Written by **Denise Behreandt** on November 6, 2008

Cancer Researchers Make Breakthrough

The research was made possible by a leukemia patient whose donated cells formed the basis of the study. When her normal cells were compared to her cancer cells, the results showed 10 gene mutations. Of those genes, the researchers discovered that one blocks chemotherapy treatments from penetrating the cell, therefore allowing cancer cells to survive. Four other genes deactivate a warning system in the normal cell, allowing it to turn into a cancer cell. By mapping the entire genome of an individual with cancer, researchers were able to take steps in answering why mutations in cells occur, resulting in cancer.

Dr. Timothy Ley, who led the study, underscored its importance. "This is the only way we would have found these mutations. There's no other path to get this information. I think it really has begun to tell us how little we know about cancer. This is the first human cancer genome that's been sequenced. In the past, we've always looked at parts of the genome for mutations. But this is the first time that we've been able to look at everything."

No less a scientist than Dr. Francis Collins, former director of the National Human Genome Research Institute and author of the book *The Language of God: A Scientist Presents Evidence for Belief*, hailed the new research as a landmark advance. "The determination of the first complete DNA sequence of a human cancer genome, and its comparison to normal tissues of the same individual, is a true landmark in cancer research," Collins said, according to a news release from Washington University in St. Louis, Missouri, where the research was conducted. "In the past, cancer researchers have been 'looking under the lamppost' to find the causes of malignancy — but now the team from Washington University has lit up the whole street. This achievement ushers in a new era of comprehensive understanding of the fundamental nature of cancer, and offers great promise for the development of powerful new approaches to diagnosis, prevention and treatment."

Still, genetics is highly complex and despite recent advances much remains to be learned. The research team compared the mutations they found with DNA from other tumor samples from patients with the same form of cancer and came up empty. "This suggests there is a tremendous amount of genetic diversity in cancer," said researcher Richard K. Wilson.

While there may be much more to learn, this research may point the way forward. "Although this information doesn't yet tell us how to treat patients, it is a critical first step along that path," said Dr. Brian Druker, director of the Oregon Health & Science University Cancer Center.