list for doing good science. And good science often leads to consistent funding. The key to steady funding does not necessarily lie in the practical applicability of one's research results. "The research that has come from my lab," says Oscar Ratnoff, a professor emeritus of medicine at Case Western Reserve University, "has only occasionally had pragmatic interest."

Ratnoff has spent a large portion of his time studying the initiation of blood clotting as it occurs in a test tube, but rather than winnow one idea

down to a more and more minute approach, he has studied clotting properties in blood from every conceivable angle. Ratnoff received his first NIH grant to study these properties in 1951, and he's still funded by NIH today.

Researchers successful in getting serial grants "are people with the bigger picture," says Umminger. "There are people who get narrower and narrower, but not these people. They have novel, creative ideas. They are not static."

Keeping Current Kenneth Brinkhaus, Alumni Distinguished Professor of Pathology, emeritus, at the University of North Carolina, takes this idea one step further. Brinkhaus, who has received continual NIH support for 45 years, says the key to his funding success has been keeping up with the state of the art.

"I think you have to keep current," Brinkhaus says. "You have to be dealing with current problems and modern methods." He describes how his own work in blood coagulation and hemophilia, which involves keeping hemophiliac dogs healthy, started out using such methods as organ transplant. But "right now," he says, "our focus is on gene therapy--this focus has developed in the last three years."

Working With Others This change, like others over the years, has required Brinkhaus to learn new techniques and, when a required technique was not easily mastered, to collaborate. "I'm not a molecular biologist," he says. "I'm more of a pathophysiologicalist. So we work with other groups."

Collaboration is a hallmark of successful scientists, says Umminger. "They cross boundaries," he says. "They tend to go where the problem is taking them. They say, 'This is an interesting question, but I don't have the skills to solve it.' Then they solve the problem, either by learning the techniques themselves or collaborating with scientists who can do them."

As Brinkhaus notes, "It's really collaborative--the people on the other side are looking for someone to work with, too; so it's a two-way street."

Following The Problem Following the problem wherever it leads is recommended by other researchers, as well. "Just doing science that interested me, trying to pick out things that were important problems" is what Oliver Nelson, an emeritus professor of genetics at the University of Wisconsin, Madison, cites as the key to his grant longevity.

Working on plant genetics, he received an NSF grant in 1956, which he kept "up until the early 1970s," he recalls, when he joined the Wisconsin faculty. For a year or so he was included on the project grant of an associate, and then he reapplied for an NSF grant in 1975, which he kept until he retired in 1990.

For scientists interested in developing an equally impressive record of securing grants, Nelson has some simple advice.

"Do a bit of thinking," he says. "Find out where the real problems lie and stick with them. Stay flexible and pick up new techniques, moving into new areas to tackle those problems" when necessary.

Like Brinkhaus, Nelson mentions collaboration as a major part of his research. "We ultimately got into examination of transposable elements on a molecular basis with Nina Federoff, of the Carnegie Institution of Washington, D.C.," he recalls. "She helped us--or we helped her--to actually isolate the first gene by transposable element tagging in plants."

**Taking Time Off** Another method Nelson suggests for remaining flexible is creative use of sabbaticals. Biochemists with whom he was working "couldn't tell me what the function was that was encoded" in a gene he was examining, he remembers, "so I used a good part of a sabbatical year [at the California Institute of Technology] to work that out. It was an interesting problem I worked on in my sabbatical year, along with doing some reading and thinking."

>From Umminger's perspective, the reading and thinking may be as important as doing the work itself.

"These people periodically make use of sabbaticals," he says. "After a point, you have to reinvigorate. Take a sabbatical--go to labs abroad, pick up new techniques. Get connected with the bigger picture of things, where you can get access to unusual organisms." Researchers whose work wins continual support "tend to not shy away from new technology," Umminger adds. "They know that the future of science is in new technology. A lot of people were trained [in certain specific methods] as postdocs and want to stick with those techniques; not these people."

Regarding the long-standing grant holders, Umminger says, "There are a couple things these people use to stay creative." Beyond creative sabbatical use and collaboration, he believes that the most successful scientists surround themselves with young researchers.

"They generally have a lot of young people in their labs," he says, "who question their professors, keep them on their toes. The young people gain from this arrangement, but the investigators gain, too."

One person who agrees with this is Lynn Riddiford, a professor of zoology at the University of Washington.

"You have to have postdocs, graduate students, and undergrads," she says, describing her lab, which focuses on hormonal control of metamorphosis in insects.

"I like to give the students something to do," that is not crucial, "but I assume they'll do something [instead]," she says, describing the freshness young researchers bring to her lab. "That's how often we'll go off in a new direction."

The students ask an unexpected question, or perform an unexpected task, and suddenly an anomaly appears. "And that often becomes the next grant application," she says.

Riddiford has had her NSF grant since "the late '60s," she says, shortly after Rachel Carson published *Silent Spring* (Boston, Houghton Mifflin Co., 1962), which awakened the environmental consciousness of the world. Riddiford's approaches to pest control through natural means were thus well-received.

Still, her methods have changed over the years, following the progression from topic to topic that characterizes the path of a successful researcher following a problem.

"I started out doing whole-animal endocrinology," she recalls. "Now we've begun changing particular genes."

Though she has worked mostly with *Manduca sexta*, the tobacco hornworm, she has found ways to apply results of studies with *Drosophila* to her work.

Further, she even went on one sabbatical to Nairobi "to work on tsetse flies," she says. "Mainly to have some experience in Africa."

Put these characteristics together--boundary crossing, a big-picture approach, the willingness to learn new skills and work with young scientists, and the ability to collaborate with other researchers--and you get a pretty solid list of attributes that consistently funded scientists have.

**Tips For Young Scientists** Many young investigators wonder how crucial frequent publishing and submission of timely grant applications are for a grant's longevity. Regarding publishing, of course, there is no way around it. "They have to be productive," says Umminger. "If they don't publish papers, when they come in for their renewal they're not going to get funded."

Riddiford even has a special take on publishing. "I prefer to publish substantial papers rather than little ones," she says. It's important, Riddiford adds, to "be critical of your own work--be really sure [of its value] before you publish." This may not keep your name in print as often as other approaches, she says, but it keeps your work at its best.

Regarding such issues as timeliness, Delill Nasser, program director for genetic biology in the biological sciences directorate at NSF, says simply,

"that doesn't get you grants--filling out your forms on time makes you a good accountant, not a good scientist." When all is said and done, says Brinkhaus, after one year or 30 years, the process remains the same. "My own reaction is that every time you put a grant in, it's like the first time," he says. "You never know whether you're going to have to go back and reassess. I certainly don't feel certain."

Maybe in the final analysis it's the certainty of not being certain that connects all good--and well-funded--scientists.

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