Eijkman and Hopkins: Vitamins, the Missing Pieces (1929)

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Imagine you are trying to assemble an incredibly complex watch. You have the large gears, the mainsprings, and the shiny dial. Everything seems to be in place, but the watch does not move. Something tiny is missing, almost invisible—a small drop of oil or a bolt the size of a grain of sand. Without that insignificant piece, the entire machinery is useless. This is the story of how humanity discovered that our health depends not only on what we eat in large quantities, but on substances so minute that for centuries no one knew they existed.

In the late 19th century, a mysterious disease called 'beriberi' was devastating colonies in Asia. Strong men grew weak, their legs paralyzed, and their hearts failed. At that time, science was obsessed with microbes; thanks to Pasteur, everyone believed that if you were sick, it was because something had invaded you. A Dutch doctor named Christian Eijkman was sent to the island of Java to find the invisible 'culprit,' the germ causing beriberi. But what he found was not an external killer, but an internal absence.

- The mystery of the chickens that cured themselves thanks to an unexpected change in diet.
- Eijkman's obsession with finding a bacteria that simply did not exist.
- Frederick Hopkins' elegant experiment in London that challenged all nutritional logic of the time.
- The revelation that the human body is an engine that needs specific 'sparks' to function.

Eijkman noticed something strange in his laboratory: the chickens he was experimenting with suddenly fell ill with symptoms similar to human beriberi, but then, without explanation, they recovered. After investigating, he discovered that the hospital cook had decided, for economy's sake, to stop feeding them the polished white rice from the kitchen and return to cheap brown rice. Could the husk of a simple grain of rice be the difference between life and death? Was it possible that we were getting sick not because of what we were eating, but because of what we were taking away from our food?

The Ghost in the Machine: The Mystery of Beriberi

In the late 19th century, the medical world was living through an unprecedented euphoria. Robert Koch and Louis Pasteur had proven that the enemies of humanity were invisible beings: bacteria. It was thought that every disease had an invader. Therefore, when beriberi began to kill thousands of soldiers and prisoners in the Dutch East Indies, the order was clear: 'Find the microbe.' Beriberi was a terrifying disease; the word means 'I can't, I can't' in Sinhalese, reflecting the extreme weakness of those who suffered from it.

Christian Eijkman arrived in Java in 1886 with his microscope and a blind faith in bacteriology. He spent years injecting the blood of sick patients into chickens, hoping they would develop the disease. What happened next was one of those accidents that change history. Suddenly, all his chickens fell ill with a polyneuritis that resembled human beriberi. Eijkman was excited: the microbe was in his laboratory! But before he could isolate it, the chickens cured themselves. The experiment seemed ruined.

The Lucky Mistake: Chickens, Rice, and a Stingy Cook

Eijkman, frustrated but curious, began to trace what had changed. He discovered that the rice supply for the chickens had been the key factor. For a time, the military hospital cook had given them 'military' rice (white and polished), claiming that cheap brown rice was not worthy of laboratory birds. When a new cook arrived and refused to give them the luxury rice, they returned to brown rice with the husk. The chickens miraculously recovered.

To understand this, imagine that rice is like a message. White rice is a message where the side notes have been erased. Brown rice preserves those notes. Eijkman realized that the rice husk contained something vital. However, his mind was still trapped in the paradigm of his time. He didn't think of a 'vitamin.' He thought that white rice contained a poison or toxin, and that the husk contained the antidote. It was a brilliant conclusion, though technically incorrect, but it opened the door to a new way of thinking.

Frederick Hopkins: The Chemist Who Saw What No One Else Did

While Eijkman was observing chickens in the tropics, in cold Cambridge, a man named Frederick Gowland Hopkins was approaching the problem from a purely chemical angle. At the time, scientists believed that the perfect diet consisted simply of a balanced mix of proteins, fats, and carbohydrates (the macronutrients). If you gave a living being these three pure things, it should be healthy.

Hopkins decided to test this theory. He fed rats a 'perfect' diet of purified proteins, fats, and sugars. According to the textbooks of the time, the rats should have thrived. Instead, they stopped growing and began to die. But then, Hopkins added a tiny amount of fresh milk to their diet, barely a drop. The rats recovered instantly and began to grow again. That drop of milk didn't have enough calories or protein to make a difference. It was something else. Hopkins called these substances 'accessory food factors.'

'Vital Amines': A New Map of Health

The idea was revolutionary. Imagine your body is a building under construction. Proteins are the bricks, fats are the insulation, and carbohydrates are the workers' energy. But what if you don't have the blueprints or if the workers don't have keys to open the toolboxes? Hopkins' 'accessory factors' were those keys. In 1912, biochemist Casimir Funk coined the term 'Vitamin' (from 'vital amine'), although it was later discovered that not all of them were amines. The name stuck because it captured the essence of life.

The discovery of Eijkman and Hopkins transformed medicine from a science of 'attack' (killing germs) to a science of 'balance' (ensuring nutrients). Beriberi turned out to be a deficiency of vitamin B1 (thiamine). Scurvy, which killed sailors, was a lack of vitamin C. Rickets, which deformed the bones of children in sunless industrial cities, was a lack of vitamin D.

A Legacy of Life: The Micronutrient Revolution

In 1929, Eijkman and Hopkins shared the Nobel Prize in Medicine. It was a recognition of an idea that seems obvious to us today but was almost heretical at the time: that the absence of something invisible can be as deadly as the presence of a lethal virus.

Thanks to them, we understood that we are what we eat, but in a sense much deeper than we imagined. We don't just need fuel; we need fine-tuners. Today, when we see fortified foods or take a supplement, we are using the map these two men drew. They learned that life is not just a matter of brute force and calories, but of a delicate chemical harmony, where the smallest pieces are often the ones that keep the entire system running. The lesson of 1929 remains vital: sometimes, to solve the biggest problems, you have to pay attention to the smallest thing on the table.