



DENDRITIC SPINES, PHILOSOPHY, AND  
THE PURSUIT OF TOGETHERNESS  
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Tim Fieblinger is a neuroscientist, working passionately at the interface of biology and medicine. Born in Germany, he studied Biology at the Universities of Bochum and Tübingen and received his “Diplom” in 2008 from the latter. Moving to Sweden, he received his Ph.D. in Biomedicine/Neurobiology from the University of Lund in 2014. The topic of his dissertation was the adaptations of striatal neurons in animal models of Parkinson’s disease and L-DOPA-induced dyskinesia. During his graduate years, he was also a pre-doctoral visiting scholar at Northwestern University, Chicago (2009–12). Continuing his postdoctoral work in Lund, he investigated the fate of striatal neurons in different neurological disease models – e.g. Huntington’s disease – and received, among other things, a postdoctoral fellowship from Hjärnfonden (The Swedish Brain Foundation). However, noticing that he needed to “gain time to think”, he applied for the College for Life Sciences Fellowship at the Wissenschaftskolleg. While keeping his ties to Lund, he now lives in Hamburg. – Address: Experimental Medical Science, Lund University, Soelvegatan 19, BMC F11, 22241 Lund, Sweden. E-mail: [tim.fieblinger@med.lu.se](mailto:tim.fieblinger@med.lu.se).

### Prologue

A writer, a historian, and a scientist walk into a restaurant ... What sounds like the opening line of a joke was the first situation I found myself in at the beginning of my Wiko time. And it was a curious moment.

My Fellowship, only five months (and way too little in retrospect), started late in the academic year. In contrast to my Co-Fellows, I couldn’t join the journey at the recom-

mended time, but had to wait until January to make my way down to Berlin. Much had happened already during the previous months at Wiko. Therefore I expected it to be strange to come in late, when almost half of the time of the others had already passed. Yet, there I was. Sitting in the restaurant earlier than the rest. It was my first meal and I was early because I had not adjusted to the Wiko times and rhythms yet. When they walked in, I recognized their faces from the Fellow list: a writer, a historian, and a scientist. I had read about their respective professions. I had also read their previous achievements and their goals for the Wiko year. Based on all that, those three should have been as alien to each other as thinkable: different lives, different ideas, different interests. Yet there they came, strolling down the last flight of stairs, chuckling, commenting on last week's colloquium or dinner, enwrapped in a sphere of almost intimate "togetherness" ...

That was the moment it dawned on me that something extraordinary was happening at Wiko. But it also deepened my concerns: could a latecomer like me still join this "togetherness"? I was skeptical – but little did I know. Less than two weeks later, I strolled down the last flight of stairs together with them.\*

### The Work Plan Achievements

I came to Wiko with a rough working plan in mind. I wanted to use my time to study in greater detail the existing literature on the structure–function relationship of dendritic spines. Dendritic spines are little protrusions, morphological bulbs like "thorns", that can be found on several types of neurons in the brain. These spines are very important, because they are the contact sites where one neuron transmits information to another. They host the synapse. The existence of dendritic spines was already described over a century ago, but only in recent years have we had the tools to study their form and function in detail. It is important to understand that these dendritic spines are very small and we need to use very advanced microscopes to study them in detail. The size of a single dendritic spine is in the range of only a few micrometers (a micrometer or  $\mu\text{m}$  is  $10^{-6}$  meter). Yet, a large body of literature exists by now that describes the structure–function relationships of dendritic spines; for example, that an experimental strengthening of the synapse also leads to an increase in the dendritic spine size. During my previous research years

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\* Although based on a true event, I took the liberty of changing the professions of the three people described in this report to conceal their identity.

I had already observed that some of these structure-function “rules” seem not to apply to the neurons I was studying, the striatal neurons. Maybe to no surprise, because the vast majority of the studies looking at this structure-function relationship question were performed on a very different type of cell – the pyramidal neuron. So I planned to dive deep into the literature and see if I could understand why pyramidal and striatal neurons do not follow the same rules, and maybe even come up with a research strategy to pursue this question further. That was the plan.

In reality, it happened to me what happened to so many other Fellows as well. The first months I ended up spending more time on finishing leftover work I had carried from Lund to Berlin. However, it turned out that this wasn't a futile task, because we managed to submit a paper already during my Wiko stay and it was published just shortly after. Eventually I did find the time to engage in the project I had intended to work on, even though I got sidetracked a couple of times. The fruit of it is a review article: Fieblinger, T., L. Zanetti, I. Sebastianutto, L. S. Breger, L. Quintino, M. Lockowandt, C. Lundberg, and M. A. Cenci (2018). “Striatonigral neurons divide into two distinct morphological-physiological phenotypes after chronic L-DOPA treatment in parkinsonian rats.” *Sci Rep* 8:10068. For example, with the help of the Wiko library, I managed to get hold of some of the earliest publications describing dendritic spines in the brain. Pioneering this work was the alleged father of modern neuroscience, Santiago Ramon y Cajal, who published his most important reports between 1880 and 1910. As was common in those times, he published mostly in his native language, Spanish, and sometimes also in French. Unfortunately for me, I understand neither. Yet, the Wiko library helped me to track down a German summary and partial translation of Cajal's early work made by one of his contemporaries. Since it was published in 1893, I had a hard time finding a digital copy. However, based on my short and vague request, the library managed to present me with the over 100-year-old original publication within a few days. While this may be less impressive for historical scholars, putting one's hands on a book concerning neuroscience of that age is really a rather rare event (and a pure pleasure for a book *aficionado* like me). Another, almost humoristic sidetrack was reading the Noble Prize acceptance speeches of Cajal and his scientific adversary Camillo Golgi. It is something I now recommend to everybody with an interest in cellular neuroscience or the history of neuroscience.

## The Out-of-the-Box Achievements

Maybe more important to me than the work plan achievements were the things that I managed to do outside my usual field of study. These were all rather small as such, but their multitude and diversity is what in the end made my time at Wiko so unique and worth it. In the following I can only name a few.

Very early on I got invited to the discussion of “ortholog vs. paralog” – and even though I learned more than I contributed, this discussion manifested in a publication that I am very grateful to be co-author of: Wideman, J. G., D. L. Balacco, T. Fieblinger, and T. A. Richards (2018). “PDZD8 is not the ‘functional ortholog’ of Mmm1, it is a paralog.” *F1000Res* 7:1088.

Further outside of my usual field of science, I was invited to read and comment on a work-in-progress piece by a philosophical Co-Fellow, dealing with panpsychism consciousness as a biological phenomenon. This, and the countless inspiring discussions with all the other philosophers (and philosophically inclined Co-Fellows), made me reevaluate my possibilities of continuing a philosophical activity even outside of Wiko. (But maybe not exactly deciphering Wittgenstein or arguing against the market logic of knowledge in life sciences.)

As my last example, I truly enjoyed the fascinating talks and discussions with the other biologists, especially about cognitive strategies in bats, bees, or elephants, as well as the mind-boggling question why some animals vomit and others not.

## The “Togetherness”

Not only did I join late, I also left early. My Wiko time ended on a nice and sunny day, the 31st of May, and we had my last Thursday dinner outside on the terrace. In contrast to my early worries, I felt very much the “togetherness” on that day. Great thanks goes to the Wiko staff members, academics and non-academics alike, since you made this experience possible. Yet even more so, it was you, the Co-Fellows, who made this experience unique. I had incredibly good conversations with so many (and I apologize for not personally addressing all of you) and truly believe that it will have an influence on me from now on.