

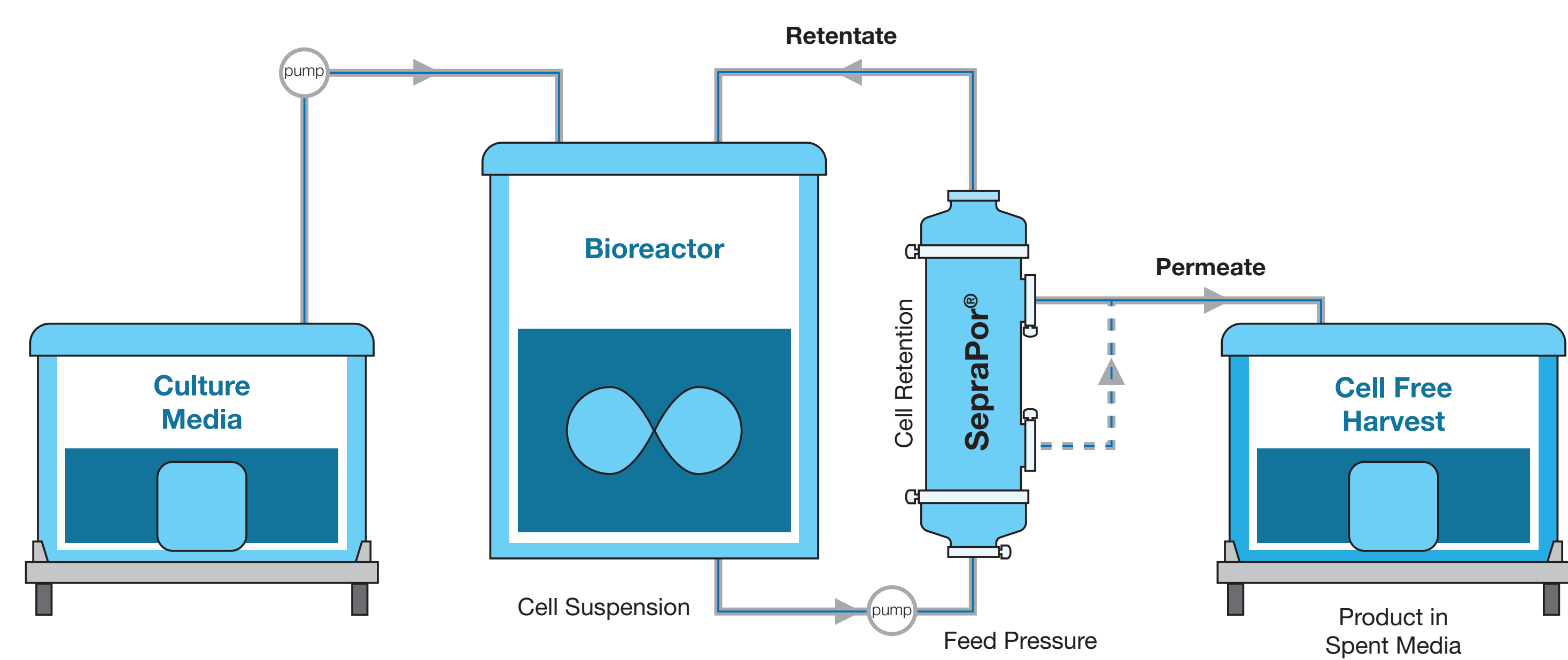
# ADVANCES IN HOLLOW FIBER MEMBRANE TECHNOLOGY FOR HIGH DENSITY PERFUSION CELL CULTURE

