Pressure inactivated influenza virus as a candidate for an universal vaccine against flu: beyond the antibody response

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Introduction. Vaccination is currently used for the prevention of flu, however, studies in animals and humans have demonstrated that in the case of infection with an influenza virus of another subtype, vaccinated individuals can present a worst outcome than unvaccinated. Current vaccines are based primarily on the induction of antibodies against variable epitopes and do not induce TCD8 + response, essential for cross-immunity. Pressure inactivated influenza (PII) H3N2 virus preserves the ability to bind and fuse membrane with cells, which has been demonstrated to be essential for TCD8+ and cross-immune responses. **Objectives.** Assess immunological parameters and protection in vaccinated mice. **Methods.** Antibody were evaluated by ELISA and in vitro inhibition assays. Cytokines were measured by ELISA. Protection was monitored by mortality and weight loss. **Resulst and discussion.** Vaccinated mice with (PII) produced IL-6 and IFN-&; (both associated with T cell stimulation) and antibodies against the highly conserved epitope HA2. Vaccinated mice showed high levels of IgA in nasal wash and higher levels of lymphocytes, macrophages and neutrophils in bronchoalveolar fluid (BAL). Mice survived lethal cross-challenge with H1N1, and this effect is long lasting with animals being protected even after 100 days after vaccination. Young and old mice were also protected by vaccination. The absence of neutralizing antibodies against H1N1 in the serum of vaccinated mice and the ineffectiveness of serum transfer in protecting naïve animals from lethal challenge strongly support the essential role of TCD8+ response. Add to this the fact of the low effectiveness of vaccine in perforin knockout mice. **Conclusions.** Our results indicate that (PII) is a robust model to induce both antibody and TCD8+. There is an urgent need to improve influenza vaccine, and our results support that (PII) can be a safe and low coast model to provide a broad spectrum of protection against flu