

Allergenic Potential of Airborne Algae Isolated from Malaysia

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Abstract : The human health risks due to poor air quality caused by a wide array of microorganisms have attracted much interest. Airborne algae have been reported as early as 19th century and they can be found in the air of tropic and warm atmospheres. Airborne algae normally originate from water surfaces, soil, trees, buildings and rock surfaces. It is estimated that at least 2880 algal cells are inhaled per day by human. However, there are relatively little data published on airborne algae and its related adverse health effects except sporadic reports of algae associated clinical allergenicity. A collection of airborne algae cultures has been established following a recent survey on the occurrence of airborne algae in indoor and outdoor environments in Kuala Lumpur. The aim of this study was to investigate the allergenic potential of the isolated airborne green and blue-green algae, namely *Scenedesmus* sp., *Cylindrospermum* sp. and *Hapalosiphon* sp.. The suspensions of freeze-dried airborne algae were administered into balb-c mice model through intra-nasal route to determine their allergenic potential. Results showed that *Scenedesmus* sp. (1 mg/mL) increased the systemic Ig E levels in mice by 3-8 fold compared to pre-treatment. On the other hand, *Cylindrospermum* sp. and *Hapalosiphon* sp. at similar concentration caused the Ig E to increase by 2-4 fold. The potential of airborne algae causing Ig E mediated type 1 hypersensitivity was elucidated using other immunological markers such as cytokine interleukin (IL)- 4, 5, 6 and interferon- γ . When we compared the amount of interleukins in mouse serum between day 0 and day 53 (day of sacrifice), *Hapalosiphon* sp. (1mg/mL) increased the expression of IL4 and 6 by 8 fold while the *Cylindrospermum* sp. (1mg/mL) increased the expression of IL4 and IF γ by 8 and 2 fold respectively. In conclusion, repeated exposure to the three selected airborne algae may stimulate the immune response and generate Ig E in a mouse model.

Keywords : airborne algae, respiratory, allergenic, immune response, Malaysia

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