

Teaching Unit 9

Activities relating to ethics, legal and social aspects in drug development: Vaccination in pandemic cases / Rational drug use / Access to drugs

Keywords and concepts: Vaccines. Drug use. Access to drugs. Pandemic. SARS (Severe acute respiratory syndrome). Type A influenza. Smallpox. Smallpox eradication. Donald A. Henderson. Maurice Hilleman. Edward Jenner. Lady Mary Wortley Montagu. Louis Pasteur.

'Xplore Health related tools: Videotape: How are drugs developed? Listen to some experts' opinions!; Game to initiate the debate 1: Access to treatment; Game to initiate the debate 2: Who pays for drug development?

Introduction: The development process of drugs as well as their use entails a series of associated ethic, legal and social aspects. In this teaching unit you will discuss some of these aspects and will gain further insight into the subject of vaccines, and will get to know the history and their use for the eradication of smallpox. You will also learn about pandemics and will find out more about emerging viruses.

ACTIVITY 1

- a)** In groups, find information on the ethic, legal and social aspects that were discussed in the video “Drug development and ethics” from the first module on drug development. As a starting point, you will find information in the information cards of the Discussion Continuum games of this module on drug development. Prepare your arguments in favour or against for debate in class.

- b)** In groups, think of other subjects that might be related to the development of drugs and that might be controversial.

ACTIVITY 2

- c)** Find information on the two pandemics that occurred in the XXI century (the SARS – severe acute respiratory syndrome- in 2003 and type A influenza in 2009) and how they were contained.

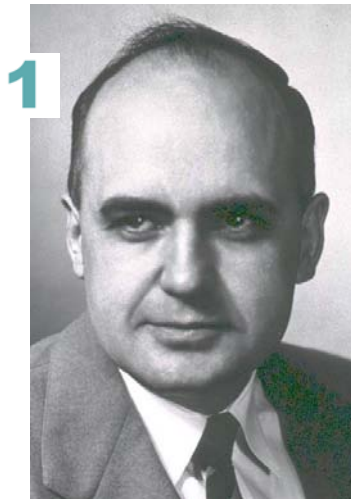
- d)** Find information on the controversy that rose up as a result of vaccination measures in the case of the type A influenza. What were the main arguments of the different involved parties? Please refer to the section “other recommended resources” for further information.

e) In the past, some viruses were eradicated. Such is the case of smallpox. Please read the following interview (in English) with Donald A. Henderson (<http://www.who.int/bulletin/volumes/86/12/08-041208.pdf>), one of the eradication campaign coordinators, and in groups, find information on:

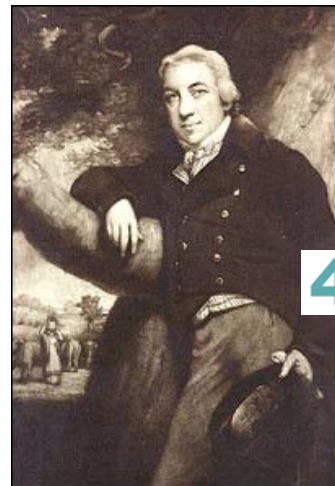
- Who was Donald A. Henderson?
- What personal opinions does Donald A. Henderson give in the interview?
- In what countries was smallpox found? In what geographical order was it eradicated? Which countries were hit the hardest?
- What is Henderson referring to when he talks about surveillance containment?
- There are two laboratories in the world that stock smallpox viruses, what was Henderson's opinion regarding the preservation of these stocks? What was done in the end? What laboratories have stocks of smallpox?
- Why would it not be possible to repeat an eradication campaign as the one carried out for smallpox for poliomyelitis?

f) Please explain what a vaccine is, what types of vaccines there are, and what their action mechanism is.

g) Match together the photographs and the different information provided in the next page on the following individuals who have played an important role in the history of vaccine development.



