

My research in relatively plain english

My full-time research was started in Sweden in the summer of 2009, when I got a chance to develop a new tool for chromosomal integration into the yeast *S. cerevisiae*. We all know by now that our life (multicellular organisms) begins from a single cell. So, I was puzzled how a single cell turns into a multicellular organism that led me into development biology. My first work in developmental biology was focused in the very early stage of the *Drosophila* embryo which is within several hours after fertilization. One of the questions was how the initial genes are expressed. Afterwards, my research was centred around how our respiratory system (trachea) was formed during embryogenesis. For that, we used *Drosophila* again, a simple and excellent model organism to answer that question and we employed different molecular and genetic tools to trace its biology. Of note, that research spanned over mid-late embryogenesis.

My PhD work was shifted towards host-pathogen interactions and we utilized *Drosophila*-nematode as model organisms. One of the underlying reasons for using these model-organisms was, host-pathogen interactions with bacteria and fungi were relatively well characterized in *Drosophila* compared to other pathogens. Just to give you an example in this regard, one of the Nobel Prize (2011-Physiology or Medicine) awarding discoveries was first found in *Drosophila* about how our immune system get activated during bacterial and fungal infection. However, how other pathogens, for instance, entomopathogenic nematodes interact with the host (*Drosophila*) has yet to be elucidated. Entomopathogenic nematodes (EPN) are parasitic worms, which can infect insects and kill them. Recent studies estimate that around 3 billion people are infected by nematodes, causing diseases leading to death. Besides human health, nematodes have devastating consequences on livestock and in agriculture. Therefore, we exploited these model organisms to the fullest to understand their complex interactions, hence tried to advance our understanding during infection.

During my 1st postdoc, I was involved in a set of studies that take a comprehensive molecular and genetic approaches aimed at understanding the central nervous system (CNS) formation during embryogenesis. This study focuses on the early embryonic stage when the neural stem cells are born. However, there were some missing knowledge of how they are born. Proper neural stem cells formation is essential for the central nervous system (CNS) development. We provided evidence for a co-ordinated team of different players (genes) that play a role for making the neural stem cells. We discovered two more genes in this process as missing pro-neural genes.