

# The hype of the human genome

BY KEN SMITH

Genetic research often faces the criticism that new advances are being introduced before we are ready to deal with their ethical implications. Although the fear about genetic research into human beings may not be unfounded, it is also apparent that in some cases the hype surrounding current capabilities in genetics have extended beyond the reality of the research. In particular, the Human Genome Project has been given so much publicity that it is difficult to see what it actually entails.

A debate about the consequences of the Human Genome Project was presented in February as a part of the Philosophy Department's Austin and Hempel lecture series. The featured speakers were Richard Lewontin, a confident population genetics professor from Harvard, and Michael Ruse, a rogue philosophy professor from the University of Guelph.

The debate began with Lewontin's criticisms of the Human Genome Project. He believes that science serves two functions: it creates technologies which help us to control the physical world, and it develops explanations for how the world works. For both of these functions, Lewontin believes that the Human Genome Project is making promises which it cannot keep.

Lewontin feels that the Human Genome Project is being falsely hailed as a pathway to a better understanding of humanity. According to him, the Project has created an impression that our DNA determines what we are, and that we will understand the human condition once we discover DNA's sequence. Lewontin believes that the metaphors that scientists use to describe human development lead us to believe that our DNA controls everything about us. For instance, DNA is

often compared to a blueprint which determines how we are constructed. These metaphors and explanations create the idea that the project will help us to understand ourselves.

Lewontin thinks it is a mistake to say that DNA "makes" us what we are. First of all, he claims that DNA does not actually "make" anything by itself. Without the machinery of the cell, DNA cannot reproduce itself, nor can it produce proteins. Instead, the proteins of the cell use the DNA as a reference in creating other proteins, and in creating copies of the DNA. So it is a mistake to talk about DNA as if it is a master molecule which is solely responsible for our development.

Secondly, he emphasizes the role of the environment in the development of an organism. It is simply not possible to recreate an organism with only its DNA. Furthermore, Lewontin argues that even if you know what genes an organism has and the type of environment it grew up in, it is still impossible to predict what it will be like. As an example, Lewontin discusses a bacterium which develops on a petri dish. The bacterium divides so that its daughter cells contain the exact same DNA. However, the daughter cells divide at different times than one another. So even though these two daughter cells have the same DNA and live in the same environment, some sort of random developmental noise has caused each of them to divide at different times than the other. Therefore, since knowledge of an organism's DNA sequence is not enough to predict how it will develop, Lewontin thinks we are misled in our belief that the Human Genome Project will help us to understand how traits develop in humans and in human culture.

The claim that many new technologies will arise from the Human Genome Project is also of concern to Lewontin. One of the

hopes for the Project is that it will enable us to control diseases which are linked to genetics; possibly by identifying how the disease is caused and developing a therapy for it. According to Lewontin, however, there has never been a case in medical history in which knowing the sequence of a gene has benefited a patient. So far, all genetics has allowed us to do is to diagnose that a child has a genetic disease before it is born. And as Lewontin points out, aborting a child before it is born is not the same as curing a disease.

Professor Michael Ruse replied to Lewontin's arguments after his presentation. Ruse agrees with Lewontin that there are problems with the Human Genome Project, however, he does not think it is fair of Lewontin just to point out these problems without discussing possible solutions. Ruse believes that the debate must go further. He thinks we should be concerned about whether or not it will ever be possible to determine the shape of a protein simply from the code in the DNA. We should question whether we will be able to sort through the variation among individual humans in order to determine which sequences are responsible for genetic diseases. Ruse would also like to concentrate on how the money for the Project is being spent, and on whether it could be spent more productively elsewhere.

It seems that for all of Lewontin's criticisms of the Human Genome Project, he does agree that it will produce information of interest to scientists. However, his fear is that the results of the project will be far less groundbreaking than science has been promising to its financial supporters.

Lewontin also worries about the ideology that the Project has helped to build. In some of his

writings, he has expressed concern that the Project is helping to perpetuate the myth that our behaviour and even our culture is determined by our genes. This sort of deterministic ideology could be used to argue that inequalities in our society cannot be helped since it is written in our genes. So in the case of the Human Genome Project, perhaps the surrounding hype is more dangerous than the technology itself.

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