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***The Human Genome Project,  
Reproductive Technology and  
Cloning: One Happy Family?***

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Introduction

- ☑ The Human Genome Project (HGP)
- ☑ Human genetic normalcy - medicine?
- ☑ Human genetic normalcy - eugenics?
- ☑ HGP in reproductive technology - a defense
- ☑ The slippery slope to cloning?

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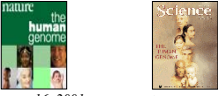
Human Genome Project



US Department of Energy: <http://www.ornl.gov/hgmis/>

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The Human Genome Project



February 16, 2001      February 15, 2001

The HGP project *reduced* the number of human genes from an estimated ~120,000 to ~30,000

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Goals of the HGP

- ❑ Describe disease at the molecular level
- ❑ Use a molecular concept of the gene
- ❑ Develop a profile of human genetic normalcy

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The 'Gene-for-X' Model

Discoveries in medical genetics are frequently described as:

*Researchers have recently discovered the gene "XYZ1" for horrible disease, Absolutely Awful Syndrome*

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Function and Normalcy

- ❑ Health ideals for a human body (parts or systems) means that the body is functioning as it should
- ❑ Proper functioning is an adaptationist account of gene selectionism
- ❑ Normalcy, on the HGP account, means that one is well-functioning as one should given one's evolutionary past

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Disease at the DNA Level

"[I]nherited defects would be caused by changes in the sequence of DNA, perhaps by a change in a single nucleotide. Such change might result in the replacement of one amino acid by another in a protein at a critical location, making the protein biologically useless."  
(Jukes, quoted in Lloyd p.555)

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Biochemical Pathway Model

James Watson: "[W]hat is desired is some complete set of causal steps yielding a living organism. But variation plays no role in this model. It is an uninteresting and even distracting feature of the processes on which the explanatory theory is focused."




James Watson

(quoted in Lloyd p. 556, Ruse and Hull, Philosophy of Biology OUP)

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What's the Problem?

"...while molecular techniques will certainly aid in the diagnosis, identification and analysis of disease processes, they cannot replace the profoundly evaluative social decisions made in medicine about standards of health and disease. In fact, molecular techniques should be understood as offering an unprecedented amount of social power to label persons as diseased. [...] The potential submersion of normative judgments under seas of DNA-sequence data should not persuade anyone that conclusions concerning health and disease have now, finally become scientific." (Lloyd 555)



Lisa Lloyd

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Variation and Disease

- ☒ Sickle cell anaemia
- ☒ Gilbert's disease
- ☒ Williams syndrome
- ☒ Fibrocystic breast disease
- ☒ Homosexuality

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- ☒ All variation is abnormal?

or


- ☒ Which variation is abnormal?

The alternative is a developmental model that tracks an expected range of outcomes relative to a background developmental context.

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Eugenics

- ☒ Eugenics means "good genes"
- ☒ Eugenics is the study or practice of human improvement by genetic means
- ☒ Francis Galton (2nd cousin to Darwin)
- ☒ *Hereditary Genius: An Inquiry into its Laws and Consequences (1883)*
  - ☒ System of arranged marriages
  - ☒ Social improvement through better offspring



Francis Galton

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**Ethical Questions**

*Individual:* Should individuals have the freedom to determine their own genetic future? (eg. offspring or themselves)

*Family:* Do prospective parents have a duty to their future children to get tested? Should children be able to sue? (Tay Sachs)

*Patient-Physician:* Should physicians recommend genetic testing? (eg. Huntington's, Tay Sachs, Cystic Fibrosis)

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**Ethical Questions**

*Individual-Corporation:* Should life insurers or employers be able to discriminate against carriers of genetic diseases? (HGP and Insurance)

*State-Individual:* Is it permissible to over-ride individual reproductive autonomy to achieve social goals? (Eg. Carrie Buck)

*State-Society:* Should the state play an active role in recommending an ideal genetic make-up of the population? (*Bell-Curve*, Nazi Germany)

*Global-Social-Individual:* Is there a global need to limit certain individuals' reproductive autonomy in some societies? (eg. China's one-child policy)

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**Methods of Implementation**

- ❑ Voluntary
  - ❑ Common social ideal
  - ❑ Voluntary testing / voluntary action
  - ❑ CF screening
- ❑ Coerced / State Mandated
  - ❑ Enforced social ideals
  - ❑ Compulsory testing / compulsory action
  - ❑ Canada, US, Germany, China, India

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**Defining Eugenics**

- ❑ Diane Paul is concerned that we are overly broad in what counts as eugenics:
  - ❑ *intention* - is the purpose of every pre-natal genetic test eugenic?
  - ❑ *consequence* - are all actions that change gene frequencies eugenic?

