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OBITUARY

Remembering Angelika Amon (1967–2020)

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The scientific world says farewell to Angelika Amon, a tremendous geneticist and cancer researcher who passed away unexpectedly at the end of October at the age of 53. In this obituary, we would like to add our goodbyes and remember Angelika for who she was: one of the great minds of our time and an even greater person.

Scientifically, Angelika will likely be most remembered for her groundbreaking work on cell-cycle control and the effects of chromosome missegregation. As a graduate student in the lab of Kim Nasmyth at the Institute of Molecular Pathology, Vienna, Angelika made seminal discoveries about the regulation of cyclins and the mechanisms that control the step-by-step execution of the cell-cycle program (Amon et al., 1994, 1993). After a short postdoc in the lab of Ruth Lehmann at the Whitehead Institute, she was recruited to the Whitehead Institute as an independent Whitehead Fellow and was subsequently appointed to a faculty position across the street at MIT. Her work led to the mechanistic description of two major signaling pathways, the mitotic exit network (or MEN) and the Cdc14 early-anaphase release network (or FEAR), which together control exit from cell division in budding yeast. Her research showed that MEN triggers mitotic exit by releasing the Cdc14 phosphatase from the nucleolus (Bardin et al., 2000; Visintin et al., 1998, 1999), and that this release is initially stimulated by the FEAR network (Stegmeier et al., 2002). The acronyms FEAR and MEN led to a memorably humorous moment during her tenure talk when Angelika's overview slide showed the two pathways next to each other. It was a testament to Angelika's focus on science that the humor of this situation only became clear to her while she was giving her talk.

Angelika's lab subsequently worked out the spatiotemporal signals that trigger mitotic exit (Chan and Amon, 2010; Rock et al., 2013) and provided key insights into how the mitotic cell cycle is altered to generate the meiotic program. Her lab made numerous discoveries illuminating how cells elegantly alter the biology of centromeres (Corbett et al., 2010; Monje-Casas et al., 2007), cohesins (Marston et al., 2004) and cyclins (Carlile and Amon, 2008) to accommodate the meiotic chromosomal divisions. Often, this research was driven by her depth of intuition and knowledge, which frequently allowed her to interpret complicated data in the span of a few seconds. For example, the glimpse of a single unusual cell was enough for her to deduce that mitotic exit was not governed by a checkpoint but rather by the presence of a spindle pole in the daughter cell (Falk et al., 2016).

Although Angelika was interested in understanding how the cell cycle is properly executed, she was also fascinated with the consequences when these processes fail. The lab set up powerful yeast (Torres et al., 2007) and mammalian (Williams et al., 2008) models, which were used to elucidate how chromosome missegregation, and the resulting imbalances, affect cellular physiology. This work led Angelika to develop one of her favorite hypotheses, namely that the expression of genes on aneuploid chromosomes leads to stoichiometric imbalances of complex-forming proteins (Brennan et al., 2019; Oromendia et al., 2012; Torres et al., 2010). This work fundamentally changed our understanding of aneuploidy and formed the basis of our understanding of protein homeostasis defects within aneuploid cells, which are a hallmark of many cancers.

Angelika at a lab member's wedding in 2012. Picture courtesy of Jeremy M. Rock.

The common thread of Angelika's research was a love of genetics, a knack for well-designed and watertight experiments and an ability to move freely between research fields. She fostered a fearless scientific environment where any question was fair game, so long as it was interesting. As such, her lab was consistently making remarkable discoveries well outside of the main thrusts of the lab's focus. Among these were major insights into the interplay between growth and the cell cycle (Goranov et al., 2009) and the resetting of aging that occurs during gamete development (Boselli et al., 2009; Unal et al., 2011).

Along the way, Angelika positively impacted the lives of many people. She had a larger-than-life personality, and those lucky enough to have met her almost certainly have at least one story about their experiences. Angelika was a powerhouse communicator. She was a brilliant lecturer in undergraduate biology classes and gave excellent seminars that were crisp, rigorous and usually very entertaining. As a lab member, seeing her present your own research left you knowing that you needed to change everything and present as closely as possible to the way she did. She was well known for her

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outspokenness in scientific meetings, calling attention to missing and alternative interpretations, but also regularly providing highly incisive insights. For better or for worse, Angelika had an uncluttered mind, free from wishy-washy thinking. I once asked her whether she saw any issues, scientific or otherwise, as not black and white; her reply was "no". For those in the MIT biology PhD. program, there was no faculty member more respected and feared in oral exams. She brought a similar approach when addressing larger issues about inequalities in the scientific community, in particular when speaking up about the prejudices that women in science face.

Her directness was also a central feature of her mentoring style. There was no sugarcoating of hard truths, but there was also unbridled joy and the knowledge of full support all the way. When the stakes were highest, Angelika was at her most supportive. It was this honesty with which Angelika forged a strong sense of belonging among the members of her laboratory and lasting friendships with her colleagues. Angelika took a keen interest in the lives of her trainees far beyond science, and every lab member has stories about her directness. But this directness came from a deep sense of caring, and Angelika was a constant source of support for her students, postdocs and technicians. She cared about the future of her lab members and helped numerous former lab members with continued scientific input, feedback on grant writing or editing of cover letters for journal submissions. Her care for her lab members went so far that she once arranged a technician's new job while attending their wedding. The close-knit community she managed to build was particularly apparent during her 50th birthday symposium, which was organized by her alumni three years ago and highlighted the many research fields Angelika managed to influence over the course of her career. There are few people in this world who, when they pass, take with them insight and wisdom that no other human possesses; Angelika was one of these people. It is her approach to science and her incredible personality that will live on in everyone who knew her. She will be missed tremendously.

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