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Vaccine strategies

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Remerciements

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1 Introduction

Vaccines represent an amazing invention which saved millions of lives in the world since 2000 [2]. Even if vaccination is not new, the recent pandemic of COVID-19 brought to the forefront this field, generating great advances but also important debates about safety, ethics and politics. It is necessary to take into account all these changes and to adapt to be avoid a backward step and the rejection of these opportunities.

Therefore it would be interesting to better understand the recent evolutions in vaccine strategies and technologies and the consequences it may have on society.

Firstly, I will briefly recall the history of vaccination, detailing the different types of vaccines which have been developed. Secondly, I will present the technology of mRNA (messenger ribonucleic acid) vaccines which are currently the main source of progress. Thirdly, I will observe how society is integrating these developments and what issues remain to be solved.

This theme is closely linked to the mechanics of the immune system, in medicine, which will not be detailed in this article due to the needed knowledge in medicine. In any case, I would like to thank Ms. Stoven for her molecular biology course and her help in the writing of this article.

2 A brief history of vaccines

2.1 Discovery of the principle

The principle of vaccination could come from the idea of mithridatism, that is to say the ability to gain protection against a poison by taking several benign amounts.

Variolization, which corresponds to injecting smallpox pustules to gain immunity against smallpox, began in China around the 10^{th} century [1]. Before the scientist Jenner, several persons realized variolization in England. However, in 1798, this is Jenner who made a link between cowpox and smallpox: cowpox could an attenuated version of smallpox.

The idea of vaccination is to create an individual, long-term and efficient protection against a pathogen (like a virus or a bacteria), without causing serious symptoms. This is made possible thanks to the memory of human's immune system.

2.1.1 A quick look on the immune system

2.2 First generation of vaccines

It is only between 1870 and 1885 with Pasteur's works, that the first vaccines were developed.

A Source code

The source code of this document is available at https://github.com/florian6973/biology-report.

References

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