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**When is Eugenics Bad?**

- ❑ Positive eugenics - active trait selection
- ❑ Negative eugenics - trait avoidance
  
- ❑ Good eugenics - no coercion
- ❑ Bad eugenics - coercion
  
- ❑ Freedom from coercion (conservatism)
- ❑ Freedom of opportunity (liberalism)

Imagine a case in which pre-natal diagnosis shows a fetus is severely disabled  
the conservative response is that parents would be uncoerced if free to abort or bring to term  
the liberal response is that parents lack that freedom if the social burden of caring for a severely disabled child are overwhelming

In which of the two cases are we really free?

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**Direct Eugenics Pressure**

- ❑ Slippery slope arguments about the HGP\*
- ❑ Cost-benefit analysis drives pre-natal testing
- ❑ Testing drives selective abortion
- ❑ Negative eugenics works on recessive traits that are 'hidden' - slow process

Pauling on tattoos:  
“If this were done, two young people carrying the same seriously defective gene in a single dose would recognize this situation at first sight, and would refrain from falling in love with one another. It is my opinion that legislation along this line, compulsory testing for defective genes before marriage, and some form of public, or semi-public display of this possession, should be adopted”

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Indirect Eugenics Pressure

- ❑ Insurers and employers have a clear cost-benefit justification for genetic testing
- ❑ Consensual testing carries no liability for physicians, insurers or employers
- ❑ Is it possible to give “informed no’s”?

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Consumer Pressure

- ❑ People want perfect babies
- ❑ They have duties, once babies are in the world, to make their conditions as good as possible
- ❑ Paul: “once the principle of choice in respect to a non-medical condition is admitted, it is hard to know on what grounds it can be denied to parents who want to give their child a competitive advantage with respect to intelligence, height, or other socially desired characteristics.”

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HGP - Laudable Goals?

- ❑ Lisa Lloyd
  - ❑ Human genetic variability is under threat when genetic ‘normalcy’ is defined in medical terms
- ❖ Diane Paul
  - ❖ Once genetic normalcy is defined for a population, it becomes insidiously coercive

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James Watson

- ▣ Argued that 3% of the \$200 M annual budget for the HGP should go to the study of the ethical, legal and social implications (ELSI) of the HGP
- ▣ "...I saw the need to be proactive in making ELSI's major purpose clear from its start - to devise better ways to combat the social injustice that has at its roots bad draws of the genetic dice."

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James Watson

"...past eugenic horrors in no way justify the 'Not in our genes' politically correct outlook of many left-wing academics. [...] Whether these scientists on the left actually believe, say, that the incidence of schizophrenia would seriously lessen if class struggles ended, however, is not worth finding out. Instead, we should employ, as fast as we can, the powerful new techniques of human genetics to find soon the actual schizophrenia predisposing genes...."

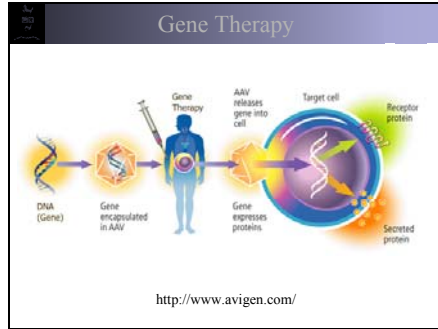
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James Watson

"Yet anyone who proclaims that we are now perfect as humans has to be a silly crank. If we could honestly promise young couples that we knew how to give them offspring with superior character, why should we assume they would decline? Those at the top of today's societies may not see the need. But if your life is going nowhere, shouldn't you seize the chance of jump-starting your children's future? Common sense tells us that if scientists find ways to greatly improve human capabilities, there will be no stopping the public from happily seizing them."



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Avigen's main work is on Haemophilia B

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- ### Disease and Disability
1. We are not morally obliged to give *all possible* children an existence.
  2. But we are obliged to provide children that do come into existence a minimally satisfying life.
  3. A minimally satisfying life includes provision of normal health
  4. Genetic diseases and disabilities are conditions we all have a strong, rational preference *not* to be in.
  5. There is no morally significant difference between providing the conditions for normal health *prior* to birth than to provide them *after* birth.
  6. Failure to remove disease and disability, if it is possible to do so, is to harm children.
  7. We should use genetic screening and gene therapies to remove disease and disability in children

John Harris

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### Objection 1

Gene therapy and screening discriminate against those who presently have genetic diseases.

*Response:*

- ❑ The moral status of existing persons is equal, regardless of whether or not they have diseases or disabilities
- ❑ To remove disease in neonates is not an attack on existing persons with disease
  - ❑ e.g. Is setting someone's severely broken legs an attack on people in wheelchairs?

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Objection 2

Gene therapy is just negative eugenics, and should be condemned because it will usually be coercive.

