Margaret (Peggy) Wheelock (1945-2009): cell scientist, mentor and friend

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The recent death of Margaret Jean (Peggy) Wheelock has deeply saddened her family and world-wide circle of friends, and has left in shock those in the cell adhesion field who knew her. Peggy was a tirelessly energetic person whose brave battle with an unexpected and puzzling series of complications related to cancer has left many of us shaking our heads at the vagaries of life, while reaffirming how precious each day is. Peggy was a thought leader in the field of cadherins, a family of calcium-dependent cell-adhesion molecules that are central coordinators of intercellular adhesion and tissue morphogenesis. She was also a passionate champion of developing young investigators and scientific peers alike, a loyal friend to many and best friend to her husband, Keith Johnson.

I met Peggy and Keith during my first Cell Contact and Adhesion Gordon Research Conference at Proctor Academy. At that time, I was working hard to build a niche for my own small group in the cadherin world. Peggy and Keith took an interest, inviting me to Toledo where I had my first experience as their guest. I appreciate even more now that I am a jaded old Professor with many seminar trips under my belt that Peggy and Keith were unusually exceptional hosts, bringing people into their personal lives, their home, their love of antiques and auctions, the comfort of sharing good food and wine and – once they moved to Nebraska – their hot tub under the stars! The young investigators in our labs inherited the fruits of the relationship, and our scientific offspring continue to collaborate to this day. In addition to her extensive leadership roles at UNMC and nationwide, Peggy was a member of the Editorial Board of *Journal of Cell Science*, a role she took very seriously. Peggy was someone you could count on – she never said "no" to a request from me, regardless of how busy she might have been.

Peggy will live on in those who were so fortunate to benefit from her knowledge and leadership, her patience and encouragement, her grace and friendship. In the piece that follows, Karen Knudsen and Pamela Jensen, Peggy's colleagues and best friends, leave us with their remembrances of this remarkable woman.

When Peggy was born in 1945, her parents did not waste any time dreaming about the possibility that their baby daughter would one day become a world-renowned scientist. However, the experience of growing up on a farm in the small rural community of Cresco, Iowa, provided Peggy and her siblings with countless opportunities to observe the natural world and, for a curious child like Peggy, to consider its mysteries. Running barefoot through the fields, observing the flora change with the seasons, finding baby mice and rabbits and observing close-up the new life in these little creatures – this was Peggy's introduction to science.

Although Peggy loved science school and dreamed of going to college, such dreams were not easily attainable for a girl born shortly after World War II into a family of modest means. But national interest in science was greatly stimulated in the 1960s by the successes of Russian scientists, and biomedical research was beginning to attract funding and to blossom. So, in 1963, when Peggy graduated from high school, she began her scientific career as a technician at the Mayo Clinic in Rochester, Minnesota. In 1967, Peggy moved to St Paul, where she worked as a laboratory technician at the University of Minnesota, College of Veterinary Medicine. It was not until 1973 that Peggy fulfilled one of her personal dreams by enrolling in classes at the University of Minnesota. While studying, she continued to work as a technician and, towards the end of her undergraduate studies, she asked for a promotion. Believing that she deserved the promotion and surprised when it was denied, she quit. Three people had to be hired to accomplish the work that Peggy had done single-handedly. This early experience reveals several of Peggy's life-long characteristics. She never accepted injustice lightly, whether it was visited upon her or someone else. The energy, focus and commitment that Peggy brought to any project she tackled were nothing less than astonishing. She never lost the joy of working at the bench, especially at the microscope, where her technical and observational skills were unparalleled, and her sense of wonder remained undiminished. In 1977, Peggy graduated from the University of Minnesota with a Bachelor of Science in Microbiology. As an insatiable student of natural science, Peggy immediately began graduate studies and, in 1982, she was awarded the Doctor of Philosophy in Cell Biology.

