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Exploration of fluid dynamic indicators/causative factors in the formation of tower structures in staphylococci bacteria bio-films ERICA SHERMAN, University of Nebraska - Lincoln, MOORMEIER DEREK, KENNETH BAYLES, University of Nebraska - Medical Center, TIMOTHY WEI, University of Nebraska - Lincoln — *Staphylococcus aureus* bacteria form biofilms with distinct structures that facilitate their ability to tolerate treatment and to spread within the body. As such, staph infections represent one of the greatest threats to post-surgery patients. It has been found that flow conditions play a significant role in the developmental and dispersal activity of a biofilm. The coupling between the growing biofilm and surrounding flow, however, is not well understood. Indeed, little is know why bacteria form tower structures under certain conditions but not in a predictable way. μ-PTV measurements were made in a microchannel to try to identify fluid dynamic indicators for the formation of towers in biofilm growth. Preliminary experiments indicated changes in the near wall flow up to five hours before a tower formed. The reason for that is the target of this investigation. *Staphylococcus aureus* bacteria were cultured in the Bioflux Fluxion channel and subjected to a steady shear rate of 0.5 dynes. In addition to μ-PTV measurement, nuclease production and cell number density counts were observed prior to and during tower development. These were compared against measurements made under the same nominal flow conditions where a tower did not form.

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