

Bioethics Briefing

Number 1: Ethics and Bioethics

Chris Willmott, University of Leicester

This is the first of a planned series of Briefings designed for busy scientists wanting some ideas about how to tackle the inclusion of Bioethics in their courses. Most Briefings will focus on one particular topic. They will follow a standard format, including a background on the science underlying the issue, a summary of the ethical arguments for and against the development and recommendations for resources to help you explore the subject at greater depth. Atypically, this first issue looks more generally at reasons to include ethics provision in our bioscience courses, discusses how much philosophy will be needed, and concludes with an outline of one way in which the topic could be introduced.

Why bother with bioethics?

“We do not have access to appropriate personnel from other departments and there is a mixed feeling amongst Biology staff as to whether this is ‘our job’”. So wrote one of the respondents in a survey of bioethics provision undertaken by the Learning and Teaching Support Network Centre for Bioscience in 2003. (Willmott *et al*, 2004) Perhaps these are sentiments that you share. Perhaps you recognise that there would be merit in adding a component of bioethics to your degree programme, but if you are honest there is already too much content crammed into the specifications – what would you drop to make room for it? So why *should* we bother with bioethics?

I want to argue that there are a number of reasons why bioethics should be a significant component of all biosciences programmes. During the month that I have been preparing this paper, the BBC news website has reported more than fifteen different bioethics stories. These have included claims of cloned embryos, concern about bioweapons, confusion about whether to plant GM maize, fears about the mental state of mice derived from ‘lab grown’ embryos. There has been abandonment of plans for a primate research centre, the genetic modification of zebrafish sperm with the suggestion that the same technology could be used for germ line alteration of humans, and so the list goes on. This month has not been unusual – the popular media is reporting biology issues with ethical consequences each and every week.

We are presented, therefore, with a marvellous opportunity to show how our subject engages with the contemporary world; to place in context the scientific content of our lectures. In many ways *this* is where the rubber hits the road. It is important for the students themselves to have a handle on these topics, but it is also important for their potential role in disseminating this information to the wider public, as both formal and informal educators of others. The general public is being encouraged to make ethical decisions about biopolicy without sufficient grasp of the science to formulate a reasoned response. Perhaps the most illuminating example of recent years comes in a 1999 Eurobarometer survey, looking at attitudes of Europeans to biotechnology. The survey included the statement “Ordinary tomatoes do not contain genes while genetically-modified tomatoes do”. This statement, as we all know, is false, but 35% of respondents agreed with the statement and a further 30% said they “do not know” (Eurobarometer, 1999). It is all the more pressing that at least our graduates in the biosciences are able to answer the question correctly.

Thirdly, we hope that participation in our programmes is a first step in the development of the research scientists of the future. It is important that we prepare them to think about the ethical implications of their work. Some of the issues they face are long-standing dilemmas, but others will not

have been thought through by previous generations because it was never imagined that they would escape from the pages of science fiction to become science fact. There are issues that will arise that are still not anticipated, so it is important that we provide our students with the tools to make their own *de novo* decisions and not simply furnish them with answers to the issues of today.

Finally, consider it a logical progression from the arguments outlined above, or consider it an imposition, but the subject benchmarking statements produced by the Quality Assurance Agency (QAA, 2002) require the inclusion of an ethical dimension in all our undergraduate programmes. Specifically, the bioscience statements make nine references to “ethical” aspects of the subject, including the following requirements:

- “Students should expect to be confronted by some of the scientific, moral and ethical questions raised by their study discipline, to consider viewpoints other than their own, and to engage in critical assessment and intellectual argument” (p.3)
- “Recognising the moral and ethical issues of investigations and appreciating the need for ethical standards and professional codes of conduct” (p.4)
- All students should: “Have some understanding of ethical issues and the impact on society of advances in the biosciences” (p.8)
- Good students should: “Be able to construct reasoned arguments to support their position on the ethical and social impact of advances in the biosciences” (p.8)

Do you want philosophy with your bioethics?

Having acknowledged, therefore, that ethics is expected to be a feature of our degree programmes, we are faced with a moot point, namely how much philosophical ethics do we need to include in order that our biologists can appropriately handle the applied ethical field of bioethics? Noonan, for example, is highly critical of the “decontextualised, ahistorical and uncritical applications of philosophical theories to immediate practical problems” characteristic of most courses in applied philosophy, and he cites bioethics as one such area (Noonan, 2003). In particular, he argues that philosophy taught in this way fails to address the sociological context in which a given theory has emerged, and in consequence will never adequately question the current social values.

