Anne Ridley

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Watching cells go about their business converted Anne Ridley from the viola to the microscope so it's fitting that she was the first winner in 2000 of the British Society of Cell Biology's Robert Hooke Medal. If Hooke, a 17th-century English polymath, is remembered at all today, it is usually for losing a bitter feud with Isaac Newton. However, it was Hooke who named the cell. Studying a section of cork through a primitive compound microscope in 1665, Hooke was reminded of monk's cells, "cellula" in Latin and "cell" hereafter in English and wherever cell biology is spoken. And Ridley is fluent in cell biology, worldwide.

Based at the Ludwig Institute for Cancer Research in London, and active in the British Society for Cell Biology (BSCB), Ridley was elected last year to a three-year term on the ASCB Council. The ASCB is a society that she has long admired for the sheer variety and accessibility of the Annual Meeting. "The ASCB poster sessions are like walking around in a city and bumping into the most amazing people," says Ridley. She is also taken with the strong leadership style of many American women in cell biology, such as ASCB Past-President Zena Werb and Sally Zigmond.

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As a researcher, Ridley is best known today for pioneering the Rho family of GTPases, according to Laura Machesky. Machesky is now at the University of Birmingham in England. She says that it was Ridley's work on Rho and its growing family of close relatives, first with Alan Hall and then on her own, that opened up the critical upstream molecular biology of the cell migration pathway. Cell migration is considered an area with significant clinical implications today in cancer, immune disorders, and heart disease.

Yet Ridley very nearly became a professional viola player. It was Hooke's microscope—or at least the visual element of cell biology—that finally fired her imagination as a graduate student at the Imperial Cancer Research Fund Laboratories (ICRF) in London (now Cancer Research UK). Ridley's 1985 undergraduate degree was in biochemistry, but her passion at Cambridge University had been music. Ridley says that she probably spent more time at Cambridge in orchestra rehearsals than in labs. "I knew I had to make a decision. I'm glad that science won, but it was close," she says.

Tim Hunt, the Nobel laureate now with Cancer Research UK (London Research Institute), was Ridley's "Director of Studies" at Cambridge. His first encounter with Ridley was "memorable," Hunt recalls, but for the wrong reasons. Ridley waltzed in late to his supervisory group meeting, bringing her viola and a not very sincere apology about a university orchestra rehearsal running overtime. "Naturally I felt a little 'dissed' and more than a little skeptical about her prospects," says Hunt. "But then my attitude changed dramatically."

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Each member of the supervisory group was required to present a current literature review on a research topic. Ridley did T-cell receptor cloning and left Hunt, in his own words, "flabbergasted. She absolutely mastered the topic. It was awesome." After that, Hunt pushed and prodded Ridley toward graduate studies in biology, not music. Looking back, Hunt says, "Anne was definitely worth the effort."

Ridley's graduate advisor at the ICRF was Harmut Land. In his lab, she studied the GTPase Ras in cultured rat Schwann cells, stopping and starting the cell cycle by manipulating Ras. Ridley remembers, "We were making videos—films in those days—and I realized that the thing I really enjoyed was putting the cell lines under the microscopes and seeing whether they'd stopped growing. I loved watching the cells."

Since 1993, Ridley has been at the Ludwig Institute in London, where she holds a University College London joint appointment in Biochemistry. A changing cast of 14–18 postdocs and graduate students, plus technicians at her lab, use a wide repertoire of molecular and biochemical techniques, including RNAi screening, to study the Rho family of GTPases.

Nonetheless, Ridley insists that newcomers take a good look first. "Everyone should watch and see what their cells actually do. Cells are not just buckets that you lyse open to get at the stuff inside."

There are wonderful researchers who study "the stuff inside" lysed cells, and there are wonderful researchers who make breakthroughs from watching whole cells; but when you have someone who can do both, you have someone like Anne Ridley, says Alan Hall. Hall recently moved to New York to become the Chair of Cell Biology at the Memorial Sloan-Kettering Cancer Center. He credits Ridley's postdoc with him in the early 1990s at the Institute of Cancer Research in London as a major stroke of "my good fortune."

Ridley arrived in his lab just as Hall was changing directions from Ras to Rho, a submember of the Ras superfamily. In 1990, Rho was a black box protein. Hall knew only that Rho in its activated state seemed to trigger a collapse of the actin cytoskeleton in fibroblasts grown under certain conditions. With Ridley's grounding in biochemistry—plus what Hall calls her "green fingers" for fibroblast cell culture—they closed in on Rho. By microinjecting fibroblasts with a bacterially derived enzyme that inhibits Rho, they revealed Rho's pivotal role in actin filament assembly and organization. That work led Hall and Ridley to discover the function of Rac, the first of a whole clan of Rho relations. This family has now been linked to everything from cancer cell migration to arterial inflammation.

Ridley and Hall's 1992 papers on Rho and Rac caused a sensation in the cell motility community, according to Gareth Jones, now at King's College London. Jones heard Ridley present a poster on the groundbreaking experiments at a Cold Spring Harbor symposium shortly before the work's publication. Jones recalls, "People were milling around the poster, and I was but one of many participants who recognized the huge significance of what I was seeing. After years of describing how cells moved in culture, here I was reading about the control of the molecular machinery involved!"

Ridley was the fifth of six children born to a pair of Oxfordshire petrochemists with a strong musical streak. All six Ridley children eventually took university science degrees. All six also took music lessons. "What were my parents thinking?" says Ridley with a laugh. "Six of us practicing at home! It must have been bedlam." It must have been effective, too. Four out of six became professional scientists and although none became professional musicians, they still play music. Ridley herself is married to a professional pianist and music teacher, Edward Kay. They live in the city of St. Albans, north of London, with their two daughters, Emily, who is 13, and Rachel, who is 11. Both girls take music lessons, says their mum, but not from their parents.

Between family, lab, and commuting between them, Ridley has finally had to give up playing in London amateur orchestras. She now limits herself to strictly private chamber music sessions with friends. "We sit around and play not very difficult music. The idea is just to have fun," she says.

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Beyond the renowned researcher and the talented musician, there is yet another side to her friend, says Machesky. "When you first meet Anne, you get the impression that here is someone very quiet and reserved. But then give her a glass of beer, [and] you'll discover that Anne has the most wicked sense of humor." ■