



SCIENCE. TECHNOLOGY & ETHICS

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When you have completed the reading and participated in the taught components for this week, we hope you will be able to....

- Describe the way in which ideas about science, scientific knowledge and technological development shape medicine and healthcare
- Demonstrate a good understanding of the ethical principles and practices underpinning health research.
- Outline the potential impact of new technologies on the future of health, medicine and society.

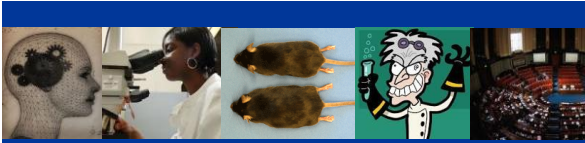
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LECTURE DEBATE



Four main areas:

1. History of science and medicine
2. Research ethics
3. Summary
4. Debate



1. History of science and medicine

- Importance of historical and social change
- Types of knowledge production
- Shift from 'little science' to 'big science'

Historical and social change

- Examine shifts over time and why these occur
- Science as a social activity, guided by e.g.:
 - Expectations and hopes about the future
 - Funding
 - Scientists
 - Existing knowledge
- Implications for what kind of knowledge is produced, by whom and how



Knowledge production

- | | |
|---|---|
| <p>MODE 1</p> <ul style="list-style-type: none"> • Problems are set/solved by academic community • Focus is on increased understanding • Discipline-based | <p>MODE 2</p> <ul style="list-style-type: none"> • Problems are set/solved in context of application • Focus is on practical goals and being useful • Interdisciplinary |
|---|---|

Characteristics

Big science

- Big budgets
- Big staffs
- Big machines
- Big laboratories

ENCODE initiative

- \$36m funding
- International consortium
- Over 30 research groups
- More than 400 scientists in government, industry and academia

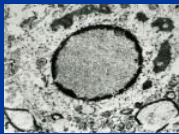


Biotechnology

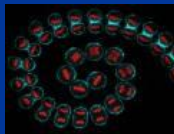
- Genetics, genomics, pharmacogenetics
- Immense gains and insights
- Does not represent complete knowledge
- Fails to account for complex living systems
- Guides particular way of seeing the world



DNA double helix

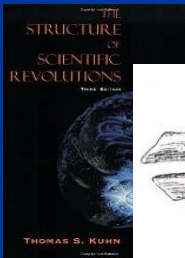


Measles infection

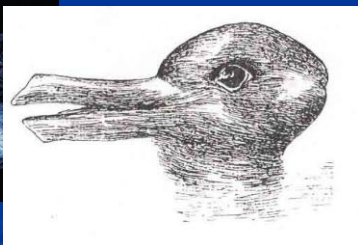


Cell division

Paradigms



Different ways of seeing the same information



PRICE'S LAW

25% of scientific authors are responsible for 75% of published papers

What are the implications of this shift to 'big science' for medicine?





2. Research ethics

- Ethical principles in research
- Ethics and pharmaceutical (clinical) trials
- Ethics and qualitative research

Ethical principles and *human subject research*

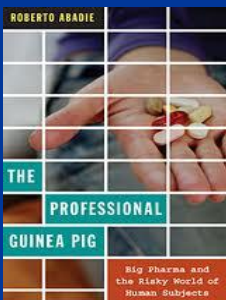
- Ethical issues are present in ALL research
- Tension between the aims of research for the good of society and the rights of participants to maintain privacy
- Respect and maintain the dignity, rights, safety and wellbeing of all involved in research , or who could be affected by it.

Harm can be prevented or reduced through the application of ethical principles

- Good research design and practice
- Protecting participants from harm
- Honesty and integrity
- Avoiding conflicts of interest
- Consent to research
- Respecting confidentiality

Review by Research Ethics Committee

Clinical drug trials



- History of clinical trials & 'captive populations'
- Poor, unemployed working class
- Professional volunteers
- "Economy of the flesh"
- Risks by trial (not successive, long-term)
- Challenge to ethics and informed consent

Have India's poor become human guinea pigs?

By Sue Lloyd-Roberts
BBC Newsnight

Drug companies are facing mounting pressure to investigate reports that new medicines are being tested on some of the poorest people in India without their knowledge.



<http://www.bbc.co.uk/news/magazine-20136654>

Ethics and qualitative research

- Subtle and different compared to problems in quantitative research
- Shift away from thinking of human subjects
- Power between researchers and participants

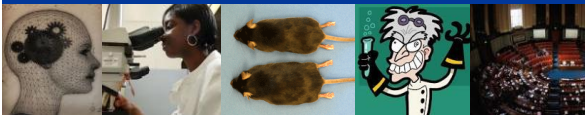
5 ETHICS AND SOCIAL RESEARCH Suki AE and Moira Kelly	
Chapter Contents	
Why do we need research ethics?	02
What is research ethics?	02
Influences on the ethics of social research	02
Researcher responsibility	02
Research participant consent	02
Relationships with research participants	02
Research processes	02
Privacy, confidentiality and data protection	02
Research outcomes	02
Quality research	02
Researcher ethics	02
Research ethics checklist	02
What does it mean to be ethical?	02
Research ethics in planning and conducting research	02
Research participants and ethics boards	02
Conclusion	02

Ethics and qualitative research

- Potential risks include:
 - anxiety and distress
 - Exploitation
 - Misrepresentation
 - identification of the participant
- Critical reflection on:
 - *researchers own role*
 - *potential bias and influence during formulation of the research, data collection, and analysis*

Good research practice is essentially an attitude of mind that becomes an attitude to work. It is about the way in which research is planned and conducted, the results are recorded and reported, and the fruits of research are disseminated, applied, and exploited.

Medical Research Council, 2000



3. Summary

Science and technology play a significant role in society

This impacts on the kind of research that is funded and undertaken in relation to health, illness and medicine

The current emphasis is on producing knowledge to solve problems and create wealth

Biotechnology is seen as particularly important

The history of clinical trials is one littered with exploitation and this continues into the current day

Ethical issues are present in ANY kind of research... informed consent is key...



4. Introduction to the debate

Should contemporary medicine offer longevity without disability and infirmity?

MOTION
Contemporary medicine
should offer longevity
without disability and
infirmity
