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MEETING ABSTRACTS

PARTIAL UNFOLDING OF INSECT ACETYLCHOLINESTERASE: STEPS TOWARD CYSTEINE-TARGETING INSECTICIDES

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To obtain insight into the development of thermally stable insect acetylcholinesterases, 200 distinct, independent, unrestricted, unbiased, isobaric–isothermal, 316-ns molecular dynamics simulations of a substrate-bound mosquito acetylcholinesterase responsible for cholinergic functions (AP-agAChE)[1] were performed using forcefield FF12MC[2] and PMEMD of AMBER 11 with a periodic boundary condition at 1 atm and 340 K. In-depth conformational analysis of these simulations with an aggregated simulation time of 63.2 microseconds revealed partially unfolded regions of AP-agAChE that could be stabilized with mutations for developing thermally stable AP-agAChE variants and thereby enabling rigorous characterization[3] of cysteine-targeting anticholinesterases as potential insecticides that are effective and environmentally safe and also spare beneficial insects[1].

Keywords: insect acetylcholinesterase; protein unfolding; protein engineering; anticholinesterase; cysteine-targeting insecticide

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