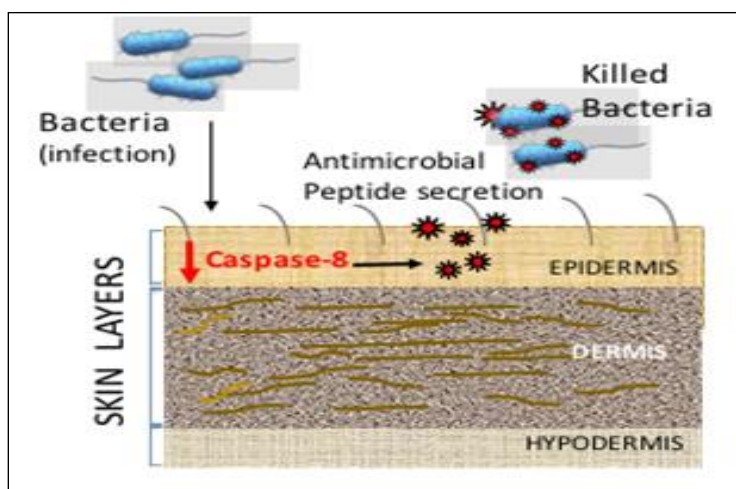


Averting the Superbug infections by blocking production of *Caspase-8*, and subsequently increasing the activity of Antimicrobials Peptides (AMP's) produced in Skin



Bhatt *et al.*, 2019, *Cell Reports*

A team of researchers and scientists led by Prof. Colin Jamora working in IFOM-inStem Joint Research Laboratory at the Institute for Stem Cell Science and Regenerative Medicine (inStem), Bengaluru in a collaboration with Dr. M. S. Mathapathi from Unilever, London, have made a significant breakthrough with a discovery of a way to stimulate skin cells to secrete naturally occurring antimicrobials called Antimicrobial Peptides (AMPs). Such AMPs target and kill bacteria in multiple unpredictable ways such that rarely few bacteria survive and become resistant to these AMP's. It makes them uniquely suited to treat antibiotic resistant bacteria, also called *superbugs*.

The superbugs are microorganisms such as bacteria (usually) and fungi (sometimes) that have become resistant to antibiotics, a vital class of drugs used to treat a wide range of infections including urinary tract infections, dermal infections, life threatening sepsis, etc. Superbugs have evolved so many smart ways to protect themselves against antibiotics. Therefore, the World Health Organisation (WHO) fears that humanity may slip back to the pre-antibiotic era when such infectious diseases caused death of millions of people.

Recently, world has witnessed an unprecedented rise in superbugs owing to overuse of antibiotics and emergence of antibiotic resistance development thereof. Some microbiologists have shown that development of resistance to antibiotics is a part of their natural evolution which makes it difficult for health experts and doctors to prevent superbug infections. Superbugs cause about 2-7% of total global deaths and 15% of deaths in India. The researchers, academicians and biotechnology laboratories across the global are trying to help humanity by developing and finding new ways and drugs to combat these drug resistant superbugs.

Prof. Colin Jamora at inStem, Bengaluru and his collaborators have been successful in discovering a way to unlock the release of natural AMPs from our skin with potential to effectively kill the superbugs. The novel work has been recently published in reputed peer reviewed journal *Cell Reports*¹.

The team has found that AMPs are released to fight the bacterial infections when a direct contact is established between skin epidermal cells and bacteria. The release of such AMP's is triggered by a reduction in the levels of a protein called *Caspase-8*. When *Caspase-8* was removed from the skin cells, the team was successful in activating the production of AMPs. The AMP's produced play a significant role in providing natural protective barrier to the drug resistant bacteria. Their discovery has provided new ray of hope, and showed that the lowering the levels of caspase-8 in our skin can provide us protection against bacterial infections. The discovery can be of great help to people such as hospitalized patients, people with weakened immune systems, diabetics, and people with dermal infections who supposedly at rise of contacting frequent infections.

The research works also provides an excellent example of successful industry-academia collaborations. The collaborating partners included researchers and scientists from IIFOM-inStem Joint Research Laboratory, inStem, Bengaluru, National Centre for Biological Sciences (TIFR), Bengaluru, IFOM, FIRC Institute of Molecular Oncology, Milan, Italy, and Department of Oncology and Hemato-oncology, School of Medicine, University of Milan, Italy.

Dr. Bilqeesa Bhat
Project Scientist,
bhat.bilqeesa3000@gmail.com

References:

1. Bhatt, T., Bhosale, A., Bajantri, B., Mathapathi, M.S., Rizvi, A., Scita, G., Majumdar, A. & Jamora, C., (2019). Sustained Secretion of the Antimicrobial Peptide S100A7 Is Dependent on the Downregulation of Caspase-8. *Cell reports*, 29(9), 2546-2555.

Contact Person:

Mr. Mahinn Ali Khan, Email: mahinnak@ccamp.res.in