LADY MARY WORTLEY MONTAGU IN TURKISH DRESS



Name

a

Maurice Hilleman

b

Edward Jenner

c

Lady Mary Wortley Montagu

d

Louis Pasteur

Lifetime

a

(1919-2005)

b

(1749-1823)

c

(1822-1895)

d

(1689-1762)

What did he/she do

a

He is often credited as the discoverer of vaccination. Strictly speaking, it was not him who discover vaccination, as other people had previously ran isolated experiments, but it was him who gave vaccination a scientific status and continued its research.

b

She introduced variolation in England, and later this practice was extended throughout Europe.*

c

He developed more than forty vaccines, among others, measles, mumps, hepatitis A, hepatitis B and chickenpox

d

He was the discoverer of attenuated vaccines. These vaccines are made from microorganisms that have lost their virulence and that cause a benign version of the disease at the same time that the body develops immunity against future infections.

Anecdote

a

While she lived in the Ottoman Empire she discovered variolation and used it on her two sons to prevent them from catching smallpox, which she had suffered from.

b

He started to develop a vaccine against mumps when his daughter caught the disease at the age of 5. He went to the lab to gather the equipment he needed and when he returned home he cultured his daughter's virus, attenuated it and developed the vaccine.

c

He casually discovered, with the aid of his assistant, the vaccine against avian cholera. They were working on the transmission mechanisms that caused cholera and had to inoculate a group of chickens with bacteria to see the evolution of the disease. However, they left on holiday and forgot to inoculate the bacteria. On their return, the bacteria had become quite weak but despite everything they decided to go ahead and inoculate the chickens with the weakened bacteria. Instead of dying, the chickens developed a mild form of the disease. When the chickens were inoculated with non-weakened cholera virus the chickens survived because they had been immunised. To test this new virus, they inoculated no previously-inoculated chickens and these chickens did in fact die.

d

He inoculated James Philipps, an 8-year old boy, with cowpox pus, and one month later he realised that the child was immune when he inoculated the boy again with pus from a person infected with smallpox and did not show any sign of the disease.

** Variolation was a practice that involved inoculating healthy people with pus from people infected with smallpox so they became infected in a controlled manner with the aim of achieving immunization. It was well known that people who had survived became immune to the disease and the practice was already being used in Africa, India and China much before it was introduced in Europe. Nevertheless, this practice was not risk-free and some infected people continued to die (even though in a much lower rate) and could transmit other diseases.*

ACTIVITY 3

Please read the article in English that you will find in the link below and give us your reasoned opinion on the use of drugs. Is your opinion the same depending on the drug subject of discussion? Share your opinions with your classmates and start a debate. <http://www.wellcome.ac.uk/Education-resources/Teaching-and-education/Big-Picture/All-issues/Drug-development/Articles/WTX042357.htm>

You will find more information in the Dialogue game: *“Access to treatment”*. You can send us your opinion via the Xplore Health blog <http://www.xplorehealth.eu/xploreblog>

ACTIVITY 4

h) Read this article (in English) on the appearance of a new virus strain in South Africa towards the end of 2008 and explain the different steps undertaken by the researchers that were able to contain the disease. <http://www.who.int/bulletin/volumes/86/12/08-011208/en/index.html>

i) Why are projects such as the VIZIER project explained in video: *“Dew drugs for new threats”* important?

OTHER RECOMMENDED RESOURCES:

The links below provide interesting activities to work on the ethic, legal and social aspects involved in drug development:

Big picture – Wellcome Trust – Role game in which you need to decided on which drug to invest:

<http://www.wellcome.ac.uk/Education-resources/Teaching-and-education/Big-Picture/All-issues/Drug-development/Student-activity/index.htm>

<http://www.wellcome.ac.uk/Education-resources/Teaching-and-education/Big-Picture/All-issues/Drug-development/Teachers-resources/index.htm>

The link below, which includes an issue of the Big Picture magazine, provides information and activities that will enable you to work on the subject of epidemics, including SARS:

<http://www.wellcome.ac.uk/Education-resources/Teaching-and-education/Big-Picture/All-issues/Epidemics/index.htm>

To practice on the subject of the H1N1 influenza pandemic, you may consult the influenza special issue of the Big Picture magazine, with information and activities to do:

<http://www.wellcome.ac.uk/Education-resources/Teaching-and-education/Big-Picture/All-issues/Influenza-special-issue/index.htm>

To see how a virus such as the common cold virus spreads, students may be asked to play the following game:

<http://www.routesgame.com/games/?challengeId=2>