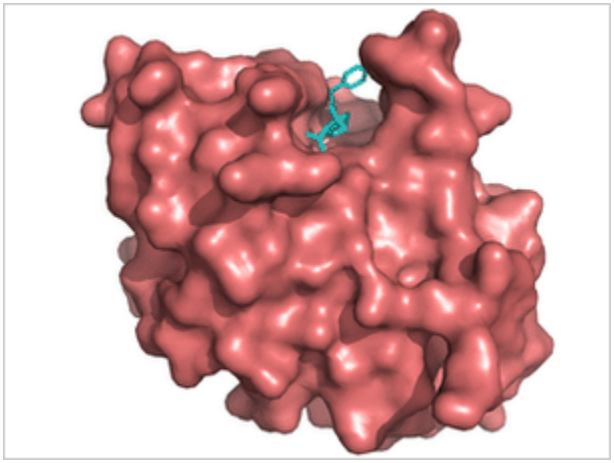
BBC NEWS HEALTH



The NDM-1 enzyme, in red, breaking down an antibiotic in blue.

NDM-1 superbug enzyme's 'photofit' taken

By James Gallagher Health reporter, BBC News

The structure of the protein which stops some of medicine's most powerful antibiotics working has been determined by researchers.

Bacteria which make NDM-1 are of growing concern to health professionals.
The protein has larger "jaws" which allow it to attack more antibiotics than other enzymes.
It is hoped drug companies will be able to use the chemical structure to design new drugs.
Carbapenem antibiotics are considered the last line of defence against resistant bacteria.
However, some are now resistant even to these drugs.

Bacteria with a gene for New Delhi metallo beta lactamase (NDM-1) are able to produce an enzyme which breaks antibiotics down.

The way bacteria freely exchange genes between themselves, and even between species, means this resistance gene could spread to other disease-causing bacteria.

Photofit

Research published by **groups in China**, **Canada** and the UK have determined the structure of the NDM-1 enzyme.

They used the genetic code to produce the enzyme, crystallised it and then used X-rays to develop a detailed picture of the enzyme's structure.

Prof Simon Phillips, part of the Medical Research Council study at the Research Complex at Harwell, said: "It is like getting a photofit of a criminal so the police can go after it."

He said NDM-1 belonged to a class of enzymes which break down antibiotics. Most of these enzymes cannot attack carbapenems because their active sites - or jaws - are too small. However, NDM-1's active site is a little bit bigger and can destroy carbapenems.

Scientists say this knowledge could be used to develop two types of treatment.
A drug could be designed to inactivate NDM-1 so current drugs would work again or to create different antibiotics which are not susceptible to NDM-1.

Cardiff University's Prof Timothy Walsh, who discovered the NDM-1 gene, said: "Given the NDM-1 sequence is very different to other similar resistance mechanisms of its type, the crystal structure is very important indeed.

"It shows the architecture of the active site, ie how it breaks down antibiotics and potential ways to develop new medicines."

Prof Sharon Peacock, a member of the Medical Research Council Infections and Immunity Board, said: "Identifying the structure of NDM-1 is a crucial step towards ensuring that drug development is based on a sound understanding of the mechanisms of bacterial resistance to antibiotics."