20th Century Medical Megastars

Paul Ehrlich and the first magic bullet

Ehrlich was one of the students of Emil Behring who discovered that the bodies of animals could produce natural chemicals which would kill the poisons (toxins) produced by some germs. These natural chemicals are called antitoxins. Behring discovered that antitoxins produced in the blood of horses could be injected into humans suffering from diphtheria. Ehrlich began to wonder if man-made chemicals could be found that would work inside the body in the same way. He wanted to find a "magic bullet" which would always find its target.

In Germany, where Ehrlich worked, the chemical industry was large and wealthy and ready to spend money on research that might find new uses for its products. Koch had used chemical dyes to stain microbes so he could see them better, and he found that some of them killed the microbes. Ehrlich set out to look for a dye that would kill disease microbes without harming the human body. He wanted to find a cure for syphilis. He infected rabbits with the disease and tested 605 dyes on the germ over a period of ten years. The 606th one worked. It killed the germ and cured the disease. The first magic bullet had been found. It was called salvarsan.

The discovery was nearly missed. The 606th one had been tested a year before and discarded as useless. Hata, a Japanese assistant, was testing one of the discarded dyes and found out that it did work. Ehrlich insisted that it was thoroughly tested and found it did work.

Fleming and the discovery of penicillin in 1928

In the first World War Fleming worked in an army hospital in Fance. Bullets or shell fragments carried dangerous germs deep inside the body and antiseptics could not be used against them. Fleming wished he had something like Salvarsan which could be used to kill these dangerous germs. After the war he went back to his research on identifying bacteria and trying to find ways of killing them. In 1928 Fleming was studying the germs causing boils and spots. He had dozens of glass dishes on which they were growing. He noticed that some of the dishes had a mould growing upon it. It was not unusual for this to happen but Fleming noticed that no germs were growing the edges of the mould. He took a sample of the mould so that he could study it further.He discovered that the mould could killl a number of dangerous bacteria e.g the ones causing diphtheria, gangnrene and meningitis. The mould was a member of the penicillium family and he called the germ-killing substance penicillin. He could not purify the mould juice nor could he make it last for a long time. He did find out that it seemed to do no harm to body tissues. When he could get no further with the mould he wrote articles describing his work and returned to study other substances. For 11 years penicillin was not studied.

Gerhard Domagk, the French and the sulphonamides 1932 and 1935

In 1932 Gerhard Domagk, a scientist working for a large German chemical firm, discovered a dye that could kill the germs of several diseases without harming the human body. Then in 1935 French scientists discovered that it was one of a group of chemicals called sulphonamides. Domagk had first used it to save the life of his daughter who had pricked her finger with a needle and had developed blood poisoning. But sulphonamides were soon found to cure many infectious diseases such as pneumonia and scarlet fever.

Florey and Chain (Penicillin Part Two)

In 1938 work began on penicillin again. Florey was an Australian and Chain was a German Jew who had fled to Britain to escape Hitler's persecution. They were studying natural substances which killed bacteria and read Fleming's 1929 article on penicillin. Their tea, were able to purify the mould juice but they could only produce long-lasting penicillin in very small quantities. The British chemical industry was fully occupied with producing explosives for the war. Florey went to the United States to ask for American help. The US government paid out millions of dollars to the companies to pay for all the new equipment. The improvements that patients made justified the expense. The firsr variety of penicillium used would only grow on the surface of liquids. A new variety of the penicillium was found which could be grown at depth in huge tanks. By 1943 Allied armies began to use it. By 1944 there was enough for all the wounded in the D-Day invasion of Europe.

Christiaan Barnard and the first heart transplant 1967

Organ transplants can cause problems for surgeons. The body produces substances to destroy foreign tissue and these can affect the workings of transplanted organs. Drugs have to be given to reduce the amount of these natural substances. This reduction in the body's immune system means that disease-causing germs could do well. Doctors carrying out transplants have to try to make sure that as few germs are around the patient as possible. The doctors had to be as clean as possible. The average person is estimated to have about 60,000 microbes on each square inch of his or her skin. The first heart-transplant made front page news all around the world when it was carried out in South Africa . Today sufferers from cystic fibrosis are often given the heart and lungs of a donor as this causes fewer complications.

Parts of the human body which can be transplanted from one person to another include hair, cornea, lungs, blood, heart, liver, kidneys,pancreas, skin and blood vessels.