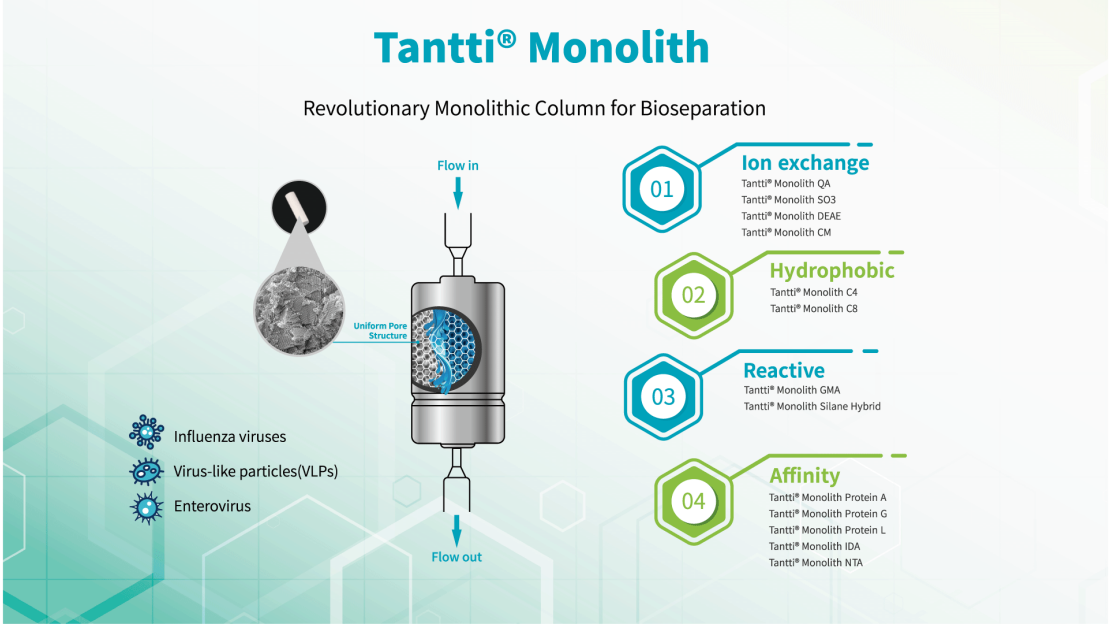
A Novel Monolithic Column with Controlled Pore Structure and its Applications in Virus Purification

Tantti Laboratory developes a polymer-based monolithic column with highly ordered pore structure. It has high porosity which provides excellent hydraulic permeability and can operate under a high flow rate with minimal increase in the operating back pressure. This novel monolithic column exhibits high connectivity, and the precisely controlled pore size especially suits purification of mid to large biomolecules. It has been shown to improve throughput performance and shorten running time, e.g., H7N9. Our initial results suggest our monolithic column is very competitive against other columns in the market.



In recent years, with the increasing need for high quality and low cost pharmaceutical products, scientists and engineers demand better and faster downstream processes. Comparing conventional chromatographic purification, monolithic columns with large flow channels and low operating pressure have been of great interest to the pharmaceutical industry, particularly for downstream purification of large molecules or particles, e.g. proteins and viruses. Since 1980, both organic and inorganic monolithic columns have been developed and commercialized using either phase separation methods or sol gel processes. However, these methods have intrinsic limitations, such as broad pore size distribution and nonuniform and inconsistent column matrices. Thus, the commercial applications of monoliths for bioanalysis or downstream purification are hindered by their poor lot-to-lot consistency and limited scalability.

To overcome these issues, Tantti has developed an In-Mold Polymerization (IMP) process to prepare a novel monolith. The innovative In-Mold Polymerization method offers uniform and consistent pore structures while being easy to scale to various dimensions. This breakthrough overcomes the

conventional monolith's limitations and broadens the application of monoliths to commercial bioseparation.

In addition, various functional monomers can be selected in this IMP process to form monoliths with desired surface chemistries, e.g. cationic, anionic, alkyl, metal chelating or reactive groups. Common ion exchange, hydrophobic or affinity monolith columns can be easily achieved using this novel monolithic technology.

Tantti Laboratory Inc. is a startup founded in 2014 with the mission of developing and commercializing novel uniform Nano-porous structure formation technologies. Recently, our technologies have demonstrated great potential in serval biotechnology applications, including 3D cell culture, bioscaffolds, microcarriers, and monolith columns for bioseparation. We start reaching out major market players who also present in Pittcon 2019 and exploring strategic partnership.