Bowel cancer linked to common bacteria

Rhys Blakely, Science Correspondent

Friday February 28 2020, 12.01am GMT, The Times

Thousands of cases of bowel cancer in Britain each year are linked to a common bacteria found in the gut, a pioneering study has shown.

Scientists found that a toxin released by a strain of E. coli caused unique patterns of DNA damage to the cells lining the digestive tract. These fingerprints were also seen in bowel cancer tumours from British and Dutch patients, revealing for the first time a direct link between a bacterial toxin and the genetic errors that drive cancer development. The results, published yesterday in the journal *Nature*,

suggest that the bacteria could be a factor in more than 2,000 cases of bowel cancer in Britain each year.

Hans Clevers, of the Hubrecht Institute in the Netherlands, who led the study, said: “Things like tobacco or UV light are known to cause specific patterns of DNA damage, and these fingerprints can tell us a lot about past exposures that may have caused cancer to start. But this is the first time we’ve seen such a distinctive pattern of DNA damage in bowel cancer which has been caused by a bacterium that lives in our gut.”

The researchers believe that identifying this DNA damage could be a means of screening for people with a higher risk of the disease.

There are about 42,000 new bowel cancer cases in Britain every year and it is the second most common cause of cancer death. The bacteria appear to be a factor in about 5 per cent of the cases.

Doctors are looking for ways to identify the disease at the earliest stage, when treatment is most likely to be successful. This led them to investigate the role of the microbiome — the trillions of bacteria, viruses, fungi and other single-celled organisms that each person carries around with them.

The study focused on a strain of *E. coli* that produces a toxin called colibactin and which is more often present in the stool samples of people with bowel cancer compared with healthy people. Colibactin was known to cause DNA damage in cells grown in the laboratory and the researchers suspected that it could play a similar role in the body. They used human intestinal “organoids” — miniature replicas of the gut grown in the lab — and exposed them to colibactin-producing *E. coli*. They analysed the DNA sequence of the gut cells in the organoids after five months and found about double the DNA damage in them,

compared with organoids exposed to *E. coli* that did not produce the colibactin.

The DNA damage caused by colibactin followed two very specific patterns, or “fingerprints”. The researchers found the same patterns when they analysed the DNA of more than 5,500 tumour samples from Britain and the Netherlands.