E. coli celebrity among scientists [1]

Submitted on 3 December 2006 - 8:33pm

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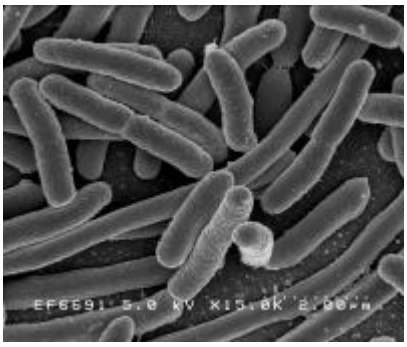

By Mónica I. Feliú Mójer/ Special for El Nuevo Día endi.com [2] In the past few weeks, E. coli breakouts in fresh produce have been all over the news. Sadly, E. coli is famous for causing gastrointestinal problems, infant meningitis, kidney failure, urinary tract infections and even death. In spite of its bad reputation, E. coli is not the monster you imagine. In fact, in the world of science, Escherichia coli is a beloved celebrity. The bacterium Escherichia coli are part of our gastrointestinal flora. While living there, it protects us from pathogenic microbes and fungus, preventing those bugs from colonizing our gut. E. coli has a symbiotic relationship with humans: we provide them food and home, and in return E. coli secretes vitamins B12 and K, which are essential for our nutrition. Also, E. coli produces an enzyme, lactase that contributes to our tolerance and digestion of dairy products like milk and yogurt. If E. coli lives in our gut, what is it doing in our salads? E. coli inevitably exits our gut with the feces. Usually this natural process does not affect anyone. However, when there is a lack of hygiene in the food processing, especially those coming from cattle, E. coli can end up in our food. Besides being a valuable inhabitant of our gut, E. coli is also an important model organism for scientific research. Scientists know the biology of Escherichia coli better than that of any living creature. This bacteria has been,

since the beginning, microbiologists favorite experimental model, largely because it doesn't need complex nutrients to grow and it reproduces fast; in optimal conditions E.coli divides every 20 minutes. E. coli popularity skyrocketed in the 1950's, when scientists decided to adopt a reductionism strategy to study basic biological processes in the simplest organism they could find. Research with E. coli has shed light on how the basic machinery of a cell works. Thanks to this bacterium we know cellular transport mechanisms, how a cell produces energy and how it synthesizes important molecules, among many other important biological phenomena. These discoveries can be applied to cells of other organisms, like humans. Without Escherichia coli the most important scientific revolution of the 20th century would have never happened. In this bacteria we have discovered much of what is known about how the genetic machinery of the cell works: what are genes composed of, what is the genetic code, how DNA replicates, DNA repair mechanisms, gene expression control, among many other discoveries. Today, E. coli not only maintains its popularity as a model organism, but it has become an indispensable tool for biotechnology and genetic engineering. E. coli produces restriction endonucleases and ligase, enzymes that are like the scissors and the glue that allow the generation of recombinant DNA that in time allow gene cloning. And, thanks to the wonders of gene cloning, the biotechnology industry can use E. coli to manufacture molecules used in the medical treatment of several diseases. Human insulin (known as Humulin), that thousands of diabetics us daily, is produces in large scale by the small Escherichia coli. Other proteins synthesized in large scale by E. coli are the human growth hormone, anti-coagulants, and somatostatin. E. coli, gut inhabitant that feeds on the unwanted part of our diet is also a microbe of high nutritional, medical and economical value for our society. From the gut to the test tubes, this important microbe is of great benefit almost everywhere…but our salads.

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