Lubricin & Nano-$BaSO_4$: Novel Methods to Prevent Surface Biofouling

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Biofouling is a serious issue that threatens the lasting beneficial effects of many surgeries, shortens the lifespan of many implanted medical devices, and is a persistent problem for hospitals, surgeons, and patients all over the world. This set of studies is aimed to address the issue of biofouling by proposing novel surface preparation methods using lubricin and/or nano-$BaSO_4$ as non toxic agents to prevent biofouling by preventing initial cellular adhesions to surfaces. Preventing initial unwanted cellular attachment and accumulation will dramatically improve outcomes and reduce instances of life threatening infection and bio -adhesions.

Lubricin is a an adhesive glycoprotein found that is found in the synovial fluid, which acts as a natural barrier within the body, lubricating surfaces and preventing undesirable cellular adhesions on cartilage. $BaSO_4$ is a common additive used to make medical plastics radio opaque. Nano-formulations would retain similar radiopaque properties while imbuing the medical plastic with nano surface features which would change surface interactions with biological agents.

This research employed bacterial studies, mammalian cell studies, and mathematical modeling to better understand how these treatments will combat surface biofouling.

The results of this study will provide the medical field with novel alternative methods to reduce bio-adhesions related complications.