

Zero Infection via Surface Contact

Scientists Develop New 'Gemini-Quaternary Technology' for Preventing Fomite Transmissions of infectious diseases

SANTA BARBARA, CA, UNITED STATES, March 4, 2022 /EINPresswire.com/ -- Since the COVID-19 pandemic began, people around the world have begun to critically discern the effectiveness of sanitation. A solution to mitigate the surface transmission of infectious diseases has now been developed by scientists from the University of California Santa Barbara and [ACatechol, Inc.](#) (Santa Barbara, CA, USA). This innovative scientific research has been published in the prestigious [Langmuir](#) (a peer-reviewed journal published by the American Chemical Society) and highlighted on the cover page of the journal. In the study, the new sanitizing technology outperformed currently available sanitizing and disinfecting products with up to 100,000,000 times higher surface germicidal efficacy.

Scientists globally have been working progressively to develop new sanitization or disinfection technologies to ensure zero transmission of harmful microorganisms via surface contact. Studies show that people touch their faces on an average of 16~23 times per hour, where half of the touch involves their mouth, eyes, and nose. Yet, current products could not prevent the spread of pathogens via surface contacts because it is impossible to wash/sanitize hands, or clean/disinfect objects on every physical contact or each droplet settlement. Moreover, the surfaces are subject to reinfection immediately afterwards.

Current approaches to address such problems involve either embedding heavy metals or biocides such as monoionic quaternary ammonium compounds into surfaces. However, these approaches take several hours to kill germs, and depletion of active ingredients after several touches is inevitable.

"Unfortunately, due to the lack of knowledge and misunderstanding, people are currently using



Self-sanitizing Gemini-Q Surface: Cover Page of Langmuir (ACS Publication_2022_Volume 38)

metal-coated stickers and biocide-embedded coatings in high traffic touching areas for mitigation, which rely on leaching,” says Professor Dr. Kollbe Ahn Ando, corresponding author of this research paper.

The above issues can be now addressed by the new technology with Gemini-quaternary silane. Gemini surfactants are a novel class of surfactants that possess two or more hydrophilic head groups separated by a spacer, and display surface activities often orders of magnitude higher than their conventional counterparts.

Despite their superiority, Gemini surfactants have not yet been translated into virucidal/antimicrobial coatings.

“Thanks to the National Science Foundation COVID-19 Research Grant, in this project, we developed a new class of quaternary ammonium coatings mediated with structural elements of powerful Gemini surfactants,” said Dr. Roscoe Linstadt, co-lead author of the study.

The study shows that the new class of gemini-mediated surface sanitizing technology kills and inactivates various nosocomial bacteria and viruses as well as skin-trouble-causing bacteria immediately, and continues to remain active on surfaces in-between cleanings with >99.99% residual efficacy. The germicidal barrier can last up to 15 days.

“This [Gemini-Q technology](#) can prevent tens of millions of deaths each year from infections such as hospital-acquired infections, directly responsible for 11 million global annual deaths and the #1 cause of hospital deaths. Those healthcare-acquired infections are transmitted through surfaces,” said Dr. Kollbe.

Hand sanitizers enabled with the Gemini-Q technology are already registered with the FDA (<https://www.oneforallhands.com>), skincare products containing Gemini Q to prevent skin troubles such as acne between facial washes are also available (<https://storybh.com>) while disinfectant registration is currently in progress with the EPA.

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