Sex-specific proteome analysis of adult *Schistosoma mansoni*

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INTRODUCTION

The surface allows male and female schistosomes to survive in their hostile environment successfully. Here we present the first gender-specific tegument proteome datasets of paired and single-sex adult *S. mansoni*. Therefore, we applied a new workflow combining a streptavidin-biotin affinity purification technique with single pot solid-phase enhanced sample preparation (SP3) for subsequent LC-MS/MS analysis.

WORKFLOW

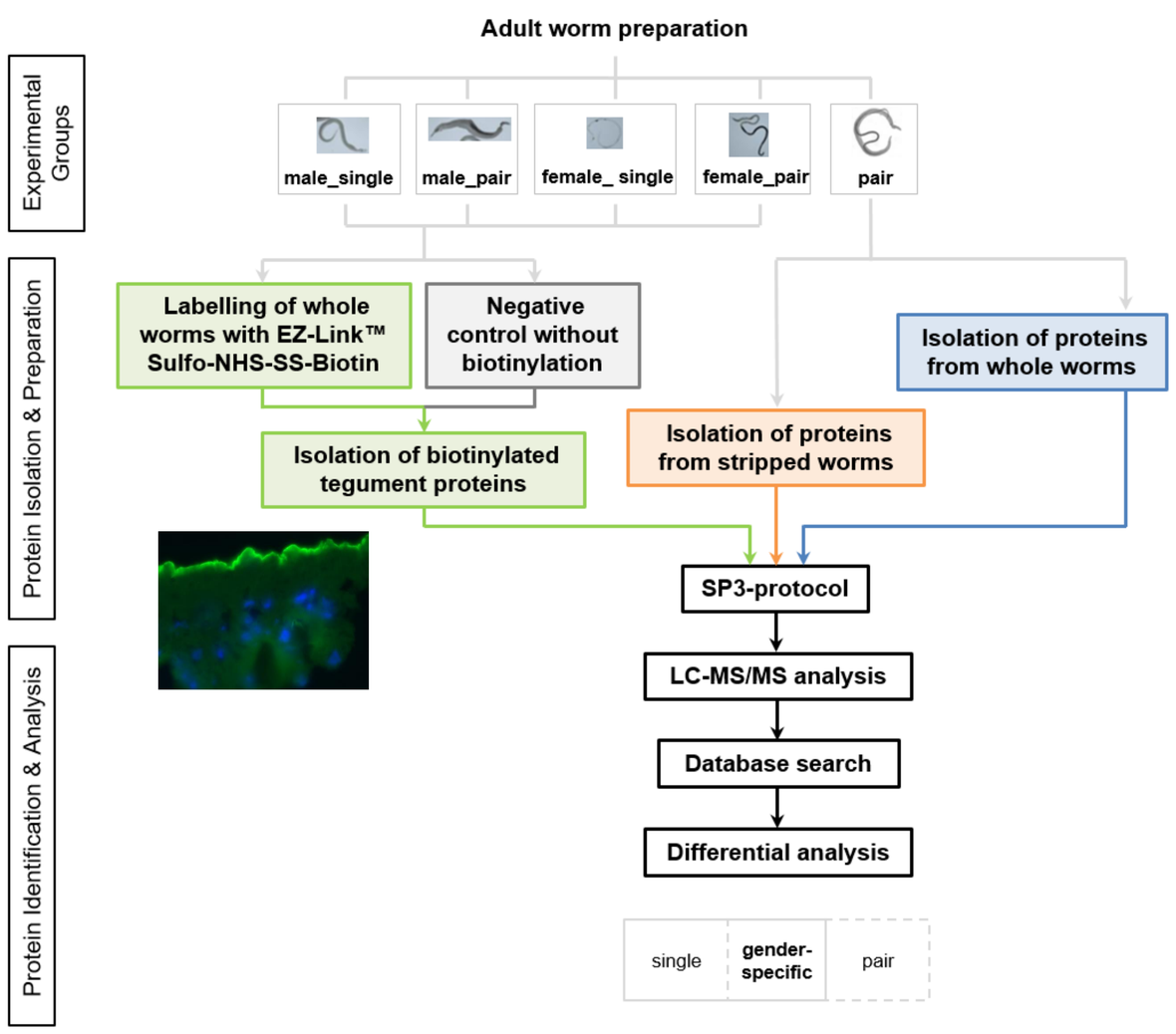


Figure 1. Research workflow showing the identification process of tegument proteins of adult *Schistosoma mansoni*. Surfaces of paired and single-sex adult schistosomes were biotinylated to extract tegument proteins. Here we show representative micrograph of surface biotinylation of male_single tagged with avidin-FITC. Protein extracts were prepared for subsequent LC-MS/MS via single pot solid-phase enhanced sample preparation (SP3) protocol and protein candidates were identified via database search followed by differential analysis. Thus, gender-specific proteins of adult worms are presented in this study regardless of their mating state.

