

CHAPTER 3

THE SCIENCE OF CLONING

- 1 Cloning is a general term used to describe processes to duplicate biological materials. For instance, researchers often copy genes or pieces of chromosomes to generate enough identical material for further studies.

- 2 Reproductive cloning refers to the application of cloning technology to animal or human cells that would result in the creation of a complete animal or human being. In the well known creation of the sheep named Dolly by scientists at the Roslin Institute in Scotland, the genetic material from the nucleus of a specialised cell from an adult sheep was transferred to an egg whose nucleus had been removed. Dolly possessed only the genetic material of the donor, and was genetically identical to the donor. The technique used is known as SCNT¹, and has since been applied to clone other animals. There are also other techniques used for reproductive cloning. The public is most familiar with the use of the term 'cloning' in this context.

- 3 Therapeutic cloning refers to the application of cloning technology on animal or human cells for research and therapeutic purposes that would not result in the creation of a complete animal or human being. With the success of cloning technology in general, therapeutic cloning of human embryos is thrown into prominence, as human embryos thus created appear to be an invaluable source of pluripotent ES cells. Potentially, therapeutic cloning is a means of deriving stem cells which are immunologically compatible with the person being treated.

¹ See Chapter 2, paragraph 3(d).

- 4 Apart from its potential value for therapy, therapeutic cloning appears important because it enables research that aids in understanding how adult cells might be reprogrammed to behave like embryonic stem cells. This will eventually make it possible to avoid using embryos as a source of stem cells. In addition, therapeutic cloning furthers understanding about human diseases, and appears important in the study of cell-based treatments.

- 5 Therapeutic cloning appears to be closely linked to human stem cell research. While it is still a frontier area of research, it hints at tremendous benefits to mankind.