Docket #: S20-530

Modulating the epigenome with adjuvants to stimulate broad and persistent innate immunity against diverse viruses

Immunity against viruses is one of the most sought-after public health solutions. Although the COVID-19 global pandemic has fast-tracked the development of vaccines, it has highlighted the importance of leveraging novel techniques for viral immunity during vaccine development. Innate immunity induced by epigenomic influences from antiviral agents offers valuable protection before vaccine inoculation and can boost the immunity system for extra protection after vaccine administration. The Pulendran lab at Stanford invented a novel method that modulates the epigenome with existing adjuvants to stimulate broad and persistent innate immunity against unrelated bloodborne viruses. Human patients are vaccinated with the existing avian influenza vaccine H5N1 and the adjuvant AS03. Epigenomic changes are imprinted within myeloid cells, eliciting antiviral responses to dengue and zika viruses for at least 2 months. By leveraging existing adjuvants, the invention can be used as general immune boosting agents and heighten the degree of immune resistance against any virus for a prolonged period of time. Epigenetic modifiers can be transformed into accessible over-the-counter medications to boost innate immunity or antiviral booster shots, offering long-term protection against rapidly mutating viruses.

Applications

- Immune boosting agent
- Antiviral agent and/or vaccine
- Epigenome modifier

Advantages

- Only existing method to imprint persistent state of antiviral immunity
- Stimulates epigenomic changes within myeloid cells
- Utilizes existing vaccine (H5N1 influenza)
- Leverages well-known existing adjuvant AS03

Publications

- Ellebedy, A. H., Nachbagauer, R., Jackson, K. J., Dai, Y. N., Han, J., Alsoussi, W. B., ... & Ahmed, R. (2020). " Adjuvanted H5N1 influenza vaccine enhances both cross-reactive memory B cell and strain-specific naive B cell responses in humans". Proceedings of the National Academy of Sciences, 117(30), 17957-17964.

Patents

- Published Application: WO2022155601
- Published Application: 20240082393

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