I, personally, have some sympathy with this view. Yet, with the best will in the world, we are generally considering the education of single subject biologists or applied biologists and

the maximum time we are likely to have available to teach ethics, *including* the specific bioethics components, is likely to be one 20 credit module. In many cases we will be constrained to perhaps one or two lectures on ethical theory. Faced with such limitations, it is impossible to go into any detail regarding, for example, the Greek cultural backdrop that shaped the thinking of Aristotle.

What then would be a minimum recommended discussion of ethics? As outlined in the model lecture (see below), I believe that it is helpful for our students to at least have a feel for some of the main schools of thought; to see both their potential and their pitfalls. Specifically, I believe it is helpful for students to recognise that they frequently make decisions themselves on the basis of either some pre-conceived principle or some anticipated outcome (or a combination of the two).

One road-tested approach

The following section describes one way in which an ethical dimension can be raised with students. Specifically, this material has been delivered to a class of approximately 100 second year undergraduate biologists as the first two-hour session in a short series of four lectures on bioethics. Although the setting is a lecture theatre, a certain amount of group work and other interaction is involved.

Experience has shown that launching straight into a discussion of the thinking of Immanuel Kant, Jeremy Bentham and the like can be as much of a turn-off for most bioscience students as it is for many of their tutors; it seems at first impressions to be too dissimilar to their usual studies. I have found, therefore, that case studies are an essential factor in helping the students to see the relevance. One that I have used satisfactorily is given below. The aim is to show them that they are intuitively making suggestions based either on founding principles or on expected consequences. I then use their answers as illustrations of wider ethical schools of thought.

Any appropriate case study could be used at this point. The topic here, namely proposals to use eggs derived from aborted fetuses as a source of material for fertility treatment, is tangibly “out on a limb”. This is a conscious choice to avoid overlap with other scenarios which the students locally will deal with in later sessions of the course. It does also, however, reflect a real-life proposal (see, for example, <http://news.bbc.co.uk/1/hi/health/3034266.stm>).

Lecture outline

The session begins with a dictionary definition of ethics and an explanation of why we are including a section on ethics and bioethics, similar to the arguments used at the start of this article. This leads into some discussion in buzzgroups, focussed on the question “*What ethical decisions (general and/or subject-specific) might we face in the biological sciences?*” After student responses are collated at the board or OHP, some examples from recent media coverage are used as illustration. These can either be newspaper headlines or links to the stories on, for example, www.bbc.co.uk or www.guardian.co.uk - both of which have free access to their archives, supported by helpful search engines.

Having shown that bioethics stories are topical and newsworthy, discussion moves on to the fact that ethical issues for bioscientists can be considered in three categories.

Firstly, there are issues of **research integrity**. These would include some subject-specific aspects such as the responsible use of animals, of human material and of genetically modified organisms. There are other aspects, however, which are more general in nature, and these would include: appropriate use of funding; plagiarism; fraud; and bias or suppression in the reporting of results. Links could be made to a variety of news stories, including Nobel laureate John Sulston’s suggestion that there should be a scientific equivalent of the Hippocratic oath (see, for example, <http://news.bbc.co.uk/1/hi/sci/tech/1250331.stm>); the alleged misrepresentation of experimental results by Imutran (see http://observer.guardian.co.uk/uk_news/story/0,6903,9400_3,00.html) and/or the recent example of the fraud perpetrated by Hendrik Schon (see http://www.ananova.com/news/story/sm_679490.html) which although specifically about research in physics has nonetheless been widely reported in both the science press and the wider media, including a recent episode of Horizon, the flagship BBC science programme (see <http://www.bbc.co.uk/science/horizon/2004/hendrikschon.shtml>).

The second major area of bioethics related to the **environment**. Issues under consideration here would include, for example; GM crops, sustainable agriculture, and the introduction of non-native species. A relevant recent link would be <http://news.bbc.co.uk/1/hi/sci/tech/3391431.stm>.

