Models of anterior gut alkalinisation of the *Aedes aegypti* mosquito midgut: new pH regulatory paradigms

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The anterior midgut of larval mosquitoes and other dipterans is known to generate a strong luminal alkalinisation of up to pH 12. However, the mechanism by which this happens remains unresolved. In previous studies, it was demonstrated that serotonergic activation of the anterior midgut activates a H^+-ATPase mediated alkalinisation of the luminal pH. We subsequently demonstrated that in concert with the serotonin application, intracellular pH (pH_i) is elevated above pH 8.8,raising interesting biochemical and pH regulatory questions. We postulated that this pH_i elevation would allow for an apical sodium bicarbonate transporter (NBC) to export both bicarbonate and carbonate and thereby alkalinize the lumen. We report the cloning and characterization of the expression pattern of the electrogenic NBC in larval *Aedes aegypti* mosquitoes. Two splice variants of the single NBC gene were found in the completed *Aedes* genome. Quantitative PCR demonstrated high levels of expression of NBC in the anterior midgut compared to the gastric caeca, posterior midgut or Malpighian tubules. We postulate that the NBC on the apical surface of the anterior midgut is an integral part of the luminal alkalinsation process.