

PATHOLOGY THROUGH TIME

- Maz Pathology: the study of what causes disease.
- Chaz I'm going to make a statement here. I'm going to say that that doctors didn't know what caused disease until Pasteur.
- Maz You're saying that everybody was thick until the 1860s?
- Chaz I'm saying that everybody was ignorant. Look at the evidence – what about prehistoric times?
- Maz Agreed there – they thought disease was caused by the spirits, or an enemy with a pointing bone.
- Chaz And in Egyptian times?
- Maz Well, they said a blocked Channel caused disease – have you never had constipation? And a blood clot causes a stroke, doesn't it – there's truth in the Channel Theory.
- Chaz Yeah – but it hardly explains all *diseases*! And they believed a spirit called the *wehedu* caused the channels to block, which is like a spiritual cause.
- Maz OK – what about the Greeks? They studied the 'Natural History' of diseases. And their Theory of the Four Humours explains things like the common cold – you get wet so you get phlegm and you catch a cold.
- Chaz But it's all rubbish! The cold causes the phlegm, not the other way round. And that explains why Greek pathology was rubbish – they observed the disease, and looked at the symptoms ... and then concluded that they must be the causes. They couldn't see the *real* causes because they didn't have an electron microscope.
- Maz But it didn't stop people getting insights. The Roman writer Varro said that disease was caused by 'creatures too tiny to be seen' – surely he was talking about bacteria!
- Chaz ... and Galen blamed the four humours, and Columella blamed poisonous smells, and Crinas of Massilia blamed the stars. They were Roman writers too. It was all just theories, and who could say one theory was any truer than the others?
- And that's why in the Middle Ages everything just descends into chaos – pins and needles are caused by demons' arrows, and the Black Death is caused by sin – no – by the Jews poisoning the wells – no, says the Bishop of Aarhus, by bad smells from latrines – no, says Guy de Chauliac, the Pope's doctor, by a conjunction of Saturn, Jupiter and Mars.
- Nobody had a clue – even into the Renaissance, Sydenham was blaming 'atmospheres' (i.e. smells again!), Culpepper still believed illness was caused by the stars. Syphilis was blamed variously on a punishment from heaven, small worms floating through the air, 'Saturn when he entered Aries' – oh, and here's another idea, on sexual intercourse, but that of course was just one more theory among the many – they didn't even know for sure that sex with an infected person gave you syphilis!!!
- Even in the 19th century Chadwick's public health measures were based on the belief that disease was caused by 'miasmas (i.e. a posh word for bad smells ... AGAIN!!!!).
- Maz But Jenner discovered vaccination in 1795. Surely that was a breakthrough – smallpox is extinct now as a result.
- Chaz Jenner just NOTICED that people with cowpox didn't get smallpox. Nobody knew WHY vaccination worked. They couldn't, because they didn't know about germs.
- Maz But they'd known about bacteria since Leeuwenhoek invented the microscope in 1683!
- Chaz Yes, but – crazily – they thought that the disease caused the bacteria, not that the bacteria caused the disease. They called it 'spontaneous generation'.
- Maz So they thought that the symptoms were the cause of the disease, and the disease was the cause of the cause?
- Chaz Exactly – they got it completely back-to-front, until Pasteur and his swan-necked flask proved that decay and disease were caused by bacteria floating in the air.

Maz The Germ Theory of disease...

Chaz Yes.

Maz And then Robert Koch discovered how to stain bacteria and his assistant Julius Petri discovered how to grow them in a potato gel, and for the first time they were able to link different bacteria to different diseases ...

Chaz Koch identified Septicaemia in 1878, TB in 1882 and cholera in 1883 ...

Maz And then Chamberland discovered viruses in 1884.

Chaz Well, of course, Chamberland also discovered inoculation – against chicken cholera – in 1880. ...

Maz .. like Jenner...

Chaz ... only the difference this time was that he understood WHY it worked.

Maz And so from then on we knew what was causing disease?

Chaz Well, no, in fact. That's how it's often presented in school textbooks, but of course not all diseases are caused by germs.

Maz You're talking about Patrick Manson, aren't you, and his discovery that elephantiasis was caused by a nematode worm, and that mosquitoes were the carrier – and *that* led to the realisation that many tropical diseases such as malaria and yellow fever were transmitted by mosquitoes?

Chaz Well, actually I wasn't, though that *was* very important. I was referring to the fact that many diseases are caused when the body goes wrong – such as rickets, which is caused by a vitamin deficiency; and diabetes, which develops when the pancreas can't manufacture enough insulin. All these things were discovered after the physiological breakthroughs at the start of the 20th century – when Starling and Bayliss discovered hormones, and Funk discovered vitamins, and Banting and Best investigated insulin etc. These were the most exciting pathological discoveries, because all you needed to do then was to give the patient the missing vitamin or hormone, and they got better!

Maz That is truly AMAZING – I'm glad I'm alive now and no 300 years ago!!!