



Oleg Shinkazh
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Dear Oleg Shinkazh,

MedImmune AstraZeneca is aware of ChromaTan's intent to commercialize Continuous Countercurrent Tangential Chromatography (CCTC). The downstream scale-up and process engineering group within MedImmune has engaged in alpha testing of ChromaTan's CCTC system and this letter is an affirmation of the positive results of our testing.

MedImmune is the global biologics arm of AstraZeneca with research focus in the areas of infectious diseases, oncology, autoimmune and respiratory diseases. The Bioprocess Engineering (BPE) department, within Research and Development, is responsible for scale up, transfer, and facility fit of clinical and commercial processes to manufacturing. The downstream scale-up and process engineering group within BioProcess Engineering, is dedicated to technology development and implementation that drive efficiency and consistency in biologics manufacturing. At MedImmune, we believe that continuous bioprocessing and single-use unit operations are key drivers for enabling these next generation manufacturing solutions. This is why we have engaged in 2014 to evaluate ChromaTan's CCTC system in alpha testing for antibody capture with the eventual goal of potentially replacing conventional column chromatography operations.

The ChromaTan team collaborated with BPE to perform multiple process development studies at MedImmune, including several CCTC demonstration runs to purify our in-house antibody product. We were truly impressed with the data generated during these evaluations. The CCTC system achieved 3.5-6 fold productivity improvements compared to conventional column chromatography while also demonstrating comparable antibody yield and purity. My team has initiated cross-functional efforts within MedImmune and Global Engineering and Manufacturing Technology and Innovation within AstraZeneca to generate further feedback and identify a potential path forward for eventual commercialization of CCTC technology.

In addition to creating significant economic benefits, the CCTC system has the potential to eliminate operational hurdles including column packing and cleaning, as well as reducing validation burdens. Because of its steady-state operational mode, the system is highly compatible with other unit operations including continuous perfusion, viral inactivation, and tangential flow filtration (TFF). Our team will be evaluating this technology further to provide detailed feedback on commercial system design, single-use flow path design, and scale up execution. We fully support ChromaTan's strategy to launch a process development (PD) CCTC system in Q4 2016 – Q1 2017. We are considering either a purchase or a rent-to-own arrangement of the PD system to enable our team to include CCTC as an option for purification processes. For legal reasons I must state that this letter serves only as a reflection on our current intentions and good faith and in no way binds MedImmune to any course of action. All forward looking statements in this letter address matters that are by their nature uncertain. Actual results could differ materially from those we expect or experienced and this letter should not be considered a warranty or firm commitment to purchase ChromaTan products.

We are excited about CCTC, and are looking forward to further engagement with the ChromaTan team. I welcome reasonable inquiries from interested parties such as investors, strategic suppliers and government officials regarding this new technology.

Best Regards,

A handwritten signature in blue ink that reads 'Jean Bender'.

Jean Bender, Senior Director BPE