A possible alternative to antibiotics

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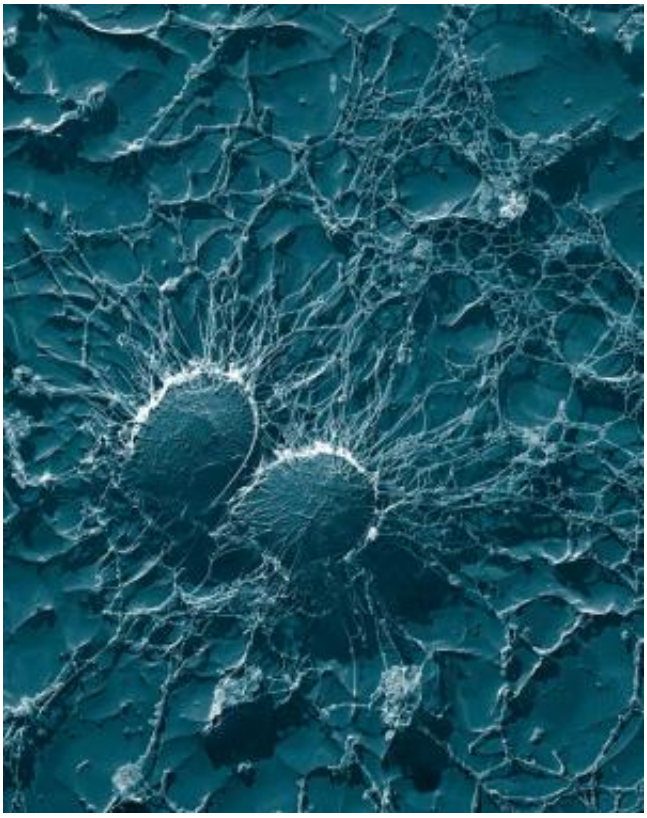

Credit: Eric Erbe, Christopher Pooley, Wikipedia

Scientists from the University of Bern have developed a novel substance for the treatment of severe bacterial infections without antibiotics, which would prevent the development of antibiotic resistance.

Ever since the development of penicillin almost 90 years ago, antibiotics have remained the gold standard in the treatment of bacterial infections.

However, the WHO has repeatedly warned of a growing emergence of bacteria that develop antibiotic resistance. Once antibiotics do no longer protect from bacterial infection, a mere pneumonia might be fatal.

Alternative therapeutic concepts which lead to the elimination of bacteria, but do not promote resistance are still lacking.

A team of international scientists has tested a novel substance, which has been developed by Eduard Babiychuk and Annette Draeger from the Institute of Anatomy, University of Bern in Switzerland. This compound constitutes a novel approach for the treatment of bacterial infections: the scientists engineered artificial nanoparticles made of lipids, "liposomes" that closely resemble the membrane of host cells. These liposomes act as decoys for bacterial toxins and so are able to sequester and neutralize them. Without toxins, the bacteria are rendered defenseless and can be eliminated by the cells of the host's own immune system. The study will be published in *Nature Biotechnology* Nov 2.

Artificial bait for bacterial toxins

In clinical medicine, liposomes are used to deliver specific medication into the body of patients. Here, the Bernese scientists have created liposomes which attract bacterial toxins and so protect host cells from a dangerous toxin attack.

"We have made an irresistible bait for bacterial toxins. The toxins are fatally attracted to the liposomes, and once they are attached, they can be eliminated easily without danger for the host cells", says Eduard Babiychuk who directed the study.

"Since the bacteria are not targeted directly, the liposomes do not promote the development of bacterial resistance", adds Annette Draeger. Mice which were treated with the liposomes after experimental, fatal

septicemia survived without additional antibiotic therapy.

More information: Brian D. Henry, Daniel R. Neill, Katrin Anne Becker, Suzanna Gore, Laura Bricio-Moreno, Regan Ziobro, Michael J. Edwards, Kathrin Mühlemann, Jörg Steinmann, Burkhard Kleuser, Lukasz Japtok, Miriam Luginbühl, Heidi Wolfmeier, André Scherag, Erich Gulbins, Aras Kadioglu, Annette Draeger & Eduard B. Babiychuk: "Engineered liposomes sequester bacterial exotoxins and protect from severe invasive infections in mice," *Nature Biotechnology*, 2.11.2014, DOI: 10.1038/nbt.3037

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