*Response:*

- ❑ The decision is not based on race, class, age or intelligence. The point is that everyone should be discouraged from having genetically compromised children
- ❑ If we have the ability to use gene therapy to do good, it would be wrong not to use it.
  - ❑ e.g. Knowing how to make airplanes safer, but not doing it would be wrong

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Cloning

Why Clone?


The grade of the slope

Dignity and its threats

Slippery slopes

Avoid the slide!

Life at the bottom



Moral, not technical issues

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Why Clone?

1. Technomadness: We have the technology!



Rael



Brigitte Boissellier

Prescriptive reproduction: Cloning is used to establish a very specific end result

Assisted reproduction: Cloning is used to overcome some other kind of barrier

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**Why Clone?**

**2. Prescriptive cloning**

- ☑ Special cognitive or physical traits
- ☑ Tissue or organ composition for harvesting
- ☑ 'Replacing' dead people


**3. Assisted reproduction**

- ☑ Infertility
  - ☑ Infertile heterosexual couples
  - ☑ Double lethal recessives
  - ☑ Homosexual couples

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**Leon Kass' Slippery Slope**

"If reproductive freedom means the right to have a child of one's own choosing, by whatever means, it knows and accepts no limits" (Kass, 1997)



We have a right to reproduce

Under that right we tolerate unnatural, artificial and extramarital reproduction, and tolerate "early forms of eugenic choice"

*Missing Premise - reproductive cloning is comparable to other assisted forms of reproduction and likewise will become tolerated*

Therefore, "[c]loning is no big deal."

Kass, L. 1997. "The Wisdom of Repugnance." *The New Republic*, June 2: 17-26.

The repugnance objection is there to set the grade of the slope as steeply as he can set it.

Kass never shows the harmfulness of what we descend down the slope to, but instead sets the slope steeply *away* from what he thinks is "natural" for human beings.

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**A Steep, Slippery Slope**

*Missing Premise - reproductive cloning is comparable to other assisted forms of reproduction and likewise will become tolerated*

Kass is worried that the missing premise will come true


"We are repelled by the prospect of cloning human beings not because of the strangeness or novelty of the undertaking because we intuit and feel, immediately and without argument, the violation of things that we rightfully hold dear."  
(Kass, *The Wisdom of Repugnance*)

Above all else, what Kass holds dear is his conception of human dignity, which is in large measure dependent on a view of the correct way that humans should enter the world, and how the correct process (natural reproduction) leads to unique individuals in full possession of their dignity.

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Human Value / Dignity

- ❑ Dignity is sometimes defined in terms of the inherent qualities of humans
- ❑ One view is that humans are unique, and have dignity because they cannot be replaced
- ❑ The twins argument successfully undermines this view of dignity



The Godino twins and twin wives

For Kant, humans acquire dignity by being rational beings who can act morally: "...autonomy is the ground of the dignity of human nature and of every rational nature."

For the challenge to this argument, see Gould, S.J. 1997. "Individuality: Cloning and the Discomfiting Cases of Siamese Twins." *The Sciences*, September/October: 14-16.

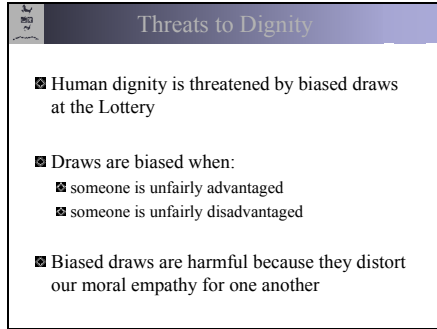
There is even at least one example of conjoined twins who married a non-conjoined pair of twins. Simplicio and Lucio Godino, conjoined twin brothers who were born in the Philippines in 1908, married a pair of identical twin sisters, with whom they performed on Vaudeville. The Godina Twins (seen in the picture below) died within a few days of each other in 1936 and it is not known what happened to their wives.

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A Different Approach

- ❑ Sharing a genetic heritage with everyone else is an essential part of having moral empathy
- ❑ Luck of the Lottery - we are bound together by our common exposure to the risk of not being healthy, and by recognizing the inherent contingency of lucky draws

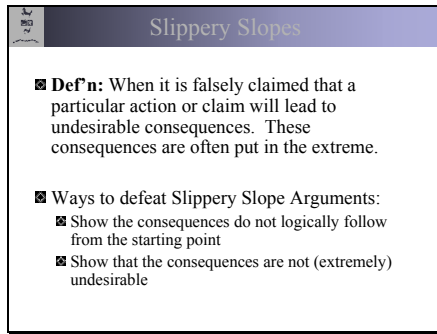
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Threats to Dignity

