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Thermodynamic studies of AgamOBP4 and AgamOBP5 from *Anopheles gambiae* with different semiochemicals

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Mosquitoes and other arthropods may transmit infectious agents causing several diseases. In such a context, *Anopheles gambiae* is considered the primary mosquito vector responsible for the transmission of malaria causing more than 1 million deaths each year. The use of repellents is one of the strategies adopted to contrast the spread of such diseases as they reduce the contact frequency between vectors and human targets.

Like for other insects, the olfactory system of mosquitoes is essential for finding food, mates and blood meals and Odorant-binding proteins (OBPs) are the first components of their odor detection unit. Specifically, semiochemicals are captured by OBPs after their interaction with insect's antennae and are delivered to odorant receptors. Therefore, given the crucial role of OBPs, they constitute promising targets for the design of new repellent or attractant molecules and may improve the effectiveness of mosquitos control strategies (1,2).

Here we present a calorimetric study of the thermodynamic stability of AgamOBP4 and AgamOBP5 and their behaviour against several potential ligands. In spite of the great structural resemblance between these two proteins, nanoDSC investigation performed at different pH values (pH 5.0 and 8.0) revealed different pH-dependent thermodynamic profiles and stability. Moreover, AgamOBP5 and AgamOBP4 exhibited different binding affinities for certain molecules suggesting their ability to recognize different classes of odors and that they are likely involved in different pathways of host recognition. Specifically, among the potential ligands tested, AgamOBP4 preferentially binds to artemisia acetate, whereas AgamOBP5 prefers carvacrol, thymol and cuminaldehyde as binders.

References

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