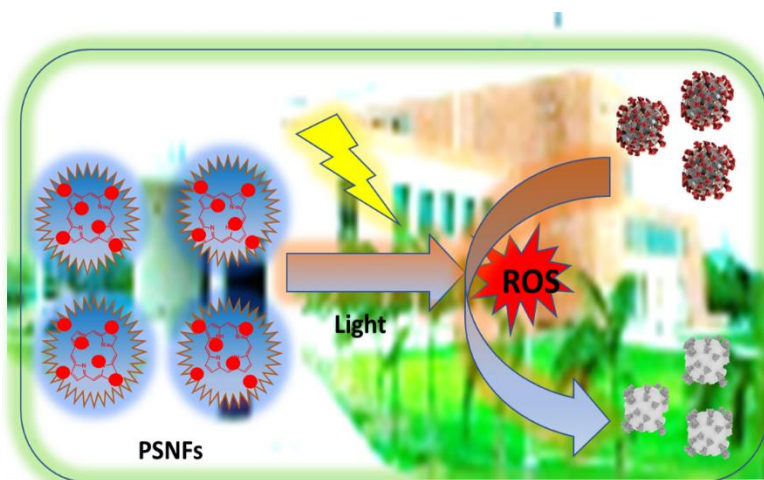


COVID-19 research preparedness initiatives at DBT-CIAB: Exploring potential of photosensitizer nanoformulations for antiviral photodynamic therapy to treat COVID-

19

In order to address the ongoing pandemic, scientists at DBT's Center of Innovative and Applied Bioprocessing has taken multiple research initiatives and are engaged tirelessly to develop low cost, scalable and light activatable nanomaterials in very short time-span. Photodynamic therapy (PDT) is an FDA approved technique to treat many deadly diseases including microbial infection and cancer. The basic requirement for PDT is light, oxygen and a photosensitizer (a light activatable fluorophore).



Antiviral PDT (aVPDT) is a branch of PDT which follows the same principles besides targeting viruses. Among photosensitizers, polypyrroles (e.g. porphyrins, chlorins - these are members of natural pigments heme and chlorophyll family) are commonly used which strongly absorb visible light to generate reactive oxygen species (ROS). ROS can directly damage virus targets through reacting with viral nucleic acids, lipids and proteins. Since these molecules lack aqueous solubility, preparation of their nanoformulations will improve hydrophilicity and targetability.

In this line, a group of researchers at DBT-CIAB headed by lead investigator Dr. Jayeeta Bhaumik to fabricate a series of photosensitizer nanoformulations (PSNFs) in simple and scalable manner. Recently, the team has completed the synthesis and chemical characterization of the PSNFs. The materials were further examined for their photophysical properties (e.g. ROS generation capacity) showing promising potential in many of them. Further, those nanomaterials were validated for their efficacy towards antimicrobial activity against *E. coli* in the presence of low cost LEDs. The screened PSNFs with promising

photophysical properties and antimicrobial activities are now ready to be sent to DBT-Regional Centre for Biotechnology BSL3 facility for testing against SARS-CoV2 cell lines. The research team has worked tirelessly during the lockdown period to prepare a series of light-activatable nanomaterials. The research team is hopeful for the library prepared by them will find a way to treat COVID-19 one day if succeeded in *in vitro* studies.

Link: <http://www.ciab.res.in/>

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