



## Her heart yearned for Boston: a few questions for Christine Mummery

**T**he *JCI* recently caught up with stem cell researcher Christine Mummery, best known for her work on cardiomyocyte differentiation of human embryonic stem cells (hESCs). Mummery, who did her training in the UK but leads a lab at the University of Utrecht in the Netherlands, has taken the last few months to pursue a sabbatical at Harvard in the labs of Kenneth Chien, director of the cardiovascular research center at the Massachusetts General Hospital, and Kit Parker, head of the Disease Biophysics group in the School of Engineering.

*JCI:* What made you decide to take a sabbatical at this stage of your career?

Mummery: We [my group] realized that even if we had a huge supply of heart cells with the right phenotype, it was going to be really tough to make them behave properly in the injured or diseased heart. I'm originally a biophysicist by training and thought it could be very valuable for my group if I developed some of those skills. Parker's group trained me in the basics of engineering 2D cardiac tissue. They also study cardiomyocyte shape in relation to force of contraction, and I thought it would be interesting to see how this related to electrical activity. So in my "goody bag" of reagents, techniques, and protocols that I'm leaving with are some stamps for microcontact printing, making cardiomyocytes line up in rows or forcing them into squares and rectangles, which determines the force with which they can contract. In Chien's lab we've shared our common interest in the identity and properties of cardiac progenitor cells, Chien coming in from the mouse heart, me from hESCs, where we now both overlap. Potential competition you might think, but it has been delightfully open on both sides, and we've done our best to help each other.

*JCI:* What is your take on the US restrictions on stem cell research, and have you found that they have any impact on your work here?

Mummery: Incredibly different from Holland, where I work, and the UK, where I come from. It seems Europeans accept the surplus embryos resulting from IVF as an essentially unavoidable caveat in the procedure and that as long as society and law accept it, we are obliged to think about what to do with those embryos. There has not been an outright ban on IVF, and IVF/embryo research and

stem cell derivation has not been mixed up with the abortion issue, as in the US. I think that is probably the greatest difference. The fellowship I received to be here is jointly from the Radcliffe Institute and the Harvard Stem Cell Institute (HSCI). Part of the purpose is to hear talks given by the other Fellows, which can range from history to theoretical physics. One of the Fellows this year is Francis Kissling (formerly of Catholics for a Free Choice). In her talk she discussed the abortion issue in the same way we discussed it in my youth: pros of sex education, contraceptives to minors, women's rights . . . I could hardly believe these were still issues in the



Christine Mummery traded The Netherlands for Boston for a semester.

US. In much of Europe the major discussion issue is only what is the maximum acceptable age of the fetus for a termination. I then realized why stem cells were such an issue.

In the HSCI, this had little direct impact on the work, although it was clear I use hESC lines in my lab that could not be NIH funded. Not everyone I met and worked with was comfortable with using hESC, and I tried to be sensitive to those differences.

*JCI:* How do you feel about the various clinical trials that have been done with variations on stem cells and bone marrow cells injected into patients suffering from infarcts or other cardiac ailments?

Mummery: I would say I am pretty skeptical. It goes without saying that it would be wonderful if it did work; why would you go to the bother of making cardiomyocytes if bone marrow from your own body, which

will not be rejected, works just as well? I think the problem is that the evidence is not strong enough to say that this is the case. It could depend on the disease, the cell types that get injected, the numbers that are injected, and how they are delivered. It seems to me that the antipathy for hESC in many countries is driving the quest for alternative stem cell sources. I see this as underlying the explosion of bone marrow trials in cardiac/myocardial infarction patients, initiated in Germany and deriving from the Orlic paper in *Nature* in 2001, which few were able to repeat and a couple of years later were disproved using a different technique. Bone marrow and derivatives seem to have a short-term benefit (neovascularization or paracrine factors postulated but not proven as mechanisms) in recovery from acute myocardial infarction, but long-term, and for other cardiac diseases, the data are not convincing. I think it is premature to be testing all of these variables in patients even if, as the evidence suggests, most of the procedures seem safe.

*JCI:* As a head of a lab and a five-person family, how do you manage to accommodate a semester-long sabbatical?

Mummery: The major thing is to start very early in keeping everyone open to adventure! My husband and three kids were delighted to share this opportunity, my youngest two went to high school here but were willing to work doubly hard and keep their Dutch schooling going, just for the experience of living in the US. My eldest was ready to take a gap year and do something else. She is doing Harvard extension courses. And make sure you find an easygoing partner! My husband took a couple of months unpaid leave, homeschooled the kids, and learned to play golf. And on the weekends we saw most of what New England has to offer.

*JCI:* What do you feel is the most important thing you will take from your sabbatical: a technique, ideas, a collaboration?

Mummery: All three. I have my goody bag, we are writing reviews together, we will continue to collaborate and share reagents and people. Ideas are less tangible but are certainly among the most valuable of this Harvard experience. Boston is so successful, I just wanted a glimpse to try and figure out why.

**Ushma S. Neill**