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Studies on H1N1 vaccine-induced monoamines alternations and oxidative stress on brain of adult mice

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ABSTRACT

Over the past decade illness outbreaks have posed a serious threat to human life and well-being. The 2009 outbreak H1N1/A influenza virus also was expected to disproportionately affect healthy young persons under the age of 25 years. A small amount of the preservative thimerosal is routinely added to many vaccine preparations, including H1N1 vaccine. Thimerosal is an organic mercurial containing an ethylmercury moiety attached to the sulfur atom of thiosalicylate. Since the 1930s, thimerosal has been used as an antiseptic and a preservative in a wide variety of products, to investigate the monoamines alternation and oxidative stress induced after H1N1 vaccine injection, adult male Swiss mice were injected with thiomerosal, adjuvant, H1N1 antigen and H1N1 vaccine. Results obtain on the present study showed that thiomerosal, H1N1 antigen and H1N1 vaccine were caused significant decrease in norepinephrine (NE) and dopamine (DA) contents of hypothalamus, striatum and cerebral cortex. The alternation in NE and DA was associated with significant increase in oxidative markers namely lipid peroxidation and nitric oxide, oxidation induction was extent to cause significant decrease in glutathione level. In conclusion, the present study demonstrated that H1N1 vaccine as a whole and/or its ingredient caused oxidative stress and monoamines alternations in brain of mice. The present observation could be due to the presence of thiomerosal.

INTRODUCTION

New communicable disease influenza A (H1N1) affected geographically diverse areas around the world in 2009. Person to person transmission has led to increase the numbers of patients. The current H1N1 virus, which was previously referred as Swine Flu is totally a new virus subtype. This new virus subtype is efficiently able to be transmitted from human to human which may cause Pandemic Influenza (Gangurde *et al.*, 2011). Influenza virus infection, one of the most common infectious diseases, is a highly contagious airborne disease that causes an acute febrile illness and results in variable degrees of systemic symptoms, ranging from mild fatigue to respiratory failure and death. These symptoms contribute to significant loss of workdays, human suffering, mortality, and significant morbidity (Islam and Rahman, 2010). Strategies to shorten the time between emergence of a human influenza pandemic virus and the availability of safe and effective pandemic influenza vaccines are of the highest priority in global health security. There are limited immunogenicity and safety data, and no efficacy data would be available when human pandemic influenza vaccines are first administered after a pandemic is declared.

The risks and benefits of pandemic influenza vaccine will need to be studies post marketing (Bouvier and Palese, 2008). Vaccines contain live viruses, killed viruses, purified viral proteins, inactivated bacterial toxins, or bacterial polysaccharides. In addition to these immunogens, vaccines often contain other substances. For example, vaccines may contain preservatives that prevent bacterial or fungal contamination (eg, thimerosal); adjuvants that enhance antigen-specific immune responses (eg, aluminum salts); or additives that stabilize live, attenuated viruses (eg, gelatin, human serum albumin).

Furthermore, vaccines may contain residual quantities of substances used during the manufacturing process (eg, formaldehyde, antibiotics, egg proteins, yeast proteins) (Offit and Jew, 2003).

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