The embryo's right to protection

SIR — The opponents of all human embryo research seem to have shifted ground, from the meaningless proposition "life begins at fertilization" to the argument that a human embryo is inherently entitled to full human rights by dint of genetic uniqueness and potential. R. Watson (*Nature* 7 March, p. 10) goes so far as to assert that there can be "no objections" to the idea that a unique potential individual is created "at fertilization".

Leaving aside the difficult questions of when fertilization can be said to have occurred (at sperm penetration, at pronuclear formation, or at activation of the paternal genome some hours or days later?), and of clear differences in potential between embryos, the assertion does not bear close scrutiny. If anything, the beginnings of genetic uniqueness occur in the forming gametes, during the second meiotic division. Here genetic information is exchanged between pairs of homologous chromosomes (the chromosomes of the embryo's *grandparents*, in fact): in the egg this will have occurred several hours, and in the spermatozoon, several weeks before fertilization. If the embryo is to be granted "rights" on the grounds of genetic uniqueness and potential, how can we logically withhold similar "rights" from the gametes? What of the "rights" of the polar bodies, so wantonly cast aside during oogenesis, and yet clearly of human origin and containing genetic information capable, if suitably nurtured and combined, of potential humanity? One could push the argument for "rights" back still further, to parental embryos, when the germ cell lineage separates from that of the somatic tissues: who can deny that to destroy a primordial germ cell prevents it from fulfilling its life-transmitting potential?

My purpose is not to argue that embryo research should not be constrained, nor that the embryo is worthless. Rather, it is to point out, yet again, that the transmission of life and of human identity forms a continuum, and that there is no point at which human potential suddenly jumps into existence. Setting such arbitrary points may give us the warm glow of moral certainty, but the exercise is not supported by the real complexity of biological systems.

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SIR — The legal and moral status of embryos and the way in which they are handled are the subjects of a complicated debate. R. Watson (*Nature* 7 March, p. 10) seeks to simplify the topic by referring to a clear topological event, fertilization, "at which a unique member of our species is created". One problem with such an oversimplification is that it may be applied to give silly conclusions.

I contend that each member of a pair of identical twins is a unique member of our species, even though both result from one fertilization. I believe that it is (and should be) illegal to murder one, or to use him or her destructively in medical research. I reach the decision that it is morally wrong to kill a member of a pair of identical twins by deciding that each is a separate, thinking, feeling person, and not by some simple topological argument about the moment when a genome is created.

Of course one might argue that any mitosis (like that which produces identical twins) is an event "at which a unique potential member of our species is created", since it is probably possible to freeze any human diploid cell, await the development of practical human cloning by nucleus transfer, and make an individual of that cell. The killing of single human cells is neither legally nor normally the equivalent of homicide nor, I contend, should it be. This line of argument, too, is an oversimplification.

Whether the benefits of research on embryos (or of abortions) outweigh the disadvantages of destroying embryos is a complex and difficult question. We should address that complex question without looking for quick and easy definitions of what is a person.

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Genes and intelligence

SIR — Summarized briefly, John Hartung's hypothesis (*Nature* **311**, 515; 1984) is that ill health caused by genetic factors may indirectly affect the intelligence. The principle point of my letter (*Nature* **313**, 425; 1985) was to question that *a priori* assumptions that intelligence and school attendance are linked and that hay fever impairs intellectual performance. Both these assumptions may be true, but they are unproven. Since Dr Hartung's hypothesis depends directly on the validity of these assumptions and since they may be tested empirically, it is essential to his argument that they should be examined experimentally.

His reply (*Nature* **314**, 398; 1985) deals largely with the viscosity of gases. Of course he is right that the viscosity of gases increases with temperature; he was wrong in his original letter to suggest that humidity also increases viscosity. The problem is, however, far more complex. For instance, the air flow in the nose is turbulent and resistance will therefore depend on gas density, being in general terms less in humid air than in dry air. The shape of the nose is obviously not wholly dependent on climate. This is illustrated by the observation that the inhabitants of the dry desert regions of North Africa and the Middle East, where natural conditions provide the most viscous air to be found on Earth, are not noted for short noses with wide nostrils.

I agree with Dr Hartung that the search for genetic differences that may also affect intelligence is a proper subject for scientific enquiry. My familial credentials are even more extensive than his, since I can claim to be the son and nephew of both men and women who served in the fight against Hitler's Germany. I think, though, that Dr Hartung would agree with me that neither moral nor political rectitude are genetically determined characteristics. The assertion of familial virtue is no guarantee of the value of his opinions or of mine.

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Goldfarb's letter

SIR — In your latest article on the Goldfarb case (*Nature* 28 March, p.307), my name is mentioned as follows: "During his recent conversation with KGB officer Gusev, Dr Goldfarb was confronted with a copy of a letter he had written to Professor Elie Wollman of the Institut Pasteur in Paris, supporting the idea of the moratorium." Gusev said that the letter might constitute a case of 'anti-Soviet propaganda' and made Dr Goldfarb sign a document to that effect".

I wish to make a few points clear.

- I have known David Goldfarb for many years, because he was a pioneer in introducing bacteriophage and bacterial genetics research in the Soviet Union. I consider myself a close friend of this exceptional man, both professionally and personally.
- Our correspondence is brief, containing only personal news of the usual kind, and neither him nor I ever approached in writing any subject that could be interpreted as being controversial in the broad sense of the word.
- I have received no letter from Goldfarb for about a year and was astonished at not even getting a Christmas card, although I wrote to him at the New Year.
- I never received the letter mentioned in your article. There are therefore three possibilities:

(a) such a letter does not exist and has never existed;
(b) the letter exists and has been diverted by the Soviet secret police;
(c) a fake letter has been manufactured.

Hypothesis (b) seems to me to be excluded for the reasons given above.

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