

Biotechnology Congress 2015 : Nanosystems formed by amphiphilic antimony(v) complexes incorporating amphotericin B for the treatment leishmaniasis- Arshad Islam - Universidade Federal de Minas Gerais

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This work aimed to develop an oral formulation of amphotericin B (AmB) for treatment of leishmaniasis. AmB is an antifungal and antibacterial macrolide polyene derived from *Streptomyces nodosus* strain, that belongs to the group of second generation anti-leishmanial drugs and is extensively used in case of failures in the treatment with antimonial compounds. AmB was incorporated into nanosystems formed by amphiphilic antimony(V) complexes with ligands of alkylmethylglucamide series (L8 and L10, with 8 and 10 carbon chain, respectively). Incorporation rate of 0.2% AmB into SbL8 and SbL10 dispersions was determined using an HPLC-based technique and was found to be $84 \pm 1\%$ and $74 \pm 1\%$, respectively. The characterization of SbL10-AmB and SbL8-AmB by circular dichroism and UV-visible spectroscopies showed that AmB is present predominantly under the monomeric form in both SbL8 and Sb10 nanosystems, which is the least toxic form to the host and potentially most bioavailable. The potential for the oral treatment of visceral (VL) and cutaneous leishmaniasis (CL) was evaluated in murine models in comparison to the standard drug Anforicin B® or Glucantime® administered intraperitoneally or orally. In Balb/c mice infected with *Leishmania amazonensis*, the SbL10-AmB mixed formulation (170 mg Sb/kg and 14 mg AmB/kg, each 2 days by oral route) resulted in a significant decrease of the lesion size, when compared to orally administered Glucantime® and SbL10 (170 mg Sb/kg, each 2 days), Anforicin B® (>1mg/kg/each 5th day, by intraperitoneal route) and control saline group. In Balb/c mice infected with *Leishmania infantum*, both the SbL10-AmB and SbL8-AmB mixed formulations given orally (170 mg Sb/kg and 14 mg AmB/kg per day) reduced significantly the parasite load in the liver

compared to the untreated control, to a similar level as AmB given intraperitoneally (0.9 mg/kg/day). This study established for the first time the potential of mixed SbL10-AmB and SbL8-AmB formulations for the oral treatment of both cutaneous and visceral leishmaniasis, indicating their potential for further development and applications. RNAi has been created as an incredible strategy in the examination of useful genomics just as plant biotechnology control. In this report, two-fold downregulated RNAs (dsRNA) focusing on 3-hydroxy-3-methylglutaryl coenzyme A reductase (HMGR) quality, which catalyze a rate-constraining enzymatic response in the mevalonate pathway of adolescent hormone (JH) combination in cotton bollworm, was communicated in cotton plants by means of *Agrobacterium tumefaciens*-mediated change. PCR and Southern investigation uncovered the joining of HMGR quality into cotton genome. RT-PCR and qRT-PCR affirmed the high interpretation level of dsHMGR in transgenic cotton lines. The HMGR articulation both in interpretation and interpretation level was altogether downregulated in cotton bollworms (*Helioverpa armigera*) hatchlings in the wake of benefiting from the leaves of HMGR transgenic plants. The interpretation level of HMGR quality in hatchlings raised on transgenic cotton leaves was as much as 80.68% lower than that of wild kind. What's more, the relative articulation level of vitellogenin (Vg, vital wellspring of sustenance for posterity incipient organism advancement) quality was likewise decreased by 76.86% when the bug hatchlings were taken care of with transgenic leaves. The aftereffect of bug bioassays indicated that the transgenic plant harboring dsHMGR restrained net weight gain as well as postponed the development of cotton bollworm

hatchlings. Taken together, transgenic cotton plant communicating dsRNAs effectively downregulated HMGR quality and hindered the turn of events and endurance of target creepy crawly, which gave more choice to plant bug control. Catchphrases: 3-hydroxy-3-methylglutaryl coenzyme A reductase(HMGR), cotton bollworm, RNA impedance, transgenic cotton, twofold abandoned RNAs, bother control. Cotton (*Gossypiumhirsutum*) is a significant fiber and financial yield far and wide, which shows obvious noteworthiness in crop creation. Irritations and pathogenic growths present principle worry for the profitability and nature of cotton. As of now, the significant vermin in cotton creation is cotton bollworm (*Helicoverpaarmigera*). Despite the wide development of transgenic bug safe BT cotton demonstrating gigantic financial and social superiorities 1, the transformations of bollworm quality among ages and the determinations coming about because of BT bug safe proteins supply bollworm with protection from transgenic BT crops 2-6. Consequently transgenic creepy crawly obstruction crops with elective procedures is alluring. RNA impedance (RNAi), a compelling quality quieting instrument in eukaryotes, has been found in *Caenorhabditiselegans* 7 just because and afterward created as a powerful bug safe framework in a wide assortment of plant species 8, 9. Twofold strand RNA (dsRNA) can be created by inside interpretation, transposon, counterfeit transgenesis and RNA infection disease, which are perceived and decayed into little meddling RNAs (siRNA) by endoribonuclease Dicer. RNA-actuated hushing complex (RISC), including siRNA and a few proteins, for example, endonucleases, exonucleases and helicases, displays the capacity of nucleases to perceive and sever explicit objective RNA 10. Thusly, RNAi can be misleadingly used to hinder the statement of endogenous quality. Sharing basic atomic system of arrangement explicit quality quieting in a wide assortment of animal varieties, RNAi activated by exogenous dsRNA has been created as one

of the most productive apparatuses for the examination of quality capacity 11 as well as bug control 12-16. The dsRNA delivered by transgenic plants against key quality of vermin has been viewed as shield that supplies transgenic safe nuisance plants with new development 17, 18. Cotton bollworm experiences complex shedding process in its life cycle, whose development and advancement are coordinately directed by hydroxyecdysone 19-22 and adolescent hormone (JH) 22. Analogs of JH have been combined misleadingly and carried new originalities to the essential innovative work of pesticide 23. Fruitful utilizations of hormone analogs identified with shedding process indicated that hindrance or exaggerating of critical hormones could be another system for the coordinated bug the executives (IPM) of bugs having a place with the Phylum Arthropoda 24. Along these lines, the critical qualities or interpretation factors engaged with the hormone biosynthesis pathways are slanted to be utilized as perfect targets when RNAi innovation is applied to bug control 25. JH is integrated by means of the mevalonate pathway in bugs, in which mevalonate is one of the most significant intermediates. HMG-CoA, the forerunner of mevalonate pathway, is obliged to experience three enzymatic responses to be changed over into mevalonate, and HMGR catalyzes and manages the last response 26.

Biography

Arshad Islam has completed his PhD from Universidade Federal de Minas Gerais, Brazil and currently working as Post-doctoral researcher at Laboratory of Biophysics and Nanostructured Systems, Department of Physiology and Biophysics, Institute of Biological Sciences, Universidade Federal de Minas Gerais. He has published 4 papers in reputed journals.

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