Immunological adjuvant effect of Quillaja brasiliensis saponins on specific antibody response to poliovirus in mice

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Introduction: The saponins of Q. brasiliensis, a native species from Southern Brazil, are remarkable similar to those of Q. saponaria, which are used as adjuvant in vaccine formulations. Potential adjuvant activity of an aqueous extract (AE) and a purified saponin fraction (QB-90) obtained from leaves of Q. brasiliensis was reported for bovine herpesvirus type I (Fleck et al., Vaccine, 24, 7129, 2006). Further studies showed that QB-90 is a safe preparation whose adjuvant effect resembles that of Quil-A®, a well-known saponin-adjuvant (Silveira et al., Vaccine, 41, 9177, 2011). Herein, we studied AE and QB-90 adjuvant activity using an inactivated poliovirus vaccine.

Experimental: Leaves from Q. brasiliensis were extracted according to Fleck et al. (2006) to yield AE and QB-90 fraction. Poliovirus antigen was prepared following standard laboratory procedures. The infectious virus titre before inactivation was $10^{3.25}$ TCID$_{50}$/50µL. Five groups of seven mice each (7–8 weeks old) of the CF-1 breed were vaccinated subcutaneously on days 0 and 28. Animals were immunized with viral antigen plus saline (control group), or with either Quil-A® (50 µg), AE (400 µg) or QB-90 (50 and 500 µg). Sera from inoculated mice were collected on days 0, 28, 42, 56, 84 and 112 post-inoculation of the first dose of vaccine. Specific antibody titres were evaluated by indirect ELISA.

Results: Serum levels of specific anti-poliovirus IgG, IgG1, IgG2a, IgG2b and IgM were significantly enhanced by AE, QB-90 (both doses) and Quil-A® compared to control group ($p < 0.05$). On day 112, all saponin-adjuvanted vaccines significantly continue to enhance levels of all antibodies tested as compared with control ($p < 0.05$).

Conclusion: Both AE and QB-90 from Q. brasiliensis are potent immunological adjuvants and can be considered as a Brazilian alternative to Quil-A®.

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