

# Abstract

The distal tip of the cilium/flagellum, also known as the ciliary tip domain (CTD), is critical for the structure and function of the eukaryotic cilium. The limited knowledge of its protein constituents hinders a better understanding of the domain. In this thesis, we set out to verify the localization of a subset of known mammalian CTD constituents and to assess the localization of candidate CTD proteins, orthologs of which localize to the tip of the flagellum of evolutionary distant protozoan *Trypanosoma brucei*.

Using our localization pipeline, we identified two proteins that robustly localize to the CTD of the primary cilium. One of these proteins (ZC2HC1C), in addition, also localizes to stationary foci along the axoneme, positions of which coincide with sites of intraflagellar train pausing and turning. We hypothesize that these may be ends of sub-distally terminating axonemal microtubules.

We further show that the protein ULK4 localizes to the CTD of motile ependymal cilia but not to the CTD of primary cilia, consistent with previously published phenotypes in ULK4 depleted mice and exemplifying differences in the composition of CTDs of the two types of cilia.

Finally, we demonstrate that Expansion microscopy, a rapid and robust super-resolution technique, is well suited for ultrastructural and localization studies of CTDs of both mammalian cilia and *T. brucei* flagella.