As an recent graduate of UCLA and co-founder of the Society and Genetics Undergraduate group there I have taken particular interest in the controversy surrounding the proposal to offer gene testing to incoming freshman at UC Berkeley, and have several concerns related to both the scientific validity and social implications of the project. I am raising these issues not as an attack upon science, but rather as a call to my fellow undergraduates to begin to ask the right questions of science as participants, as students, and as future researchers.

The first concerns I would like to address are based on critical questions regarding the science of the proposed gene testing. These essential questions may act as a model for other students to think about science and technology. First, I would like to know what aspects of the genome are being analyzed to determine alcohol, folate, and lactose metabolism. Last quarter I did research on the lactase persistence allele in humans and came across the following statement: "(the) single nucleotide polymorphism is located 14 kb upstream from the start of transcription of lactase in an intron of the adjacent gene MCM6. This change does not, however, explain all the variation in lactase expression" (Swallow, 2009).

What this suggests is that, at least up until 2009, there is more than one nucleotide change that can account for the expression of the enzyme that breaks down lactose- and hence the rate of lactose metabolism. If researchers are only testing for this particular polymorphism, they could be missing part of the picture. I would also urge them to examine whether this is the same case for alcohol and folate metabolism.

Furthermore, I am hesitant to believe that researchers understand the relationship between genes and environment well enough to offer definitive genetic tests, and that students themselves are aware of this limitation. How much of my environment can affect gene expression? It is well known that there is the possibility that one may have a gene, but the body's ability to express that gene is not turned on.

My grandma was never lactose intolerant, but a few years ago she started having problems with consuming dairy products. Might this be attributed to some sort of gene and environment interaction? In a related vein, how much of one's alcohol susceptibility is based upon how much you eat versus your genes? It seems very plausible that someone who does not eat dinner before a night of drinking, but can metabolize alcohol quickly would be just as susceptible to one who does eat dinner, but does not have the same genes.

Beyond the scientific questions, there are also issues related to privacy, consent, and understanding. First, I would encourage students to ask how strong are the privacy safeguards to protect against someone finding out and potentially using their genetic information. Might parents have access to the information, especially if students under 18 years of age submit their DNA? Would other researchers have access to DNA? If so, might the researchers use the participant's DNA without their knowledge for further studies?

For some students, this might not seem like such a big deal, but I would refer them to the Havasupai or Greenberg cases, situations in which the legal rights of research participants were infringed by unethical practices. Finally, just how much does our DNA tell us about ourselves? Might this exercise be placing too much emphasis on genetic testing to tell us about ourselves? I believe students might construe this to mean that we are defined by our genes.

In closing, I would like to reemphasize that this is not meant as an attack upon science, or the researchers who are pursuing the genetic testing of students at Berkeley. In fact, I think it is a wonderful idea that the larger aims of the "On the Same Page" project are meant to encourage students to think critically and discuss personal genomics. However, I fear that doing a genetic test before learning about it, especially if students are going to learn about the pros--and the cons--of what they have just done.

I am unsettled by this premature use of genetic testing and I hope that the questions that I have posed will prompt other students to engage with science on a deeper level. After all, isn't the purpose of college to facilitate thoughtful and critical inquiry, debate, and a meaningful understanding of ourselves as responsible students in relation to our world?