Minnesota had a special place in Peggy's heart for another reason: it was there that she met her life-partner, friend, colleague and husband, Keith Johnson. They were married in 1977 and began a journey as soul mates and scientific collaborators, eventually working together to study cadherins and catenins and the roles that these cell-cell adhesion and signaling proteins play in cancer and its metastasis. Together, Peggy and Keith moved in 1983 to Philadelphia where Peggy began postdoctoral training at the Wistar Institute. They moved in 1987 to the University of Toledo in Ohio as assistant professors. In Toledo, they established productive careers as research scientists and teachers, rising to the rank of Professor and honing their incredible skills as mentors. In 2001, Peggy and Keith moved together once again, this time to the University of Nebraska Medical Center in Omaha as members of the Department of Oral Biology in the College of Dentistry. It was in the heartland of the country that Peggy was truly appreciated for her incredible

talents, and where she responded with sustained creativity and productivity.

One might think that marriage combined with constant professional collaboration would strain both relationships, but this was never the case with Peggy and Keith. The unique gifts that they each brought to their life together allowed them to blend work and play seamlessly. They worked incredibly hard in their laboratory, but they also loved to travel and to bicycle. They trekked nearly three miles to and again from their laboratory every day (regardless of weather conditions) and took that time to talk and to reflect on their work and their students. At home, Peggy and Keith enjoyed cooking together as a couple and with friends. They shopped regularly at the open-air farmers' market in Omaha. Fresh fruit and vegetables were the start of nearly every meal in their house. Peggy was an imaginative and adventuresome cook, as fearless in the kitchen as she was in the laboratory. But she and Keith also enjoyed eating at restaurants, ferreting out the best dining places in Omaha. If you were hosted by Peggy and Keith for a visit to Omaha, you'll remember not just the delicious meals, but also the gracious welcome. Peggy and Keith were at the airport waiting with smiles for you to emerge from the gate. (However, if you had to retrieve your suitcase from baggage claim, Peggy likely wondered why you brought so much. She was a minimalist.)

Peggy's scientific contributions are numerous and significant. She authored or co-authored over 100 papers, many of them with Keith. Her ideas were creative, and she was scrupulously honest. The data in Peggy's papers are clear, unambiguous and of the highest caliber. Peggy's ethical standards were unsurpassed. She held herself, her students and her collaborators to equally high standards. Peggy was successful in obtaining grants from NIH and other funding agencies to support her research. As a writer, she just kept improving – her papers are a pleasure to read because they are so well written. Although Peggy's accomplishments as a researcher are great, she was so modest that it sometimes took some time to appreciate just how brilliant she was, and how instinctively she approached her work and understood the cells she studied.

Peggy stands out as a great researcher, but many of those who worked most closely with her believe that her most significant contributions are yet to come – in the form of the future careers of the younger scientists that she mentored. Her deep care and concern about her mentees – whether students, trainees, or younger faculty – perhaps stemmed from her own challenge to grow into the gifted scientist that she became. Peggy was a leader by example, with high expectations of herself and those that she mentored. She did not tolerate the frivolous, sloppy, slothful or uncommitted. The breadth of her abilities was nothing short of incredible. Peggy devoted herself to writing a five-year ten-million dollar grant application to mentor young faculty, which was awarded in 2003 and was recently renewed for another five years. Simultaneously, Peggy managed to serve as the principle investigator of this major grant and also work at the bench like a student or post-doctoral fellow. As a visionary who shared any rewards and modestly shunned personal praise, Peggy empowered others to succeed. Her approach to mentoring was holistic, focused not just on scientific excellence but also on the need for a healthy personal life and a solid home base. The young scientists who were actively being mentored by Peggy will miss her immensely for her scientific and personal guidance and her stellar example. The scientific community will also be the poorer for lacking those future young scientists that have been denied the benefits of Peggy's mentoring by her untimely death. However, Peggy's many trainees will no doubt apply the lessons they learned from Peggy when mentoring their own students.

Peggy was a unique individual. She was brilliant, gracious, kind, generous and thoughtful. She loved science, flowers, birds, good food, gardening, friends and especially her husband Keith. She loved the outdoors, where she could experience nature with all her senses. She loved a physical challenge, running at ASCB meetings and recently bicycling across Iowa with the RAGBRAI just two months before being diagnosed with liver cancer.

Peggy will be greatly missed by Keith, her family, her friends, her colleagues and her students. She was a shining example of a scientist, teacher, friend and woman.

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Journal of Cell Science 122, 1475-1476
Published by The Company of Biologists 2009
doi:10.1242/jcs. 053132