- ❑ Human dignity is threatened by biased draws at the Lottery
- ❑ Draws are biased when:
  - ❑ someone is unfairly advantaged
  - ❑ someone is unfairly disadvantaged
- ❑ Biased draws are harmful because they distort our moral empathy for one another

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Slippery Slopes

- ❑ **Def'n:** When it is falsely claimed that a particular action or claim will lead to undesirable consequences. These consequences are often put in the extreme.
- ❑ Ways to defeat Slippery Slope Arguments:
  - ❑ Show the consequences do not logically follow from the starting point
  - ❑ Show that the consequences are not (extremely) undesirable

My argument here is that the consequences do not logically follow: That is, society is not on a slippery slope that will take them from the acceptance of therapeutic cloning of human embryos (for the sake of stem cell production, for example) to the use of cloning technologies to fully reproduce human beings.

Note: The presumption here is that therapeutic cloning does not involve the production of whole human beings. There are therapeutic uses of human reproductive cloning - say in the prevention of lethal double recessives, but I'll treat those as reproductive cases since the primary intention in using the technology is to have a whole person.

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Prescriptive Cloning

- ❑ If the intention is to endow a clone with specific mental or physical abilities, then:
  - ❑ These enhancements or limitations are biased samplings of the gene pool
- ❑ If the intention is to induce the traits for highly specific uses, then:
  - ❑ The clones are manipulated into an unacceptably narrower range of life plans than what is available to those taking unbiased samples of the gene pool

1. As the specificity of the traits goes up, and as they become increasingly realizable, the capacity to do harm by biased samplings and manipulation into a narrower range of life-plans increases.

2. Manipulated into a life-plan is not a categorical harm, but admits of degrees. Children require some manipulation and coercion. The difference here is the extent to which there is *absolute* foreclosure on particular life plans, or, in the case of the tissue/organ donors, insistence on a life plan that includes very specific activities - the expectation of the donation itself.

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Prescriptive Cloning

- ❑ Shenk approves of C.S. Lewis' position:
  - ❑ "It is not that they are bad men, they are not men at all. Stepping outside of the Tao they have stepped out into the void."
- ❑ Two points:
  - ❑ Shenk (and Lewis) commit the naturalistic fallacy
  - ❑ They leave a moral vacuum about permissible uses of the HGP
- ❑ Contrary to Shenk's concern about a wildly unregulated human genetics industry, plausible moral injunctions against cloning are already available.

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Assisted Reproduction

- ❑ Richard Wachbroit says cloning can be aligned with either:
  - ❑ assisted reproductive technology
  - ❑ production of children with specific traits
- ❑ "Indeed, some commentators have called cloning asexual reproduction, which clearly suggests that cloning is a way of generating *descendents*." (i.e., not *siblings*)
- ❑ Wachbroit focus on whether descendents would be in a compromised position compared with siblings, and finds that they would not. This is supposed to remove barriers to cloning.

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**Assisted Reproduction**

- ❑ Assisted reproduction is technological intervention into compromised heterosexual reproduction
- ❑ Cloning is the *displacement* of sexual reproduction
- ❑ A separate argument has to be made that asexual reproduction is secured by the same protected right that assures sexual reproduction
  - ❑ Even if it is, cloning is an extraordinary measure that can be limited under the right

The infertile types (hetero-infertiles or double lethal recessives, homosexual couples) have no claim to access cloning on the grounds that it is a form of assisted reproduction comparable to IVF, etc. Technologically assisted reproduction assists sexual reproduction compromised for whatever reason. Cloning doesn't assist sexual reproduction, it bypasses or displaces it. It is in fact asexual reproduction, with the odd fact that the resultant clone is in fact diploid. The assisted reproductive technologies already in place are discontinuous with cloning in this significant way. Rather than provide arguments against reproductive cloning, a compelling argument needs to be made for the introduction of a radically new technology.

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**The Slippery Slope?**

**Prescriptive Cloning**

- ❑ Moral injunctions against biased draws in the lottery stop the descent down the slope

**Assisted Reproduction**

- ❑ Clarity about the difference between technological *assistance* and technological *displacement* stops the descent down the slope

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Life at the Bottom

- ❑ Clones will be people too!
- ❑ The biggest single threat to them is everyone else's failure to be morally empathetic
- ❑ The biggest risk is a runaway aesthetic judgment about the comparative worth of originals and forgeries

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No Slippery Slope

So, is there a slippery slope from therapeutic to reproductive cloning?

NO:

There are good moral reasons to prevent it

Cloning is not a technology continuous with other reproductive technologies

The bottom of the slope is not horrific

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Conclusion

- ❑ HGP is a source of eugenic threats
- ❑ Some uses HGP knowledge in reproductive biotechnology is justified
- ❑ But uses of HGP for the sake of cloning are morally problematic