

An Interesting Vaccine

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Merriam-Webster dictionary defines vaccine as “a preparation of killed microorganisms, living attenuated organisms, or living fully virulent organisms that is administered to produce or artificially increase immunity to a particular disease” [1]. The term vaccine derives from Edward Jenner’s 1796 use of the term cow pox (Latin variolæ vaccinae, adapted from the Latin vaccin-us, from vacca cow), which, when administered to humans, provided them protection against smallpox [2]. However with the advancement in science and technology the scope of vaccination is no longer limited to the arena of infectious disease. An interesting vaccine trial was reported in the Lancet in 2008; a vaccine designed to lower blood pressure in hypertensive individuals. This vaccine called CYT006-AngQb is directed against Angiotensin II and therefore blocks its blood pressure escalating effect [3]. The crucial role of renin angiotensin aldosterone system (RAAS) in the pathogenesis of hypertension is now well recognized and the use of drugs to block this system has become an important modality in the management of hypertension. Hypertension is a chronic disease and its management involves daily intake of antihypertensive agent(s) for lifetime. This has raised the concern of compliance and tolerability which in turn, has impacted the management of hypertension to a significant extent [4]. As a result, there has been a search for alternative strategies to lower blood pressure.

Renin vaccine was the earliest to be tried in animal models but it led to the onset of various autoimmune diseases [5]. Subsequently, vaccines against Angiotensin I, Angiotensin II and AT-1 were developed subsequently in hope of overcoming these particular shortcomings of the original RAAS-targeted vaccines [6]. So far, CYT006-AngQb is the only effective vaccine tested in humans that effectively reduces the blood pressure. The safety and blood pressure lowering effect of this vaccine was evaluated in a randomized placebo-controlled trial of

72 patients with mild to moderate hypertension. Three subcutaneous injections of an anti-angiotensin II vaccine given at four- and eight-week intervals reduced mean ambulatory daytime blood pressure by 9/4 mmHg compared to placebo injections. The antibody response was long lived with a half life of 3-4 months. Side effects included a transient influenza-like syndrome, which occurred in 20% of patients [3]. However, CYT006-AngQb did not get to Phase III trial as the antihypertensive effects were small compared to the drugs working along the same pathway and the effects were non reproducible across the dosing schemes. Similar vaccines with modified immunogens and different adjuvants are under investigation [4,6]. Such approach, if successful, may alter the way hypertension is managed. Vaccines playing a role as monotherapy or as add on therapy to drugs, would be of immense therapeutic value for management of hypertension among those patients with compliance issue. We may be able to spot some update in this regard in the near future.

References

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