5step approach to biomedical science research

5-step Approach to Biomedical Science Research Identified a & Proposed a Hypothesis Arteminsims from sweet wormwood are known to be the important class of antimalarial drugs. Artemisinin-containing therapies have increased, but the mechanism of action of the sesquiterpene lactone endoperoxides is controversial. The authors had earlier demonstrated that artemisinin inhibits the SERCA ortholog of PfATP6 with marked specificity. But these molecular determinants were undefined. In an another report thapsigiargin , a sesquiterpene lactone inhibits both mammalian and malarial SERCAs. These findings led to hypothesis that artermisins interact with a region of PfATP6 that binds thapsigargin-binding cleft of malarial and mammalian SERCAs, and are the determinant of the arteminisinin.

Designed Experiments to supply themselves with relevant data

Based on the previous data and literature, the authors identified PfATP6 as a target site. Using bioinformatics the researchers compared the amino acid sequences of mammalian and malarial SERCAs, and found that the leu263 residue is unique along with few more amino acid. After identification, different mutant were constructed to determine the affinity of arteminsins towards these mutated forms to establish its role of each amino acid towards arteminsins sensitivity.

Carried Out Experiments and Obtained Data:

To determine the role of leu263 and other amino acids in PfATP6 doain. Different mutant of PfATP6 were express in Xenopus oocyte and functionality test were performed. It was shown that in case of altered Leu263 sensitivity decreased to almost three fold. Whereas alteration of other amino acids along with leu263 lead to 10 fold decrease in sensitivity. Similarly, introduction of Leu263 in non-sensitive sps. like Plasmodium vivax and P.

berghei ether increased or decreased sensitivity. They also found that arteminsins have similar effect on oocyte as well as mature organism which again supports the hypothesis of SERCA as primary target for arteminsins. For further confirmation of role of Leu and the over all importance of PfATP6 conformation, Glu255 in mammalian SERC was replaced with Leu. It was observed that mammalian SERCA become sensitive to arteminsins. The authors have consistently proved their observation and results in light of structure and 3D conformation of PfATP6 subunit of SERCA. Similarly, they also demonstrated the importance of interaction between different residue and its impact on arteminsins sensitivity.

Tested their Hypothesis (Subjected their data to Statistical Analysis)

The experiments were performed with appropriate controls. Further all experimentation were done in triplicates for statistical significance and results were validated at confidence level of p