

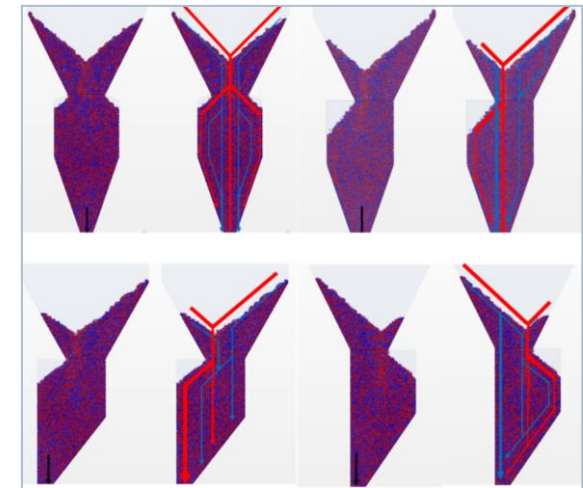
Takeda Pharmaceuticals

Making an impact on patients' lives with Simcenter STAR-CCM+



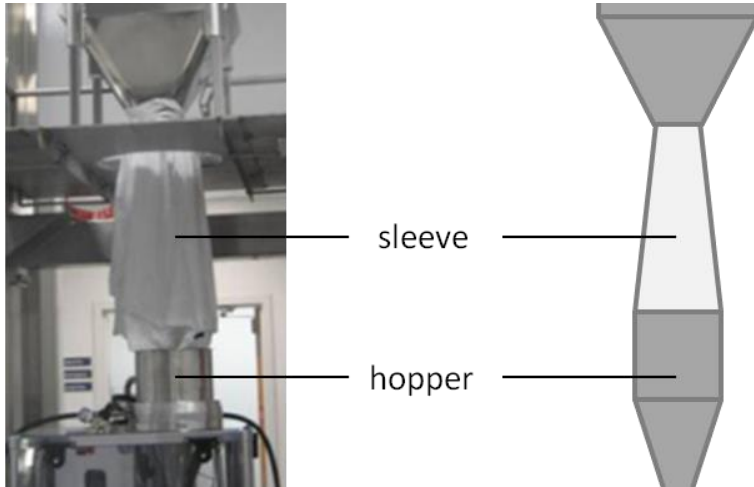
Takeda improves segregation of solid drugs, reducing number of trials & saving up to 10% in drug substances

Up to
\$1M
in savings realized

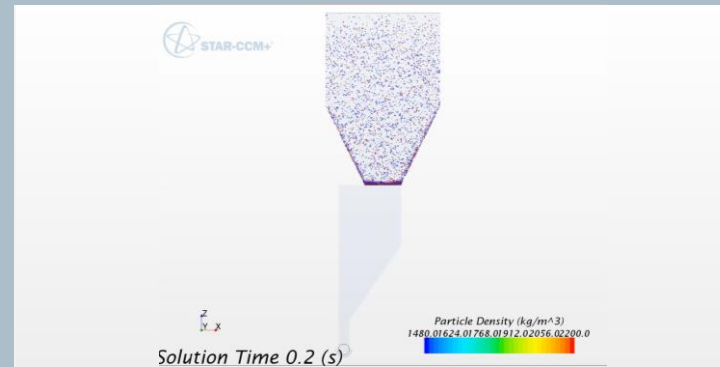


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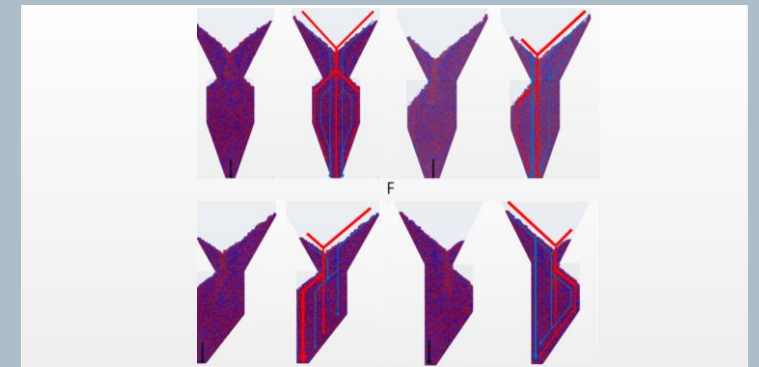
Improving feed hopper design using Simcenter STAR-CCM+



Reducing particle segregation through simulation



Explore effect of various designs parameters such as angles on segregation



Explore designs to reduce segregation
Validate at lab scale with 3D printing

- **Significantly reduced drug substance (DS) usage (5-10%) in production scale**
- **Saved \$500K- \$1 MM in process development for large scale system**

- Discrete Element Method (DEM) allows particle simulation to be accurately predicted
- Many designs can be easily tested using automated design exploration

“This quantitative model of DEM is useful to reduce consumption of drug substance (DS) by up to 5% in DP process development, especially in large scale manufacture DoE.”

Yijie Gao, Scientist, Formulation Development