**SCIENCE IN TEN MINUTES**

Chandra Emani\*

**The Father of Social Medicine**

 When we get sick, we just call in to the nearest emergency room or our personal physician. We just drive over to a place called the hospital and there is a nurse who mechanically takes care of all the health parameters, namely, temperature, blood pressure and the doctor takes care of everything in computer precision. Sometimes, a nurse or physician assistant takes care of you by asking simple questions all over a phone call. It is seen that there is a template for medicine that’s out there. We tend to take this whole process for granted. But this clockwork clarity that medical field terms “social medicine” was never there before the 1850s. Physicians were around, but the system of treatment with all the basic steps that maintain a uniformity throughout the world was what was deciphered and developed by a pioneer shifting [German doctor](http://en.wikipedia.org/wiki/Medicine) who was also an [anthropologist](http://en.wikipedia.org/wiki/Anthropology), [pathologist](http://en.wikipedia.org/wiki/Pathology), [prehistorian](http://en.wikipedia.org/wiki/Prehistorian), [biologist](http://en.wikipedia.org/wiki/Biologist), writer, editor, and politician. He advanced this monumental way of life called PUBLIC HEALTH. His name is Rudolf Ludwig Carl Virchow.

 Rudolf was called the “father of modern pathology” as he was the one who banished the concept of “humorism” from medicine. Humorism deals with a system of Greek medicine that is based on four distinct [bodily fluids](http://en.wikipedia.org/wiki/Bodily_fluid) in a person known as “humors”, namely, yellow bile, black bile, blood and phlegm that were supposed represent the four natural elements fire, earth, water and air respectively, to directly influence the temperament and health of an individual. An excess of these fluids was what was thought to trigger symptoms of diseases. This highly individualistic and contextual dealing of patients though considered holistic never passed a scientific test leading to a vague and contextualized treatments. Rudolf Virchow adopted the concept of pathology and pathogens as the external agents that brought unwanted symptoms in individuals based on basic individual responses. This essentially brought science into medicine thus revolutionizing treatment of a vast array of diseases.

 Rudolf originally trained as a theologist, but abandoned that field as he had a weak voice which he thought was unsuitable for preaching. The thesis he wrote for getting his degree in theology was titled “A Life Full of Work and Toil is not a Burden but a Benediction.” The thesis showcases his philosophy of life and his natural alternative was to get into the field of medicine just to serve humanity, and he excelled in this endeavor, so much so, he was called “the Pope of medicine” by his peers. Armed with a scholarship for gifted students from poor families, he became a military surgeon and as a medical student and researcher, he was one of the few who brought microscopes into medical field. He implored his students to “think through microscopes.” Although the term “cell” was coined by Robert Hooke around that time, it was Virchow who stated that cell is the basic unit of life and it was what should be specifically studied to understand the basis and mechanics of disease. In 1855, he published his findings and his work contained the classic scientific phrase “Omnis cellula e cellula” meaning "All cells come from cells." In 1847, the Prussian government deployed Virchow to study a typhus epidemic and this proved to be the platform for a medical campaign that resulted in his revolutionary ideas on social medicine and politics after seeing the victims and their poverty. Though in hindsight, he was not particularly successful in combating the epidemic, he authored 190 page report on his deployment in 1848 that became a turning point in politics and public health in Germany. Back home, he was witness to a political revolution where he was an active participant and to fight political injustice he helped finding “Die medicinische Reform” (Medical Reform), a weekly newspaper for promoting social medicine. The motto of the newspaper that greeted the readers was "medicine is a social science" and "the physician is the natural attorney of the poor".

 Virchow’s subsequent career read like an encyclopedia of medical science and diagnostics that have stood the test of time and are still crucial tools in diagnosing deadly diseases. In 1845, he observed an abnormal increase of white blood cells in cancer patients and named it “Leukamie” a term now anglicized as leukemia. He also identified tissue inflammation as one of the major causes of cancer tumors. One of his significant discoveries is that of an enlarged left supraclavicular node (now known as “[Virchow's node](http://en.wikipedia.org/wiki/Virchow%27s_node)”) as one of the earliest signs of stomach and lung cancers. He also elucidated the reasons for blood clots in arteries of heart patients, but his greatest discoveries came in the field of cellular pathology that included the life cycle of roundworm that gets into humans through contaminated pork to cause the fatal disease helminthiasis. He suggested a simple solution of heating the meat to 137°C for 10 minutes to kill the infecting pathogen. His final monumental contribution came in the form of a systematic method for autopsy and also the use of analyzing hair samples in crime scenes that revolutionized forensic science and crime detection and investigation methodologies.

 Virchow pioneered the revolution in societal health-care conditions such as working towards modern water and sewer systems. As we sit back and breathe easy in a safe and efficient medical system, let’s salute the father of it all who wrote in his classic report of social medicine that “a disease outbreak could not be solved by treating individual patients with drugs or with minor changes in food, housing, or clothing laws, but only through radical action to promote the advancement of an entire population, which could only be achieved by "full and unlimited democracy" and "education, [freedom](http://en.wiktionary.org/wiki/freedom) and prosperity."

\**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. He can be reached at chandrakanth.emani@wku.edu.*