



Biophysical Reviews “Meet the Editor Series”—Elisabeth Ehler

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I have been a member of the Editorial Board of *Biophysical Reviews* since 2017, and it is a pleasure for me to write a short article on my career, especially since it will be published in a Special Issue of the journal that is edited by my first ever PhD student!

As anybody will know, who has ever asked me whether I am German, due to my accent, I am a proud Austrian (Fig. 1), even if I have not lived there for 27 years! I was born and grew up in Steyr, a small town in Upper Austria (or Superior Austria as I tend to call it), which is renowned for its combination of historical town centre (the oldest house dates from 1492, which tends to be a winner with American tourists) and industrial past—and to a certain degree present, in the iron working and vehicle manufacturing industry. Since I was a girl and it was a shorter commute, it was decided that I should go to the language-focussed high school rather than the science-focussed high school in Steyr and there was absolutely no suspicion that I would have it in me to become a scientist—also no role model in sight anywhere! My grandmother used to tell a tale that as a toddler I would selectively pick yellow crocus and leave the purple and the white ones behind, but that might have been more due to a strong colour preference than an already scientifically categorising mindset.

After my A levels, I really had no very clear idea what to do. Based on my excellent results, it was obvious that I would go to university, but which field? One after the other, subjects were ruled out (for example, I did not want to study medicine and I did not want to study to become a teacher, which is a tad ironic these days because I am involved in medical research and actually like teaching bright students), and there was the

point when only “biology” remained as a potential subject. I have always found watching wildlife documentaries quite boring (give me a Shakespeare play any time instead!), so zoology and botany were out of the question, but at the University of Salzburg, they offered a course in genetics and since I did not have a clear idea what that would be about but it sounded interesting, I decided to give it a go. What a stroke of luck that was! With every term, the subjects we tackled became more fascinating to me and while genetics never really did it for me, once cell biology appeared on the curriculum, I was sold. They had this additional voluntary practical course on offer, which was on “contractile filaments” and was held not at the university itself but at the Institute of Molecular Biology (IMB) that was run by the Austrian Academy of Sciences and was a dedicated research institute. This appealed to me and so I registered. The logistics of attendance was not trivial, since in Salzburg they rent out any bed that has four steady legs to tourists in summer, so we had been chucked out from the students’ halls and were only expected to return on 1 October—and the course took place in September. Thus, I went for the 2-hour commute each way by train and bus from Steyr to the south of Salzburg every day for a week and I have not regretted it.

While my initial understanding of “contractile filaments” was quite hazy, once I saw a rhodamine-phalloidin-labelled isolated skeletal muscle myofibril under a fluorescence microscope contracting upon the addition of ATP, I was *completely* hooked. Bright colours (remember those crocusses!) and watching myofibrils doing their thing still fascinate me after all these years. I was very fortunate to be offered a master’s project at the IMB at the Department of Physics led by Professor Vic Small, and subsequently, I was hired to do a PhD project there with—at that time—Dr, later Professor, Annette Draeger.

In a way, Vic, who as the name implies is British, was my first ever proper boss and his attitude completely ruined me for a future career in the traditional hierarchical and serious German (and Austrian-style) working environment. There just was no hierarchy based on titles, but just one based on

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Fig. 1 The author “appropriately” attired for the Austrian National Holiday on 26 October

knowledge, and while Vic could be quite direct in his comments, he also did not mind if you gave back. I was not at the receiving end of this comment, but “those sections were cut before they invented the knife” as a remark on cryosections would probably not be considered a suitable comment to a student currently. From Vic, I also picked up extremely high-quality standards. I remember attending my first ever scientific conference abroad, and when I saw some of the data (especially microscopy) presented in talks and on posters, I was secretly thinking, oh gosh, I would not even dare to show this to Vic, when we are both drunk!

Annette influenced me in many other ways. Since I came from a traditional Austrian background, the idea that a woman would run things was novel, but obviously very welcome, to me and Annette was just an absolutely fantastic coach. She let people grow and develop, while at the same time pointing career-important things out to them that they could either take, if they had the grit, or leave (I attended an EMBO course and several conferences during my PhD with her), a leadership style I have tried to copy ever since. Annette also showed me what it is like to be efficient and taught me to think about the bigger picture (Ehler et al. 1995). We were just 10 years apart in age and, in addition to the scientific interests, also shared many cultural interests, among them Shakespeare! In Austria (and Germany), the PhD supervisor is usually called the *Doktorvater* (doctor father). Annette obviously would have been *Doktormutter* (mother) technically, but due to the narrow age gap, preferred to be addressed as *Doktorschwester* (sister) instead. We kept in touch and attended many Shakespeare plays together over the years. It is absolutely tragic that she died of an extremely aggressive cancer in October 2020, and I would have loved for her to sit proudly in the audience at my professorial inauguration lecture.