The third area is **biomedical ethics**. It is worth pointing out at this point that the term “bioethics” has been widely used, particularly in the USA, with the *a priori* expectation that the focus was on medical ethics. The attempt to reclaim the term for more general issues in the biosciences has only latterly gained momentum. Having said that, a vast number of current initiatives are in the area of biomedical ethics. In addition to long-standing controversies such as abortion and euthanasia (which Nigel Cameron of the Center for Bioethics and Culture terms “Bioethics 1”) there are more recent issues such as genetic screening, stem cell research and cloning (“Bioethics 2”). It can be added that our colleagues in physics are preparing the way for biological research on artificial intelligence and ‘nanobots’, which can therefore be considered as “Bioethics 3”. In Cameron’s scheme these three subdivisions then equate respectively to “taking life, making life and faking life” which, though itself value-laden, is a useful demarcation.

At this point, the case study is introduced (see Box 1). Once the scenario has been outlined, the students are given the opportunity to discuss the case for 5 to 10 minutes before their suggestions are fed back.

Box 1: Case Study

Wendy and Paul Carter have been married for twelve years. They would love to have children. Unfortunately, Wendy had breast cancer when she was 28 and although the chemotherapy has brought total remission from the disease it also caused damage to her ovaries that have made her infertile.

Paul and Wendy have been on the waiting list at their local IVF clinic for a number of months awaiting donated eggs to try and have a baby. At present, however, there are 200 potential mothers seeking each donated egg and the couple know that realistically they may never receive a donated egg via the normal channels.

Researchers at the hospital attached to the IVF clinic have recently gained permission to carry out experimental procedures using eggs harvested from aborted fetuses. The technique is controversial, but for Paul and Wendy it may represent their only chance to receive a donated egg.

Points to consider

- What are the issues involved in this case? Feel free to include aspects of the case that are likely to be an issue for other people; it will not be assumed that contributions reflect your own opinions.

Notice, in passing, the phrasing of the question is designed to allow people to contribute ideas that they suspect will be 'unpopular' without having to 'own' them. A supplementary question "As a friend of Paul and Wendy would you advise them to take part or not? You must be prepared to justify your decision." was dropped for two reasons. Firstly, it did put the focus rather too much on the students' own views, and not all potential contributors would be happy with this. Secondly, since the function of the case study here was simply to get the students to consider ways of making decisions rather than the nitty-gritty of this specific topic, the additional question actually moved the discussion away from the intended thrust of the session.

Box 2: Issues relating to the case study that were raised by students

- What is the likelihood of success?
- Where is the foetal material from? If it was aborted, why was it aborted?
- Will the child be told about its origins?
- Will the "mother" of foetus be told about the procedure?
- Does the "mother" have any rights or say in the upbringing of their "grandchild"?
- Should people be allowed to manipulate nature for their own gain?
- Won't this lead to a lot of confusion about generations and relationships?
- If the child turns out to be "defective" then who is culpable? Does that situation change if the damage is shown to result from the technique itself?
- Why don't Paul and Wendy just adopt a child?
- Does a foetus have any rights?
- What would be the psychological effects on the child?

Box 2 lists some of the issues that have been raised by students. These provide useful illustrations as the session moves into its more philosophical stage. The question is raised "how can we make ethical decisions?". There are two general starting points that can be considered. These are **Principles** – the intrinsic rightness or wrongness of doing something, and **Consequences** – what will happen if something is done. Philosophically, these two starting points are said, respectively, to be **Deontological** or **Teleological** arguments, and each has both advantages and limitations in their application.

Principles

Beginning with **principles**. The answers "Does the "mother" and/or the foetus and/or the child have any specific rights?" and "Where does the material come from?" in Box 2 are examples of arguments based on founding principles. Whilst approaches based on principles have clear appeal, the problems arise immediately when it is considered that not all

people have a common set of principles. Notions taken as “obviously right” by one person under the influence of, for example, conscience, intuition and or religious beliefs may not be shared by all in society, let alone between cultures. Immanuel Kant tried to resolve this by introducing a Categorical Imperative, namely “do your duty”. Unfortunately, this only serves to shift not solve the problem, which now becomes “How do I know what my duty is?”

There are other complications with a deontological approach. What happens, for example, when two rules collide? Take the classic dilemma faced by the Dutch woman asked by the Gestapo if she has any Jews hiding in the house. She has lived her life adhering to the rule that it is wrong to lie, but if she tells the truth it will jeopardise the lives of the family concealed in her loft. If this scenario engenders the response “well clearly she should lie in that case” then it appears that some rules are ‘higher’ than others, and the question then arises whether a ‘lower’ rule can therefore be considered as an ethical norm or not.

