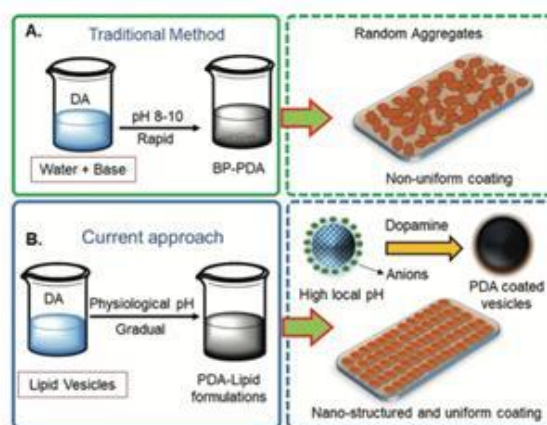


Scientists developed polydopamine based coating materials that may help in containing bacterial infections

By Dr. Bilqeesa Bhat

Dr. Avinash Bajaj's group at Faridabad's Regional Centre for Biotechnology in collaboration with Dr. Aasheesh Srivastava from Indian Institutes of Science Education and Research (IISER), Bhopal, have developed a novel strategy for synthesis of polydopamine by a better polymerization method which improves the stability and biofouling performance of their coatings.



Dr. Anand Awasthi from IISER Bhopal and Dr. Siddhi Gupta from RCB Faridabad, chose the strategy of increasing the local pH in the presence of self-assembled vesicularization formed by a series of cationic amphiphiles that successfully resulted in gradual polymerization of dopamine under physiological conditions. They prepared base polymerized (BP-PDA) as well as self-assembled liposomal formulations (PDA-L1) of polydopamine (PDA) and tested their antifouling performance on coated cover-slips and on coated-catheters in murine models.

PDA-L1 coated substrates showed improved physical stability, hemocompatibility and better antifouling activity by showing reduced biofilm formation by both Gram negative and Gram positive pathogens. PDA-L1 coated catheters did not allow the formation of biofilms in murine infection models. Therefore, such findings unravel the unique chemical polymerization strategies that can be further exploited to generate PDA based coating materials with antifouling properties, hence, may prove useful in containing bacterial infections.

From time to time bacterial infections have been associated with serious outbreaks causing alarming situations in many parts of the world. Association of bacterial infections with antibiotic resistance induce life-threatening situations in developing countries like India. Bacterial species tend to form biofilms over a variety of surfaces, and such biofilms do not respond to surfactants, biocides and even chlorinated sanitizers due to the rich extra polysaccharide matrix secreted by them.

Formulations based on polymers such as PDA possess excellent biofouling properties and can provide coatings on surfaces such as catheters and implant materials. Traditional method of polymerization of dopamine yields coatings that are physically unstable and non-uniform leading to a compromised antifouling performance.