RESULTS

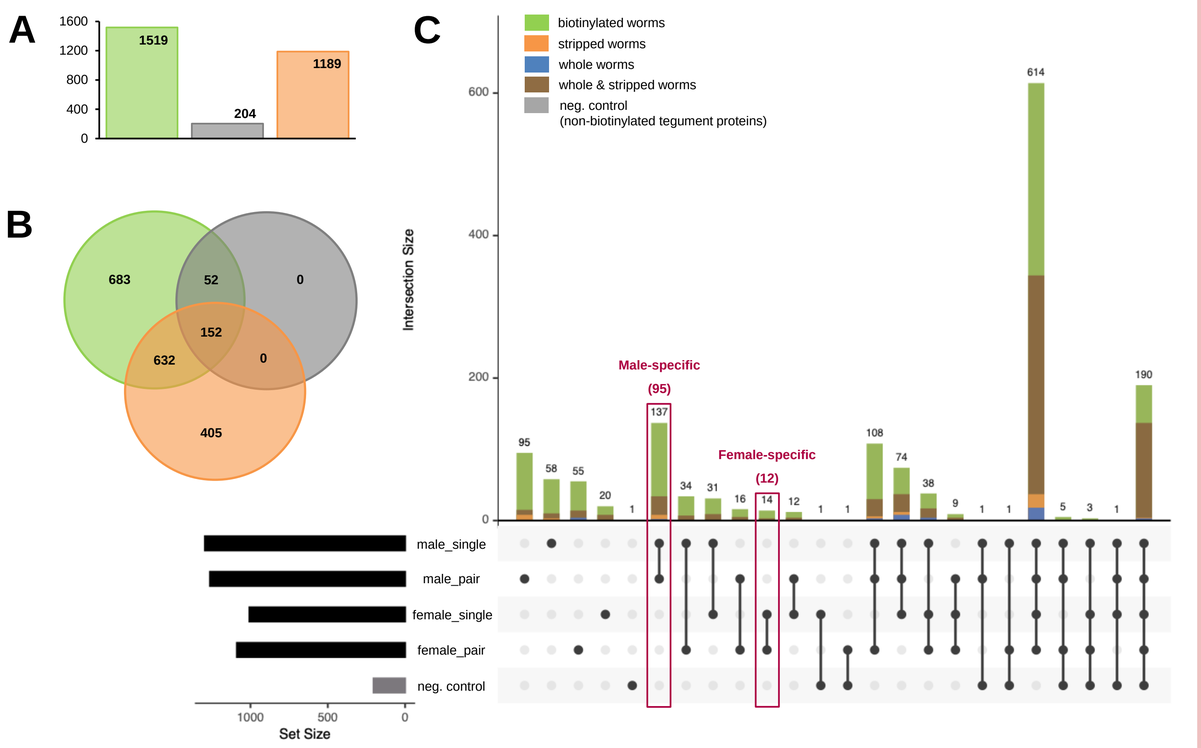
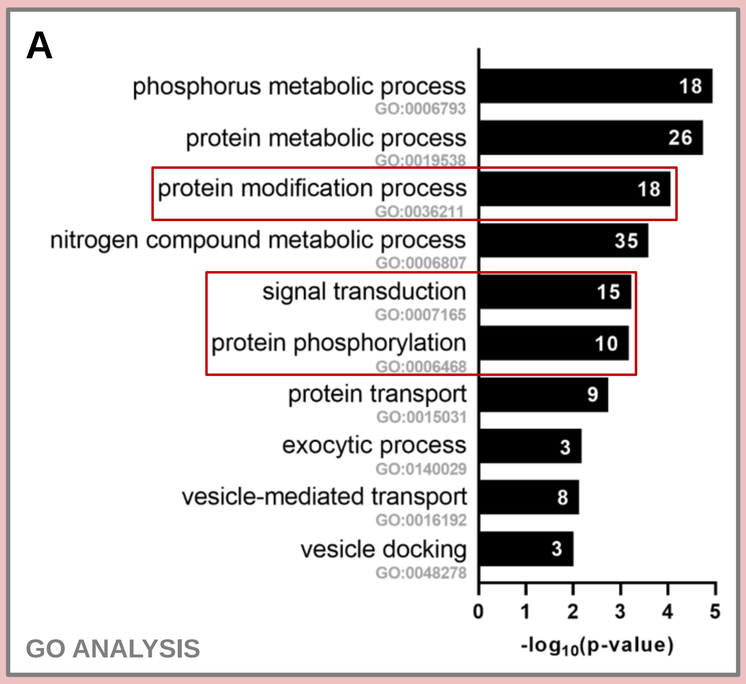
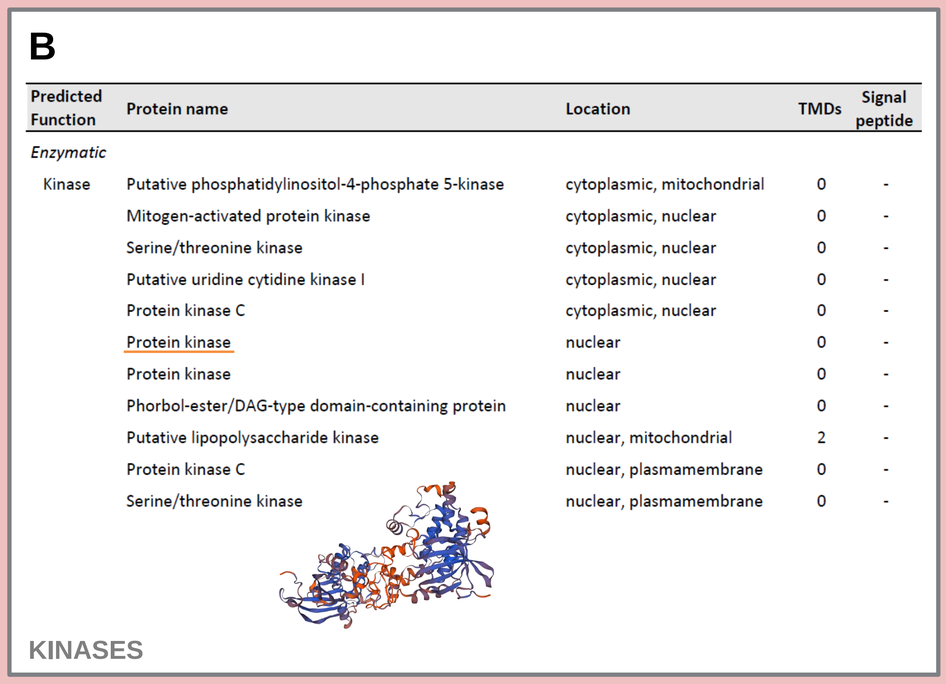