After my PhD, the obvious thing to do was to go for a postdoc and for me the only place to consider doing that was

London! I managed to bag an Erwin Schrödinger Fellowship from the Austrian Science Foundation and spent two years in the centre of London, absolutely lapping up the cultural life (I went to the theatre or opera at least once a week) and also doing some science on the side. With the science, it was a bit of a problem. My PhD had gone absolutely swimmingly, so I was not at all used to encounter major stumbling blocks. I also eventually realised that I was the wrong person on the wrong project with the wrong supervisors, and I really did not have the kind of imagination that is required to work on developmental biology and especially Wnt signalling (those were the days when Wnts did not even have identified receptors yet, and all the tools such as antibodies were also pretty lousy). It was a character-building experience, and to be honest, it made me as a scientist. Otherwise, I would just happily have drifted along without realising that there can be massive challenges. Therefore, I would recommend to every PhD student to try something a bit different for your first postdoc—if it works out, it is great and you have broadened your expertise. If it does not, like for me, at least you have tried and you know. Thus, I said goodbye to molecular and developmental biology and returned to the “nuts and bolts” world of the cytoskeleton for my second postdoc, which took me to Zurich, Switzerland, to the lab of Professor Jean-Claude Perriard at the Institute of Cell Biology (ICB), ETH Zurich.

Jean-Claude was another stroke of luck as a supervisor for me, again somebody who had the trust to let people get on with their experiments, while at the same time being absolutely supportive behind the scenes (Ehler et al. 2001; Ehler et al. 1999). I was hired to run the confocal microscope of the institute, and while I obviously had an extremely good foundation in general fluorescence microscopy from my days in Vic’s lab, I had never used a confocal before and had not the slightest idea about the UNIX computers that were used to process the imaging data at the time. However, I was a quick learner and have also never been daunted by anything, so I just tackled those UNIX beasts using a trial-and-error approach until I got on top of them (and to my amusement became something like the local UNIX expert and also the only woman to sit on the Computer Committee of the Department of Biology at ETH at the time). I ran a tight ship as “Madame Confocal”, and I am sure there are still some ICB confocal users out there that are traumatised by my strict but—I hope—fair rules.

The seven Zurich years were extremely fruitful and have laid the basis of my current career. They were also when I encountered the M-band and cardiomyocytes for the first time and thus the start of a longstanding “love affair”. In 2003, I was offered a position as a group leader at King’s College London and have been working there ever since, slowly moving up the greasy pole to my current position as professor of cardiac cell biology (since February 2021). At King’s, I managed to expand my work from studying mouse models of

dilated cardiomyopathy to looking at samples from human patients (Pluess et al. 2015). This was solely due to the generosity of Prof Cris dos Remedios, from the University of Sydney, Australia, who has given me access to his Human Heart Tissue Bank since 2004 and who also got me on the Editorial Board of *Biophysical Reviews*. My unique selling policy has always been to combine my knowledge of the cytoskeleton with studies on developing and diseased cardiomyocytes and to move the field beyond the two camps of traditional “actomyosin does it all” or “calcium does it all” thinking (Ahuja et al. 2004; Iskratsch et al. 2010; Lange et al. 2002; Lange et al. 2016; Lange et al. 2020).

I am very proud of the people whose careers I have been able to influence for the better, either directly in my group, in neighbouring groups, from collaborators or just strays picked up in the pub, and they all know who they are! As a woman, I have also always tried to give other female scientists a “leg up”, whenever I had the slightest chance. I am a strong believer in actively pursuing fair representation and made sure that for the book that I edited in 2015, 8 out of 12 senior authors were women. In my opinion, a lot of discrimination is not necessarily active, but often just laziness of thought (oh, I know a bloke...) and just thinking a little bit harder results in a fairer line-up. I have always regarded science as a collaborative enterprise and am absolutely convinced that frank and critical discussions (often accompanied by an alcoholic beverage) are the best way to advance our knowledge.

While throughout my entire career I have always worked with muscle and microscopes, I have a bit of an imposter syndrome when somebody addresses me as a “biophysicist”. My understanding of physics has not progressed much since my language-focussed high school days, and to be honest, my only “physics” links are the names of the institutions I have worked in! I see myself as a “dyed in the wool” cell biologist, but I have obviously managed to “fake it” sufficiently well to get on the Editorial Board of *Biophysical Reviews* and become the head of the “Muscle Biophysics” section of the Randall Centre for Cell and Molecular Biophysics! So, there is hope for all of you!

What have I learned?

Not everybody has “scientist” stamped on their forehead from age 2. Go with your interests and follow your passion, whether that is the fashionable thing or not. It is you who will spend those Saturday afternoons at the microscope, so you better like what you are doing.

Always be on the lookout for opportunities: conferences, collaborations, contacts. It may not bring fruits immediately or directly, but networking is absolutely key.

Make sure you occasionally pause to think whether the alley you are following down is the right one for you, your career and for the project.

Work hard and party hard.

Declarations

Conflict of interest The author declares no competing interests.

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