**SCIENCE IN TEN MINUTES**

Chandra Emani\*

**Mad dogs, broccoli and a little book**

“Hold down the dog please!” The calm words of the scientist and his composure were not shared by the four men holding down the dog as it was a mad rabid dog salivating profusely at its mouth. The scientist calmly took a glass pipette onto his mouth and through the open end started sucking at the saliva while the men winced. He then proceeded to collect the saliva into a test tube and held it against light, deep in thought. Somewhere in there, he hoped would be the virus that caused rabies and he is going to find a cure for it. Such was the dedication of a scientist who wanted to conquer the disease known as rabies. He never found the virus in the saliva, but the next thing he did was to relate the madness that was manifest in the dog and then the person who got bit by the dog to the mental seats, namely the brain and spinal cord. So his next stop was to extract the brain tissue of the mad dog and dry the tissue so as to weaken the virus in it. He then injected the dry powdered brain tissue into uninfected normal dogs for a 12-day period and then directly injected the fresh brain tissue with the rabies virus into them. When he found these dogs frisking happily around, he found the cure he was looking for. The process of giving the uninfected dogs a little bit of the virus is making them immune and thing given to them is termed the vaccine. Immunization and vaccination were thus discovered as effective tools, but then the scientist still debated whether he could use this on a human subject. On July 6, 1885, a day that is now preserved as a eureka moment in medical science, a boy named Joseph Meister got repeatedly bitten by a rabid dog and was left for dead, until a friend of the scientist persuaded him to try his vaccination treatment on the boy. The 12 day painful injection regime cured the boy completely and the name of the scientist is now etched in golden letters in medical field. His name is Louis Pasteur, but wait a minute. Does his last name ring a bell? Every time you pick a milk carton, you want to know whether it was “pasteurized”? Well, about thirty years before he cured the boy of rabies, Louis Pasteur happened to help a friend of his at a factory where some batches of vinegar made from beet juice were going bad. Under a microscope, he found that some rod shaped bacteria were interfering with the yeast cells that were making the vinegar. Boiling the liquid would get rid of the bacteria, but then the taste of the vinegar would go bad. Pasteur then found a solution through a series of boiling regimes that preserved the vinegar’s taste while killing the microbes by controlled heating of the vinegar to 50-60 degrees Celsius followed by rapid cooling. Today this process is routinely used to get rid of all kinds of microbes in food stuffs and is known to us as pasteurization. Pasteur was last seen in his lab dying of a stroke while finishing an experiment perfecting the technique of vaccination to cure cholera, and his last words were “One must work; one must work, I have done what I could.” Well, that’s a scientist we should all salute for making our daily lives safer from harmful microbes.

Need a good reason to eat a cup of broccoli florets every day? A cup of cooked or uncooked broccoli contains vitamin C, vitamin A-like substances called carotenoids, fiber, calcium and folate (a form of Vitamin B) mixed with chemicals called isothiocyanates, more specifically sulforaphane and indole-3-carbinol (I3C). The last two chemicals in the list when mixed with the right amount of the chemicals listed earlier are known to produce substances called anti-oxidants that boost detoxifying enzymes in the body leading to elevated estrogen levels to halt breast cancer. Sulforapahne and I3C by themselves were shown to have protective action against prostrate, colon, pancreatic and breast cancer in lab studies, but studies are on to see if broccoli has them in the right amounts mixed with the other vitamins to show the best effect against cancer onset. While we wait for the studies to be confirmed, it doesn’t hurt to consume a cup of broccoli florets every day.

Now before I close, it’s time for our book of science. How about a book you can slip into your pocket (yes, literally)? It has 109 pages, the size of one of those blackberry phones and has science concepts listed A to Z (A for atom, B for biological cell and Bishop Berkeley’s bucket, C for Chaos, D for DNA and so on till Z for zero energy universe and Zweig particles). Every concept is explained in about 500 words. If you want to sound simple and serious during conversations, this would be it and it can remain in your pocket. It’s called *The Little Book of Science* by John Gribbin.

\**Chandra Emani is an Assistant Professor of Biology at western Kentucky University-Owensboro. Apart from teaching introductory and advanced courses in molecular biology and Genetics and researching on utilizing plants to make useful products such as biofuels and anti-cancerous pharmaceuticals, he enjoys explaining science in simple words to his daughter.*