

## **Researchers look to exploit females' natural resistance to infection**

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Researchers have linked increased resistance to bacterial pneumonia in female mice to an enzyme activated by the female sex hormone estrogen.

Females are naturally more resistant to respiratory infections than males. Now, an international team of scientists has shown that increased resistance to <u>bacterial pneumonia</u> in female mice is linked to the enzyme nitric oxide synthase 3 (NOS3). They also show that this enzyme is ultimately activated by the release of the female sex hormone estrogen.

The team, lead by Professor Lester Kobzik at the Harvard University School of Public Health, introduced *Streptococcus pneumoniae* into the lungs of mice to mimic the inhalation of bacteria that occurs naturally as we breathe. Female mice and male mice that had been treated with estrogen were able to clear the bacteria from their lungs more rapidly than normal male mice. Female lung host defense cells were also better at killing this and other bacteria (*Escherichia coli* and *Staphylococcus aureus*) when tested in vitro.

The scientists then took another set of both male and female mice and deleted the gene responsible for the production of NOS3. They found that deleting this gene meant that the female mice were no longer more resistant to infection. The team hope that, in the future, this knowledge could be used to enhance resistance to common and serious lung infections.



"Ultimately, this work could be especially useful in reducing risk of secondary bacterial pneumonias during seasonal or <u>pandemic influenza</u>," said Professor Lester Kobzik, the senior author. "We were quite pleased that the work led us to NOS3-targeting drugs that are already available and that can indeed improve resistance to pneumonia in our mouse model."

## More information: *eLife* DOI: 10.7554/eLife.03711

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