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Influence of mosquito saliva on vertebrate animals could lead to creation of non - pathogenic vaccine

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Hematophagous insects are a major problem to vertebrate host as vectors of fetal diseases and also as nuisance pests. Mosquitoes and sandflies transmit some of the world's most serious vector-borne diseases such as malaria, encephalitis, filariasis, yellow fever and leishmaniasis. In Egypt *Culicine* and *Anopheline* mosquitoes have been incriminated in transmission of many serious diseases. Saliva is an important factor in the transmission of disease agents by mosquitoes. The saliva of vectors possesses an array of pharmacologically active compounds which helps them to locate blood vessels and to disrupt the hemostatic process of the host, mainly the blood clotting, platelet aggregation and vasoconstriction. The vertebrate immune reaction to the pathogen is somehow modulated by mosquito salivary. Intensive studies were carried out on vectors borne diseases for understanding its role on vertebrate hosts with very encouraging results. The present study aims mainly to investigate; 1) The effect of biting of certain mosquitoes species on experimental animals; 2) The developing of cross-reaction against the bites of certain mosquito species in experimental animals pre-exposed to separated bites by other species; 3) The possibility that exposure to mosquito saliva may modulate immunity to mosquito bites in vertebrate host. Group of four pigeons were exposed to bites of groups of *Culex pipiens* and *Anopheles pharoensis* (2 pigeons for each species) 100 female mosquitos per a pigeon and 12 different (clean) pigeons are used as control pigeons (6 pigeons for each mosquitoes species) where one pigeon is exposed frequently to the bites of 100 mosquitoes of one species, 6 times in 18 weeks and the biting rate was calculated. The biting rate of mosquitoes on a pigeons decreased through different attempts. The rate could be decreased due to the immunomodulatory factors in mosquito's saliva which caused resistance to their saliva. The biting rates of mosquitoes on clean pigeons (control pigeons) were not decreased through different attempts. The saliva compositions of mosquitoes are protein molecules which act as antigen components, producing antibodies against these protein molecules. Pigeons previously bitten by *Culex pipiens* and *Anopheles pharoensis* are exposed once to bites of 100 female of the other mosquito species. The rate of feeding calculated. The rate increased in comparing with the final attempts feeding rates it was relatively similar to the rate of feeding of control pigeons at the first attempt. This rate may be increased due to little cross- reactivity between the two mosquitoes species. Protein components in the salivary glands of both *Cx. sp.* and *An.sp.* were compared. Polyacrylamide gel electrophoresis was carried out for comparison of protein. The electrophoresis profiles of the salivary gland homogenate (SGH) differed between the two mosquito species. From 12 to 15 prominent protein bands with molecular masses ranging from 22-170 KDa were visualized by Commassie blue gel code staining in each SGH. They shared 7 protein bands and salivary glands have 7 protein bands were not found in the *Anopheline* salivary glands mean while, 5 protein bands found in *Anopheline* salivary glands of *Anopheline* mosquitoes and not found in *Culicine* salivary glands. This difference in the protein components of the salivary gland correspond with the phylogenetic position of species. In conclusion, this study showed that there is no significant cross-reactivity against the bites of certain mosquito species in experimental animals pre-exposed to separated bites by other species, otherwise, the saliva of mosquitoes exerts immunomodulatory effect on vertebrate host. These saliva as protein fractions act as antigen, which can enhance the production of antibodies in the host. This study indicated that the preliminary effect of mosquito saliva could affect the feeding rate of mosquitoes. Most components of mosquito saliva are highly species -specific. We considered that, the present study is preliminary step for long and intensive researches to produce nonpathogenic vaccine as salivary protein to affect mosquitoes- borne diseases to decrease or even prevent spreading the infectious diseases, and also for decreasing or prevent the biting of the mosquitoes.

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