

TITLE: TRANSCRIPTIONAL DIFFERENCES BETWEEN SALIVARY GLAND AND SALIVA-ISOLATED PLASMODIUM VIVAX SPOROZOITES REVEALED BY SINGLE-CELL RNA SEQUENCING

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ABSTRACT: Sporozoites are the infective form of *Plasmodium* parasites, responsible for its transmission from mosquitoes to the vertebrate host. They develop in mosquito midguts and migrate to salivary glands, where they await transmission through the saliva during a blood meal. Following injection, they undergo differentiation and replication, initiating the blood-stage infection. Current WHO-recommended malaria vaccines target *P. falciparum* sporozoites; however, little is known about *P. vivax* sporozoites making specific studies crucial for developing adapted vaccines and interventions efficient against this species.

Previous studies of *P. vivax* sporozoites have largely relied on parasites isolated from mosquito salivary glands. Here, we employed scRNAseq to compare gene expression profiles between salivary gland sporozoites and those collected directly from mosquito saliva, representing the population transmitted during blood feeding.

Results show transcriptional differences between these two populations with mature sporozoites presenting higher transcriptional levels of motility and invasion genes than their counterparts. Our findings highlight the importance of studying sporozoites at the point of transmission, as salivary gland-derived parasites may not fully represent the infective population that enters the host. These transcriptional insights could inform the identification of novel vaccine targets specific to transmission-ready *P. vivax* sporozoites.

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