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Study Demonstrates that Misconceptions About Genetics Remain Prevalent in U.S. Science Classrooms

Scientists Address Gap in Knowledge by Educating Local Students

About Genetics in Celebration of National DNA Day on April 25

BETHESDA, MD – April 9, 2008 – Results of a new study released in the journal *Genetics* indicate that, although all state science education standards in the U.S. include genetics content, there is still a widespread lack of understanding that includes several common misconceptions which appear to be prevalent among U.S. high school students.*

The [American Society of Human Genetics \(ASHG\)](#) education staff conducted a systematic analysis of 500 of 2,443 total essays submitted by high school students as entries for the National DNA Day Essay Contest in 2006 and 2007. Each year, high school students were invited to submit written essays on one of two questions; one asked students what they would study if they were a human geneticist, and the other asked them to explain the reasons why everyone should know about genetics, or describe in what ways knowledge of genetics will change health and health care practice in the U.S.

Although a number of the submitted essays displayed a solid understanding of genetics concepts and the possible implications of genetics research, a significant number of essays included inaccuracies and misconceptions in the submissions from ninth through twelfth grade students. Of the 500 essays that were randomly selected to be analyzed in this study, 278 (55.6%) revealed at least one obvious misconception, and 101 essays (20.2%) were recognized as containing two or more misconceptions.

The misconception most frequently identified in the researchers' analysis of student essays was broadly defined into the category of "genetic technologies" (17.2%), these responses displayed incomplete understanding of the complexity of scientific research, including biotechnology and genetic engineering. Another common theme identified in the analysis revealed that students did not fully understand concepts related to heredity and patterns of inheritance (14%); these essays reflected students' belief that single genes are the cause of traits and inherited diseases. In

actuality, even in cases of simple inheritance, multiple genetic and/or environmental factors often play a role in the expression of a trait or disease.

"Our data add to the growing literature that student misconceptions can serve as barriers to enduring understanding," said Kenna Mills Shaw, Ph.D., lead author of the study. "By focusing our examination of student writing in genetics we were able to identify specific concepts that appear to be particularly difficult for students to dissect in this important field. Our next challenge is to identify the pedagogical strategies that are most effective in teaching students basic genetic principles, as well as ways that students can apply their understanding of genetics concepts to their daily lives."

Accordingly, scientists acknowledge the important role that advances in the field are playing in our lives, and they have witnessed the significant need that this creates for widespread, accurate understanding of genetics concepts among students. To help address this need, ASHG has partnered with other genetics organizations to educate students, teachers and the general public about genomic and genetic research in events held across the country in conjunction with National DNA Day. This day, celebrated annually on April 25th, commemorates the discovery of DNA's double helix and the completion of the Human Genome Project in April 2003. The essay contest is just one of the many DNA Day activities designed to excite students about human genetics and help them gain a better understanding of the underlying scientific principles and research methods that are involved.

"ASHG is involved in educational activities on National DNA Day because we appreciate that the science of basic genetics is a difficult subject to teach, and as experts in the field, we make an effort to form partnerships with educators to share a broader understanding of genetics and increase students' interest in the field," said Joann Boughman, Ph.D., Executive Vice President of ASHG. "As the largest society for genetics professionals, ASHG members and staff are committed to expanding efforts to raise awareness about the value of genetic science education and human genetics research, and to improve access to credible, accurate and understandable genetic information."

All DNA Day activities are designed to engage and inform students, and potentially inspire some to join the next generation of scientists who will use genetic research to further benefit public health. For more information about National DNA Day, please visit the Society's Genetics Education Web site (<http://www.GenEdNet.org>), which can also be accessed through ASHG's Web site (<http://www.ashg.org>).

[*NOTE: To access the full-text PDF of the research paper referenced in this press release, "Essay Contest Reveals Misconceptions of High School Students in Genetics Content," published online in the journal *Genetics*, please visit:

http://www.genednet.org/pdf/Shaw_EssaysRevealMisconceptions.pdf]

About The American Society of Human Genetics

Founded in 1948, the American Society of Human Genetics (ASHG) is the primary professional membership organization for human genetics specialists worldwide. The nearly 8,000 members include researchers, academicians, clinicians, laboratory practice professionals, genetic counselors, nurses and others involved in or with a special interest in human genetics. The society's mission is to serve research scientists, health professionals and the public by providing forums to: (1) share research results through the Annual Meeting and in *The American Journal of Human Genetics*; (2) advance genetic research by advocating for research support; (3) educate future professionals, health care providers, politicians, educators, students and the general public about all aspects of human genetics; and (4) promote genetic services and support responsible social and scientific policies. For more information about ASHG, please visit <http://www.ashg.org/>.

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