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Characterisation of a new *Apicomplexa*-specific zinc-finger protein family in *Plasmodium* with a key role across different stages of the life cycle.

The lifecycle of *Plasmodium*, causative agent of malaria, is composed of several stages, each with its own form and environment. Transitions between these stages requires dramatic modification of the gene expression profile, but the molecular factors regulating these transitions remain poorly understood. CCCH zinc-finger domains are proportionally enriched in the *Plasmodium* proteome, however little is known about their biological role in the parasite. We analysed 3xCCCH zinc-finger domain distribution in the *Plasmodium* genome revealing they congregate within a new *Apicomplexa*-specific protein family with predicted RNA-binding function. We characterised one of these proteins, Zn3_3, using the rodent malaria model *Plasmodium berghei*. C-terminal epitope tagging of Zn3_3 demonstrated it has a stage-specific expression profile detectable with a cytoplasmic distribution in developing mosquito stages ~6 h post-transmission, and remains visible through to the mature ookinete form. Zn3_3 KO had no impact on production of the mammalian forms (asexual blood stages and gametocytes), but completely abolished formation of normally-shaped zygotes/ookinetes and transmission to female anopheline mosquitoes. RNA sequencing profiles of the Zn3_3 KO line generated at 8 h post-fertilisation did not reveal any transcriptomic changes. However, RNA immunoprecipitation experiments performed in ookinetes reveal for the first time that Zn3_3 is involved in RNA-binding. Other members of the 3xCCCH family have been identified to play key roles in other life-stages (being crucial for asexual growth and gametocytogenesis), and their targets and effect on the gene expression are being explored. In summary we confirm the 3xCCCH protein family plays key roles during *Plasmodium* lifecycle progression. Further analysis of their function may reveal new ways of the gene expression regulation in *Plasmodium* and related parasites.