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Herbal medicine in management of non-communicable diseases: A case of two medicinal plants under evaluation for bronchial asthma in Kenya

Asthma is a chronic lung disorder of enormous public health concern. The World Health Organization (WHO) estimates that 235 million people worldwide suffer from this illness. According to the Global Burden of Asthma Report of 2014, people of all ages in all parts of the world have asthma, causing a substantial burden to people, often with reduced quality of life, not only due to its physical effects but also its psychological and social effects. In sub-Saharan Africa, despite improvements in diagnosis and management and an increased understanding of the epidemiology, immunology and biology of the disease, asthma prevalence, morbidity and mortality have progressively increased. Asthma has no known cure in modern medicine. Medicinal plants constitute a rich treasure of sources of natural products, which provide health security to millions. Two plants, Synadenium grantii Hook.f. (Euphorbiaceae) and Microglossa pyrifolia (Lam.) Kuntze (Asteraceae) are used traditionally for the treatment and management of various ailments by different communities in Kenya. An observational study by a clinician on concoctions of the plants for the management of bronchial asthma has indicated a high potential of the preparations. We report on the anti-asthmatic activity of the extracts in an animal model. Total extracts from the two plants were evaluated for their anti-asthmatic activity and safety in singular and in combination in a murine model of an allergic airway disease employing an ovalbumin-induced allergic airway response. Levels of IgE and eosinophil counts were determined for efficacy and CC50/ LD50 evaluated on mammalian cell lines and in mice for safety following WHO/EDM/TRM/2000.1 guidelines. Both extracts, administered to mice in singular or in combination showed reduced levels of IgE in blood compared to control (total OVA-specific IgE: 0.562±0.001×103 [of control] vs. 0.245~0.253±0.001×103 [of test extracts]; p≤0.001 test vs. control by ANOVA Benferroni/Dunn) following oral treatments at 500 mg/kg. There was a significant reduction of eosinophil counts in the BALF of mice treated with the extracts (>80% reduction) in treated mice vis-a-vis the untreated mice; p value≤0.001 test vs. control by Student's t-test. The concentrations of extract showing efficacy were not cytotoxic in mammalian cell lines or acutely toxic in mice at tested concentrations (CC50>200 mg/ml in mammalian cell lines; LD 50>5000 mg/Kg in mice). IgE antibodies and eosinophil are mediators of asthma and their elevation indicate a possible asthmatic attack. Reduced levels of IgE and eosinophil in treated animals therefore indicated the potential of the extracts in management of asthma. This information augments observational studies and forms a basis for validation and development of the extracts as alternative therapies for asthma management.

Biography

Festus M Tolo is a Phyto-Medical Biologist with a PhD in Medicinal Phytochemistry. He is the Chief Research Officer and the Head of NAPREDA-KEMRI and Fellow at the African Scientific Institute. He is an awardee of the the Nelon Gold Award (NGA) of KEMRI and a recipient of the Inter-Academy Medical Panel (IAMP) Distinguished Scientist Award in Natural Products Research by the China Academy of Chinese Medical Sciences (CACMS) and Chinese Academy of Engineering (CAE). He is a part time Lecturer in Medical Microbiology and peer Reviewer of Quality Standards (QS) for the Commission for University Education (CUE), Kenya.

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