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Richard O. Hynes

Richard Hynes grew up in Liverpool, England with science all around him: his father is a freshwater ecologist, and his mother is a physics teacher. They always had *New Biology* and *The New Scientist* around to read. By the age of eleven, Hynes had developed a special affection for biology. "We just grew up with that way of thinking about things," Hynes explains, "it was a very exciting time in biology." This early passion for biology is still apparent in Hynes today.

Hynes remembers Liverpool in the 50s as "a great place to be." During those years he went to a large city high school "with superb teachers." Hynes credits the British school system with enabling him to focus on science at a very young age. He recalls that "three afternoons a week we were in the lab doing experiments. We had a very good biology teacher and I just loved it." Such was the excitement that his sister and both his brothers are scientists as well. Hynes attributes this in large part to the British education system that enables students to focus on one area from an early age. "If you know what you want to do," he explains, "it's very good. It's not that we didn't do anything else, but there was definitely a concentration." Hynes also recalls that concentrating on biology rather than physics or chemistry was a bit unusual at the time (outside the Hynes clan), but he was fascinated by it. "I just liked doing experiments: it was fun", he summarizes simply.

The 50s was of course also an important moment in the birth of Liverpool's place in popular culture. Before the Beatles became popular, Hynes had attended the same high school as Paul and George. By the time Hynes graduated high school at the end of 1962, the Beatles had started to take off.

Hynes had finished his academic requirements in England, "and was getting bored and starting to cause trouble so my parents shipped me overseas to learn something else". He took some courses at the University of Massachusetts at Amherst where he was kept out of trouble by a faculty member who was a colleague of Hynes' father.

When Hynes returned to the UK, he matriculated at Cambridge University, where he initially vacillated between biology and physics. He admits he "couldn't really handle university physics" his first year, so decided to focus on biology. Hynes recalls Cambridge as "spectacular." The molecular biology laboratory at Cambridge was in its heyday, producing many of today's distinguished cell biologists including Tony Hunter, Bridget Hogan and Pippa Marrack among many others. As undergraduates, Hynes and his cohorts spent four days a week in the lab. "Tim Hunt was my TA in biochemistry, and was a very good and inspiring teacher. I remember working with him on experiments to determine how long it takes a ribosome to make a step and how many ribosomes there are in a polysome."

Following college, Hynes went from one Cambridge to another, enrolling at MIT for graduate studies. "I didn't want to stay in Cambridge [England]," he says, "because it was a bit insular, and I wanted a change." Hynes was interested in eukaryotic molecular biology and cell biology, study that at that time was richer in the US. Hynes enjoyed his graduate years not only because he was able to study what he wanted, but because of the great teachers at MIT. He worked with Paul Gross on maternal messengers in early embryos during a very active time in the field of developmental biology. Hynes also reveled in American culture of the late 60s and early 70s and spent much of his free time skiing and hiking. But as much as he enjoyed his five years as a graduate student in the US, he always intended to return to England.

When Hynes did return, it was to do his postdoc at the Imperial Cancer Research Fund because ICRF was at that time an "up and coming" place, says Hynes. He set himself to investigate the changes in the surfaces of cells when they become tumor cells, a field in which he continues to work today. Along the way he and others independently discovered fibronectins. The discovery of fibronectins "opened up a whole field of things to do, and I have been playing around with it ever since. I never thought I would stick with one thing for 20-plus years."

During Hynes' tenure at the ICRF, the field of cell adhesion began to emerge rapidly. Hynes characterizes the work up until that time as "pre-molecular," becoming "molecular" in the early 70s, primarily because of the technology that enabled new research methods. Hynes feels he was lucky that his work on tumor cells and cell surfaces was and continues to be successful. He was able to show a clear difference between normal and tumor cell surfaces because, "when you get the experiment to work, you can't miss it."

In 1975, Hynes finished his postdoc and was offered an opportunity to return to the Biology Department at MIT. Hynes rose to Chairman of the Department and now serves as Director of the Center for Cancer Research. He observes proudly that fundamentally MIT in the 1990s is little changed from when he was a student in the 1970s: "MIT is committed to teaching as well as research; it's not very hierarchical and

anyone's opinion carries weight if it has merit." ASCB member and Education Committee Chair Frank Solomon has been Hynes' lab neighbor for many years and says that Hynes "contributes on about 25 different levels to MIT, teaching, advising, researching, and administering. Richard has also done an amazing job of fostering his students' careers." His first graduate student, Denisa Wagner, who is now at Harvard's Center for Blood Research, agrees with Solomon's assessment of Hynes. She says, "he is a great mentor. I still use him as an advisor and try to reproduce his skills with my students. He is very wise, calm, modest, and generous."

Hynes' lab now focuses on modern molecular approaches to understanding the role of adhesion in intact animals. "When it became possible to manipulate the genetics of mice, we began to look at what happens if you take away some of the adhesion molecules," he explains. This enables his lab to make animal models for several human diseases involving all adhesion. Hynes laments that this kind of animal research has become very expensive, accessible mostly to people who enjoy extraordinary support, as he does as a Howard Hughes Investigator. Hynes takes a great deal of pride in his students and he encourages his postdocs to carry their work with them when they leave, noting that "it is very satisfying to see what your graduate students and postdocs do with their work after they leave." He continues to enjoy teaching, and operates on the belief that research and teaching are inextricably intertwined.

Hynes' work on the molecular basis of cell adhesion has important applications. Hynes is inspired by the prospect of clinical applications and explains that "if you understand the molecules that stick cells together and stick them to their substrates, that is the receptors that mediate those functions, you realize that cells have to stick to do virtually anything. Without cell adhesion they tend to die. If you understand the receptors you can manipulate them." Hynes further explains that, "receptors and integrins were discovered in the mid 1980s and now there are already drugs on the market that are targeted to those receptors," drugs that block adhesion of blood platelets and control thrombosis and, before long, will block adhesion of white blood cells and will be used to control inflammation.

Hynes currently serves on the ASCB Council and joined the editorial board of *Molecular Biology of the Cell* at the invitation of his former teaching partner David Botstein, *MBC's* Editor-in-Chief. Hynes, one of the most productive Associate Editors, explains that he enjoys reviewing and editing, and thinks "it's important to review papers stringently and fairly." Botstein fondly remembers the courses he and Hynes taught together: "we were trying to teach students how to read a paper, and Richard was a very good Socratic teacher and a major figure in the field of cell biology." Hynes has served the ASCB in many other critical if less visible capacities, from Annual Meeting Program Committee member to Major Symposium speaker to his current chairmanship of a committee to advise Council on the electronic publication of *Molecular Biology of the Cell*.

Hynes lives in the Boston suburb of Winchester with his wife, Fleur, a grade school teacher. Their two sons, Hugh and Colin, both attended Princeton. Hugh will begin graduate studies at the Architecture School at Columbia University in the fall. Colin, a senior at Princeton, is contemplating medical school, but this summer worked with horses on the outer banks of North Carolina. Ever English, the family enjoys the fruits and labor of their large backyard garden during the summer. Come winter they take to the ski slopes of New England, Colorado or Utah and enjoy the rich classical music scene in Boston.