Consequences

Faced with these difficulties, a second major school of thought has placed the emphasis instead on **consequences**. The goal of conduct therefore is to produce the greatest balance of good over evil. Looking back once more to the students’ responses to the case study we see a number of arguments based on outcomes. For example, “What if the child is damaged?” and “Will the child be told about its origins?”.

This approach, however, is also fraught with difficulties. There is the tension, firstly, between whether I am to do the greatest good for me (philosophically, this is termed **Ethical egoism**) or for society at large (which is **Utilitarianism**). The former position puts the complete emphasis on the individual – an ethical egoist does what is right for them, never mind the impact on others. This may be the way that a lot of people seem to live, but it is frowned upon in civilised society. Utilitarianism, on the other hand, is a widely accepted moral code and implicitly or explicitly underlies a large number of social policies. Michael Reiss points out that it has two main strengths. Firstly, utilitarianism offers a single framework through which, at least in theory, any moral question could be addressed. Secondly, it does not underplay the importance

of pleasure-seeking and happiness as driving factors in decision-making (Reiss, 2002).

The main problem with utilitarianism, however, is the exact reverse of ethical egoism, i.e. that it is willing to entirely sacrifice the rights of the individual for the greater good of society. A.C. Ewing illustrated this point by asking if it would be right to totally remove the happiness from one man in order to slightly increase the happiness of ten others (Ewing, 1953). Similarly, if it was possible to save the lives of two worthy patients by taking both the kidneys of a dangerous criminal, would it be right to do so?

Consequentialist approaches also suffer from difficulties in quantifying goodness, happiness, etc. As former Moral Maze panellist David Cook quips “How many ‘Utils’ equals a good night out?” How can you measure pleasure? In fact there exists a mathematical derivation of utilitarianism that tries to do exactly this. The utilitarian calculus attempts to allocate a mathematical quotient to all good consequences (measured in Hedons) and all negative consequences (measured in Dolors). The best course of action is the one that brings the greatest overall amount of utility, i.e. Hedons minus Dolors.

Finally, theories based on consequences ultimately carry the weakness that you can never know for sure what the outcome of a particular action will be. Given the limitation of either working from consequences alone or from intrinsic values alone, it is perhaps no surprise that the most widely applied scheme for handling bioethical dilemmas combines some of the best elements of both models.

The four principles

First published in 1979, and now in its 5th Edition, *Principles of Biomedical Ethics* by Tom Beauchamp and James Childress has become for many the ‘bible’ of medical ethics and has increasingly been adopted in wider fields of applied ethics. Beauchamp and Childress propose four principles to guide ethical decision-making. These are firstly, **non-maleficence** (avoid causing harm); secondly, **beneficence** (do good, act in the best interests of others); thirdly, **autonomy** (act in the way that maximises the freedom of an individual or community); and fourthly, **justice** (act fairly, treat equal cases equally and unequal cases differently). The first two rules are more teleological in tone, the latter two more deontological.

Beauchamp and Childress would be amongst the first to admit that is no staggering originality to their four principles – each individually reflects long traditions of moral and ethical thinking. The particular advantage of this approach is to provide balance so that no one principle is allowed to ride roughshod over the others. Raanan Gillon, an enthusiastic advocate of the four principles approach, has described them as “the four moral nucleotides that constitute moral DNA” (Gillon, 2003). He argues that this methodology stands resolutely against two potential dangers; the ‘anything goes’ attitude of moral relativism and the ‘you must do it my way’ of moral imperialism.

The ethical matrix

In seeking to broaden the appeal of this kind of approach, Ben Mepham has proposed a simplification of Beauchamp

and Childress’ four principles into three guiding rules by combining non-maleficence and beneficence into one category, namely the promotion of **wellbeing**. Mepham has then designed a practical way of evaluating the impact of a given development on all interested parties. An **ethical matrix** is drawn up with the column representing wellbeing, choice (i.e. autonomy) and fairness (i.e. justice). Each row then represents the people or things that may be affected by the proposed action. In the case of the worked example on the web (see <http://www.ethicalmatrix.net/>) the issue addressed is the farming of animals and any decision should be made with due respect for farmers, consumers, farm animals and the environment.

The session could conclude by setting the students the task of applying the four principles or the ethical matrix approach to a different issue as homework.

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Chris Willmott (cjr2@le.ac.uk) is a Lecturer in Biochemistry at the University of Leicester

Annotated Resources

Books

An Intelligent Person’s Guide to Ethics Mary Warnock, Gerald Duckworth and co, 1998 ISBN 071563089X

- Don’t be put off, this book is not nearly as elitist as the title may suggest. It is particularly helpful in its dismissal of two slippery concepts, namely “personhood” and “ownership”.

