\*see also luis’s suggestions

Introduction - General

* Animals are complex multicellular organisms and as such have evolved systems through which cells communicate and coordinate with each other.
* These systems involve all aspects of animal biology. For example, a large number of these are related to perceiving the environment and elaborating responses. These are the senses. For example vision.
* The immune system is another example of organism-wide system that requires cell coordination to identify and target external invaders/pathogens. An example of this is the chemokine system.
* In this thesis, I used phylogenetic and bioinformatic approaches to understand the molecular evolution of two main systems in animals.
* First, the evolution of vision: here I wanted to understand when all the molecular and cellular components that are the minimum basic setup of vision originated. As multiple non-bilaterian organisms have vision, vision must have originated at some point in early evolution of animals, either prior to the split of extant phyla, or at one of the early splits of extant phyla. However, some of the components are involved in other cellular tasks and likely originated more anciently, so my investigation extended to all Eukraya.
* Second, the evolution of chemokine signalling: here I wanted to understand what are the evolutionary relationships between molecular components that compose the system; when they originated; and describe their evolutionary histories. Since canonical chemokine signalling has only been described in vertebrates, the focus was in searching for ancestral molecules in animals and specifically, in sister groups of vertebrates. This work was conducted in collaboration with my coworkers Matthew Goulty etc and is currently a pre-print.

Introduction – Evolution of Vision

* Phototransduction
* Photoreceptor cells
* Retinol metabolism that synthesises the 11-cis-retinal

Introduction – Chemokine Signalling

Final paragraph could have some concluding remarks about the power of evolutionary studies to understand how signalling systems work in animals and introducing that in the next chapter (methods) I will explain about the methodological approaches used to answer these questions in this thesis.