EFSA
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Cloning working group.

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- With very able assistance from the EFSA staff notably Juliane Kleiner and David Carlander.

Draft Scientific Opinion on Food Safety, Animal Health and Welfare and Environmental Impact of Animals derived from Cloning by Somatic Cell Nucleus Transfer (SCNT) and Offspring and Products Obtained from those Animals

[Question No EFSA-Q-2007-092]

Endorsed for public Consultation on

19th December 2007

Animal Health and Welfare

TheEuropean Group on Ethics in Science and New Technologies to the European Commission.

Ethical aspects of animal cloning for the food supply.

Opinion No 23 Published 16th Jan 2008

Limitations

- Opinion is confined to Somatic Cell Nucleus Transfer
- Numbers and species [cattle and pigs/swine] and longevity.
- No consideration to Genetic Modification
- No consideration specifically to other Assisted Reproductive Technologies (ARTs)
- Rate of scientific publication/ research

Cloning

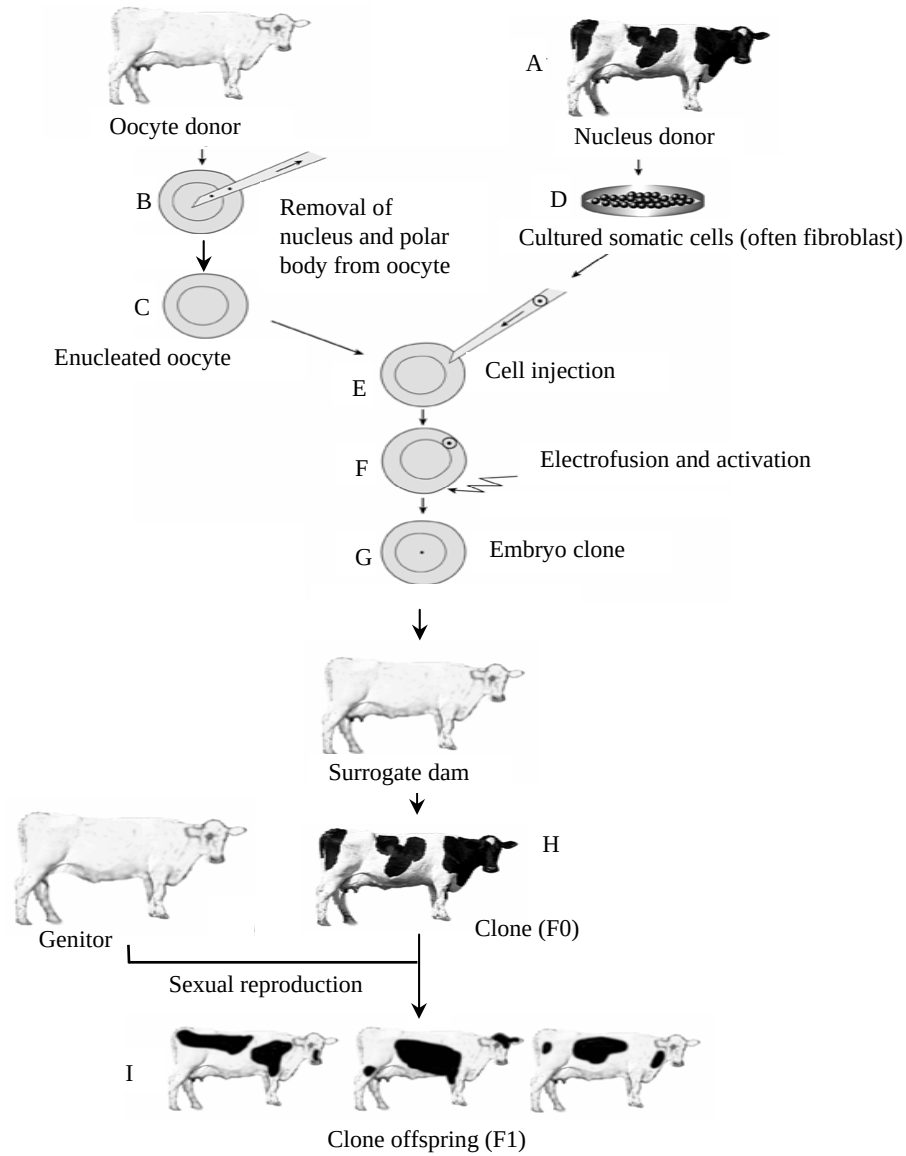
- Is not new! First farm animal born in 1984
- Amphibians in the 1950s; sheep in 1980s; monkeys in the 1990s; last 10 years more species, cattle, pigs, horses, goats, ferrets, cats, dogs etc
- 1995 Megan and Morag from embryos that had been cultured for several weeks.
- Breakthrough with the birth of ‘Dolly’ in 1996 using SCNT

Cloning

- It is an asexual means of reproduction giving rise to offspring of a known genotype.
- What is normal in the context of this technology?
- Elite animals? A biased group analysis?

Reasons for cloning

- The rapid introduction of desirable characteristic into subsequent generations.
- Prolongation of lines of breeding that show characteristics deemed beneficial for a given population.
- Propagation of offspring from animals that are unable to breed, where characteristics that they show or carry are deemed desirable.
- Maintenance of a species or breed or line threatened by extinction.


Oocyte donor
A
Nucleus donor
B
Removal of nucleus and polar body from oocyte
D
Cultured somatic cells (often fibroblast)
C
Enucleated oocyte
E
Cell injection
F
Electrofusion and activation
G
Embryo clone
Surrogate dam
H
Genitor
Clone (F0)
Sexual reproduction
I
Clone offspring (F1)

- Health of source animals for somatic cells and oocytes.
- Health of surrogate dams
- Health of clones (F0)
    - during gestation/perinatal period
    - after birth and up to sexual maturity
    - after sexual maturity
    - adult clones
- Health of progeny (F1)

Animal welfare

- Welfare of the source animals
- Welfare of the surrogate dam
- Welfare of the clone (F0)

  at time of birth

  birth to weaning

  weaning/puberty/to end of life
- Welfare of progeny(F1)

- Gurdon and Colman, 1999,[Nature 402]

‘If any new scientific technique works at all it is probably capable of improvement in efficiency and ease of operation.’