**THE SECRET LIVES OF**

**E. coli**

Causing illness is only one small part of the story of *E. coli*; its relationship to human health and the food we eat is much more complex. Not all *E. coli* are bad - in fact most are not - and some are even beneficial!

**THE GOOD NEIGHBOR**

- **E. coli** is a beneficial part of our gut
- **E. coli** can exchange genes with other *E. coli* and even other types of bacteria. There are many different genes that, when acquired, could change a harmless *E. coli* into one that makes us sick.

**THE BAD NEIGHBOR**

- **E. coli can make us sick!**
  - It all starts with poop.
  - **TO MAKE PEOPLE SICK:**
    - Get in gut
    - Stay in gut
    - Produce toxins and irritate gut
  - There are many different types of *E. coli*, but the ones that people are most familiar with are those that cause disease. Disease-causing *E. coli* disrupt body functions, resulting in diarrhea. Some can cause permanent damage and sometimes even death.

**THE SCIENTIFIC PARTNER**

- **What is true for E. coli is true for the elephant.** – Jacques Monod
  - While humans (and elephants!) are made of trillions of cells working together, *E. coli* is composed of a single cell. Biology that would be difficult or unethical to study in humans or animals can be studied more easily in *E. coli*, this is why scientists often refer to *E. coli* as a “model organism”.

- **E. coli wins record number of Nobel Prizes!**
  - The Nobel Prize is science’s highest honor given for discoveries that “have conferred the greatest benefit on mankind.” *E. coli* has contributed to 12 Nobel prizes! Some of *E. coli*’s “greatest hits” are shown here.

- **E. coli is a “molecular factory”**
  - *E. coli* jump started the biotechnology era because *E. coli*’s genetic flexibility allowed microbiologists to use *E. coli* as a factory to produce many biological compounds we use every day. Insulin (for treatment of diabetes) and renin (for production of cheese) are two examples of this.

- **E. coli is a “model organism”**
  - TO HELP PEOPLE UNDERSTAND LIFE:
    - Work in labs
    - Make helpful products
    - Make discoveries

- **How do the good guys go bad?**
  - **Stick to intestine walls** • **Produce toxins** • **Invade cells** • **Antibiotic resistance**

- **TO KEEP PEOPLE HEALTHY:**
  - Protect against invaders
  - Help other good bacteria
  - Soak up toxins

**NEWS**

- **Summer 2011:** 50 people die and over 4,000 are sickened as a result of an *E. coli* outbreak.

- **How do the good guys go bad?**
  - **Stick to intestine walls** • **Produce toxins** • **Invade cells** • **Antibiotic resistance**

- **Only 10 trillion human cells**
  - **You are only really 10% human!**

- **FAQ**
  - **There are two ways to protect food from contamination with harmful *E. coli***
    1. Prevent bacteria (and feces!) from getting into food in the first place or
    2. Treat food products to kill bacteria that have slipped past our precautions.

- **For the free full report visit:** http://bit.ly/AAMEcoli

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