Review Article

Recent Advances on the Use of Biochemical Extracts as Filaricidal Agents

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Lymphatic filariasis is a parasitic infection that causes a devastating public health and socioeconomic burden with an estimated infection of over 120 million individuals worldwide. The infection is caused by three closely related nematode parasites, namely, Wuchereria bancrofti, Brugia malayi, and B. timori, which are transmitted to human through mosquitoes of Anopheles, Culex, and Aedes genera. The species have many ecological variants and are diversified in terms of their genetic fingerprint. The rapid spread of the disease and the genetic diversification cause the lymphatic filarial parasites to respond differently to diagnostic and therapeutic interventions. This in turn prompts the current challenge encountered in its management. Furthermore, most of the chemical medications used are characterized by adverse side effects. These complications urgently warrant intense prospecting on biochemicals that have potent efficacy against either the filarial worms or their vector. In lieu of this, we presented a review on recent literature that reported the efficacy of filaricidal biochemicals and those employed as vector control agents. In addition, methods used for biochemical extraction, screening procedures, and structure of the bioactive compounds were also presented.

1. Introduction

Lymphatic filariasis is a disease that is caused by parasitic helminthes, namely, Wuchereria bancrofti, Brugia malayi, and B. timori. The parasites are transmitted by several mosquito species [1, 2], and the disease is reported to constitute serious public health and socioeconomic issues. In fact, it is said to be a major cause of acute and chronic morbidity in humans within tropical and subtropical areas of Africa, Asia, the Western Pacific, and some parts of the Americas [3]. It has been characterized with long-term infection through suppression of host immunity [1]. The pathogenesis of lymphatic filariasis is linked to host inflammation invoked by the death of the parasite (Figure 1), resulting in an altered lymphatic system and the abnormal enlargement of body for example, hydrocoele, lymphedema, and elephantiasis, causing pain and severe disability. The filarial species that infect people are known to coexist in a mutualistic endo-symbiotic relationship with Wolbachia bacteria, which are reported to be essential for the growth, development, and survival of the nematode hosts [1]. These endosymbionts are said to be among the factors that contribute to the inflammatory effect of this disease [1]. According to World Health Organization (WHO) fact sheets, more than 1.3 billion individuals in 72 countries worldwide are threatened by lymphatic filariasis, with over 120 million individuals being currently infected, and about 40 million being disfigured and incapacitated by the disease [2].

Currently, the chemotherapeutic drugs used to treat filariasis include doxycycline therapy, which targets the endosymbionts, delivers macrofilaricidal activity and improves pathological outcomes. Interestingly, the drug is said to be effective, even when used as monotherapy [1]. Combined therapeutics dosage of diethylcarbamazine (DEC), ivermectin, and