moldy mary

MARY HUNT worked for the Department of Agriculture's Northern Regional Research Laboratory (NRRL) in Peoria, Illinois in the early 1940s. She had been assigned the task of grocery shopping for the lab with a shopping list that probably surprised the businesses she frequented. She scoured markets and shops looking for moldy fruits, vegetables, cheese, and breads. She was in search of a mold that would provide a strain of Penicillium mold that could be used to mass-produce penicillin. She was nicknamed Moldy Mary.

Years before in 1928, a British laboratory scientist, by the name of Alexander Fleming, had returned from his vacation to find mold growing on one of his agar dishes. An obvious area surrounding the mold was clean of the staph bacteria that had been swathed on it. The mold had produced a substance that had killed the staph bacteria.

Other British medical research scientists would later build on to his observations and experiment with the mold Penicillium in an effort to produce the first modern antibiotic medication.

Apparently the "antibacterial effects of Penicillium molds had been known since the seventeenth century, but not to Fleming or any of his contemporary physicians. Ancient Egyptians, Chinese, and Central American Indians had all used molds to treat infected wounds."[1] With the threats of WWII howling like expectant coyotes in the not-far-off distance, the British scientists were eager to interest America in aiding them in the project of producing an antibiotic that could be used to save the lives of wounded soldiers. The NRRL had experimented with various molds, but they were either not the right strain or were not prolific. Hence, with the new enterprise before them, Mary was given the specific task of finding particular molds, in search of better producing penicillin strains.

It ended up being a solitary cantaloupe that provided the fungus Penicillium chrysogenum, which yielded 200 times the amount of penicillin as the species that Fleming had discovered. After being enhanced with mutation causing X-rays and filtration, the species yielded 1,000 times the amount of penicillin as the first batch from Penicillium notatum. Penicillin began being produced in mass quantities, saving the lives of many toward the end of the war. That lowly, moldy cantaloupe provided a substance that would transform modern medicine. "All strains of penicillin today are descendants from that 1943 mold."[2]

The birth of penicillin as an antibiotic led to the development of many other antibiotic medications. No doubt antibiotics have saved millions of lives. The over-use of these "miracle drugs," however, is a concern of Martin J. Blaser, MD, the director of the Human Microbiome Program at New York University, and has served as the president of the Infectious Disease Society of America. In his book, *Missing Microbes*, he shares how it is not the immediate side effects of antibiotics, such as loose bowels or allergic reactions that concern him.

The average American child receives three courses of antibiotics in the first two years of life. An average of eight courses is given in the next eight years. Assessed from Centers for Disease Control statistics, the average 20 year old has received approximately seventeen courses of antibiotics. In the light of this reality, it is even

more astonishing to realize that the majority of antibiotics mass-produced today do not go to humans, but to animals. Seventy to eighty percent of all antibiotics sold in the U.S. are given to cattle, swine, chickens, turkey, and farmed commercial fish: salmon, tilapia, catfish, and shellfish such as lobster and shrimp. Yes, antibiotics are given to combat disease, but there is yet another stronger motive, at least for the barnyard animals.

RESISTANCE TO PENICILLINS HAS INCREASED DRAMATICALLY. . . .

In the mid 1940s it was discovered that when antibiotics were given to animals they gained weight faster than animals not receiving antibiotics. Blaser found a 1963 study in which the researchers "asked themselves whether the observed growth promotion effects in animals were due to antibiotics themselves or to their effects on the microbiome."[2] They found that germ free chickens without bacteria within or on them did not grow bigger when given antibiotics like those who were conventionally grown. This suggested that not only was normal flora essential for antibiotics to affect weight gain, but that this was perhaps where antibiotics were making their impact.

Antibiotics have provided a way for farmers to make a larger profit by selling heavier animals. The animals do not become heavier because they are eating more. They do not become hungrier when given antibiotics or the farmers would be spending more on feed. Apparently the calories-ingested versus calories-expended rule for weight gain isn't as clear-cut, at least in animals. All this is fine and dandy for the hard working farmer, but how is this relatively new way of raising livestock impacting us?

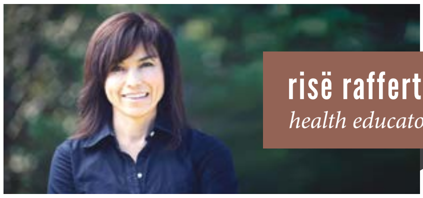
One of Blaser's concerns is resistance. Resistance is referring to strains of bacteria that have become resistant to a specific antibiotic. The illness that once was responsive to antibiotic treatment is no longer responsive because the strain of bacteria now causing the illness is unaffected by the medication. The overuse of antibiotics is heightening the development of these super bugs. Resistance to penicillins has increased dramatically.

The other concern is tied to our ingestion of sub-therapeutic doses from the food we eat. Overuse of antibiotics in livestock results in a residual amount in the meat that is consumed from them. Blaser shares that, "the antibiotics themselves arrive in our food, particularly in meats, milk, cheeses, and eggs. Milk can legally have up to 100 micrograms of tetracycline per kilogram. A child drinking 2 cups of milk a day will ingest about 50 micrograms of tetracycline every day. A 1990 report indicated that 30-80 percent of milk samples had detectable antibiotic, especially sulfa drugs and tetracycline."[3] While the amount of antibiotic residue from drinking milk is not a lot, Blaser questions the impact of drinking 2 glasses of milk per day for years.

The rate of obesity for adolescents has quadrupled in the last 30 years. Could the amount of antibiotics they have received be in some way factorial? How are the 17 rounds of antibiotics by age 20 and residual amounts in our food supply affecting the gut flora? Blaser comments that "our children may be growing up without the full complement of their necessary microbes."[4] What we do know is that what was intended to literally be a lifesaver, a solution in an emergency, has become somewhat of a cure-all, which may not be beneficial to us in the long run.

Like Mary, our life, our work, and our influence are often but a part of a something bigger. For weal or woe, we may not always be sure. Most of the time we do not know the long-term results of our contribution. Will the efforts and investment we have placed in a given field, person, enterprise, or goal truly bring forth the desired outcome? Jesus has promised that there is an investment that we need not have any question as to the return; "a treasure in the heavens that faileth not" (Luke 12:33, KJV).

[1] Martin J. Blaser, MD, *Missing Microbes*, Henry Holt and Company, New York, NY, 2014, p. 60.
[2] Ibid.
[3] Ibid., p. 85
[4] Ibid., p. 214



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Risë has been writing on various health subjects for over 20 years. She has inspired many through her research and down-to-earth writing and speaking style. She believes that healthy living is intimately tied to happiness and wholeness.