Bioethics for Scientists edited by John Bryant, Linda Baggott La Velle and John Searle, Wiley, 2002 ISBN 0471495328

- This work is one of the most comprehensive recent collections of essays on bioethics in the broader meaning of the term. It is particularly characterised by detailed coverage of environmental and agricultural ethics.

Ethical Studies Robert Bowie, Nelson Thornes, 2001 ISBN 0748757988

- Designed as a course text for AS and A level students, this book offers an introduction to the principal ethical theories. Whilst inadequate for a philosophy degree this is nonetheless an ideal start point for bioscientists keen to have a handle on broader ethical thinking. The summaries at the start and finish of each chapter are particularly helpful.

Ethics A.C. Ewing, English Universities Press, 1953

- A “Teach Yourself Book”, it was reprinted several times but has now been replaced by a more up to date work.

Introducing Ethics (published previously as “Ethics for Beginners”) Dave Robinson and Chris Garratt, Icon Books 1996 ISBN 1840460776

- In keeping with the general style of the “Introducing...” series, this book makes extensive use of cartoons and graphics to enhance the readability whilst retaining adequate content for an introductory text on ethnics.

Principles of Biomedical Ethics Tom Beauchamp and James Childress (5th edition, 2001) Oxford University Press ISBN 0195143329

- Considered by many to be the ‘bible’ of medical ethics, now applied to ethical decision-making in much broader fields, and derivatised by, for example, Ben Mepham in the “ethical matrix”.

Articles

Gillon R. (2003) Ethics needs principles – four can encompass the rest – and respect for authority should be “first among equals” *Journal of Medical Ethics* **29**:307-312

- This is a concluding paper in a special edition of JME on methodology in medical ethics. A number of other papers in the same volume add further insight into the four principles approach and viable alternatives.

Noonan J. (2003) Can there be applied philosophy without philosophy? *Interchange* **34**:35-49

- At the time of writing, this paper is available online in a “free sample” volume of the journal. This can be accessed via <http://www.kluweronline.com/issn/0826-4805/contents>

Willmott C.J.R., Bond A.N., Bryant J.A., Maw S.J., Sears H.J. and Wilson J.M. (2004) Teaching ethics to bioscience students – a survey of undergraduate provision *Bioscience Education E-journal* **3-9**, available online at <http://bio.ltsn.ac.uk/journal/vol3/Beej-3-9.pdf>

Reiss M.J. (2002) Introduction to ethics and bioethics, in *Bioethics for Scientists* (ed Bryant, Baggott La Velle and Searle – see above)

Websites

Bioethics Today <http://www.bioethics-today.org/>

- A useful portal for directing you to news reports on human, animal and agricultural issues. Funded by the Wellcome Trust, the site is frequently updated.

Ethical Matrix <http://www.ethicalmatrix.net/>

- Authored by Ben Mepham (University of Nottingham), funded by Compassion in World Farming, this is a worked example of Mepham’s ethical matrix concept applied to the specific area of animal farming. This may not be a subject of direct relevance to you or your students, but it is worth taking a look at the site for ideas about how you might adapt the matrix approach to evaluation of a different topic.

Ethics Update <http://ethics.acusd.edu/>

- Established and edited by Lawrence Hinman (University of San Diego), this is a thorough repository of material on a wide range of ethical concept and associated philosophers.

Eurobarometer (1999)

<http://europa.eu.int/comm/research/quality-of-life/eurobarometer.html>

- Evidence for the low level of scientific understanding amongst the general public.

Nuffield <http://www.nuffieldbioethics.org/home/>

- A key source of bioethics information, the Nuffield Council on Bioethics have over recent years produced comprehensive studies on the ethical dimensions of a wide range of topics.

QAA (2002)

<http://www.qaa.ac.uk/crntwork/benchmark/phase2/biosciences.pdf>

- The benchmarking statements for Bioscience programmes.

List of available Bioethics Briefings

The following Bioethics Briefings are freely available at
<http://bio.ltsn.ac.uk/resources/ethicsbrief.htm>

Briefing 1: Ethics and Bioethics

Briefing 2: Genetically Modified Crops

Briefing 3: Pre-implantation Genetic Diagnosis

Briefing 4: Xenotransplantation

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