Discovery of a novel conserved gene family with an essential role in kinetoplastid parasite – insect vector adhesion

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Leishmania transmission requires parasite adhesion to the sand fly stomodeal valve via a cytoskeletal adhesion complex. While three essential kinetoplastid-insect adhesion proteins (KIAPs) are known, the overall proteome of the adhesion complex is obscure. Using TurboID-tagged KIAP3 combined with proteomics and light microscopy, we have identified novel adhesion plaque components that localised to the adhered flagellum, including multiple members of the Adhesion Related p-loop NTPase Domain (ARND) family, of which the canonical member is the newly discovered KIAP4. Phylogenetic analysis of the ARND family showed it is conserved across the kinetoplastids, and we demonstrate that *Trypanosoma congolense* paralogs localise to the adhered flagellum in that parasite. Deletion of KIAP4 severely impaired haptomonad adhesion, with the mutant parasites unable to colonise the sand fly stomodeal valve. Our work provides details of the molecular machinery essential for vector colonisation and shows that these proteins have a conserved function in other kinetoplastid parasites.