Figure 2. 1519 identified tegument proteins for adult *Schistosoma* mansoni. (A) Bar chart and **(B)** Venn diagram show the total amount of biotinylated (green), non-biotinylated (grey) as well as proteins of stripped worms (orange). **(C)** The numbers and intersections of identified proteins from different *Schistosoma mansoni* proteomes are presented as Upset plot. Connection of dots indicates shared proteins between experimental groups. Set size displays total numbers of proteins identified within experimental groups. Number of male- and female-specific proteins are outlined in red [after subtraction of the control groups, non-biotinylated tegument proteins (= neg. control) and stripped worm proteins].





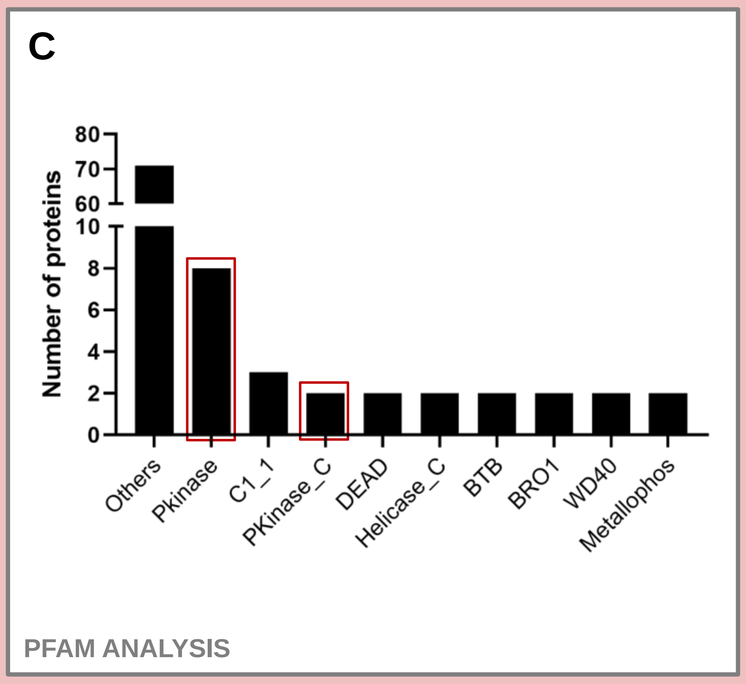


Figure 3. Kinases are enriched for male-specific tegument proteins of adult *Schistosoma* mansoni. (A) The top 10 enriched categories for biological processes of male-specific proteins. Proteins are analysed by g:Profiler and plotted using GraphPad Prism 9. Number of proteins in each category is shown in white. **(B)** Table of identified kinases within the male-specific tegument proteins. Predicted protein model of protein kinase (underlined orange) built with SWISS-MODEL. TMDs, Transmembrane domains. **(C)** 10 most abundant Pfams from the tegument proteins of male-specific adult *S. mansoni* summarised in bar graph.

CONCLUSION

The application of our new workflow give rise to a list of promising protein candidates that should be taken into account as promising candidates for the development of new therapeutic approaches against schistosomiasis.

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