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poll
According to some scientists, parents should think twice before buying a cell phone for their kids because the potential long-term health risks remain unclear. Do you agree?

- Yes.
- No.
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photo OF THE DAY



Scientists slash estimate of human genes

By MALCOLM RITTER

▫ New version of human genome reviewed



NEW YORK (AP) - How many genes does it take to make a human? Only about the same number it takes for a small flowering plant or a tiny worm, says a new estimate that's sharply reduced from just three years ago.

"We (humans) don't look very impressive in the competition," said Dr. Francis Collins, co-author of the new analysis by the international group that decoded the human genome.

The new estimate is 20,000 to 25,000 genes, a drop from the 30,000 to 40,000 the same group of scientists published in 2001.

By comparison, the tiny roundworm *C. elegans*, a favourite research subject, has around 19,500 genes. A small flowering plant in the mustard family, *Arabidopsis*, has about 27,000.

But the complexity of the human body arises from more than just its genetic parts list, experts said.

"It's not just the number of genes that matters," said another co-author, Eric Lander of the Broad Institute in Cambridge, Mass. "It really is how nature uses these genes."

Scientists have long speculated about how many genes people have. Some have put it at 100,000 or more, and the genome project's initial figure fell in the low end of estimates when it was announced.

In a betting pool among scientists that ran from 2000 to 2003, the average guess before the consortium published its estimate in 2001 was about 66,000 genes. Afterward, the average dropped to about 44,000.

Collins, director of the National Human Genome Research Institute, put his money on about 48,000 genes when the contest began. That's about twice the new estimate.

"Oh well," he said this week, "live and learn."

Like the betting pool, the new estimate deals only with genes that tell cells how to make proteins. It is reported in Thursday's issue of the journal *Nature* by the International Human Genome Sequencing Consortium, which had determined the sequence of nearly all of the three billion-plus chemical building blocks that make up the human DNA code. Certain sequences of these building blocks make up genes, just as certain sequences of letters create words.

When the consortium produced its 2001 gene count estimate, it still had many gaps in the DNA sequence it had determined. Now the scientists have closed those gaps as much as they can with current technology.

The finished version reveals that many DNA sequences originally counted as genes were actually non-functioning copies of real genes, and that sometimes parts of the same gene were counted as two genes, Lander said.

Scientists said the new range appears to be firm, especially with 20,000 at the lower end, because laboratory work has independently demonstrated that 19,599 genes exist.

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Gerald Rubin, a gene expert at the University of California, Berkeley, who did not participate in the analysis, said the result "is as good a guess as one can make at this point.... I think the estimate is unlikely to change very much."



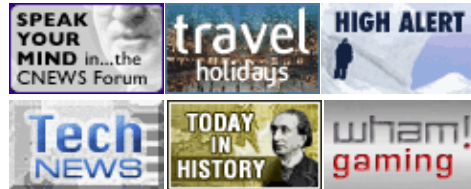
"We just have to get used to the fact that we don't have many more genes than a worm," Rubin said.

So how can humans be so complex with relatively few genes?

In comparison to simpler organisms, Collins said, humans benefit more from genes that turn out multiple proteins rather than one, and from complex proteins that do more than one job. And anyway, lots of biological complexity is based not on individual proteins but on combinations, which can create lots of variety from the proteins found in people, he said.

Lander said he's not concerned that the number of human genes has turned out to be so limited.

"To the contrary, I think it's great news," he said, "because what it means is we already know a lot about most human genes."



opinion **The important takes a while**

Watching television news today it seems our attention spans have dipped to near zero and the networks are more than happy to give us our fix. In the past month alone, the media's roving eye has swung from such earth-shattering events as Martha Stewart's jail release to the Michael Jackson trial. [Full Column](#)

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