Jessica McRoskey, Tristan Winneker, Thomas D. Lazzara, Christian Julien

## Abstract

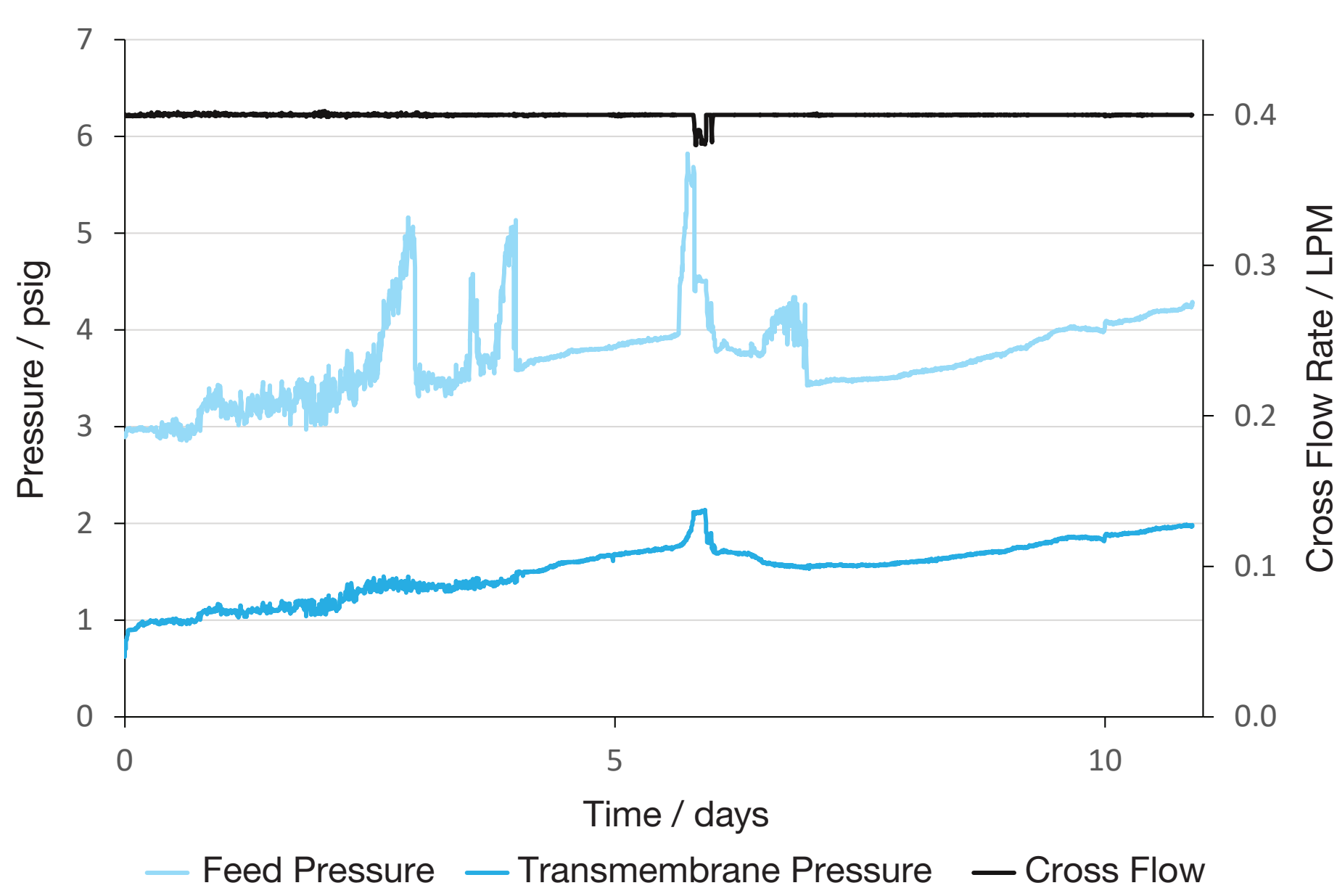
- SeptraPor® polysulfone membrane filters are designed to achieve consistent, reproducible performance in cell culture perfusion processes.
- Strict porosity specifications, distinct and narrow bubble point ranges, and high flow rates result in lot-to-lot membrane consistency for dependable filtration performance.

## Perfusion Application



This schematic demonstrates a typical TFF perfusion process using a SeptraPor® hollow fiber capsule filter.

### Small Scale Cell Culture Perfusion Run



A 0.2  $\mu\text{m}$  SeptraPor® filter with filtration area of 220  $\text{cm}^2$  demonstrated excellent transmembrane pressure consistency during an 11 day perfusion process in a 1 L bioreactor exchanging 1 vessel volume per day.

## Advanced Membrane Technology

### Bubble Point Ranges of Competitive Microporous Hollow Fiber Membranes



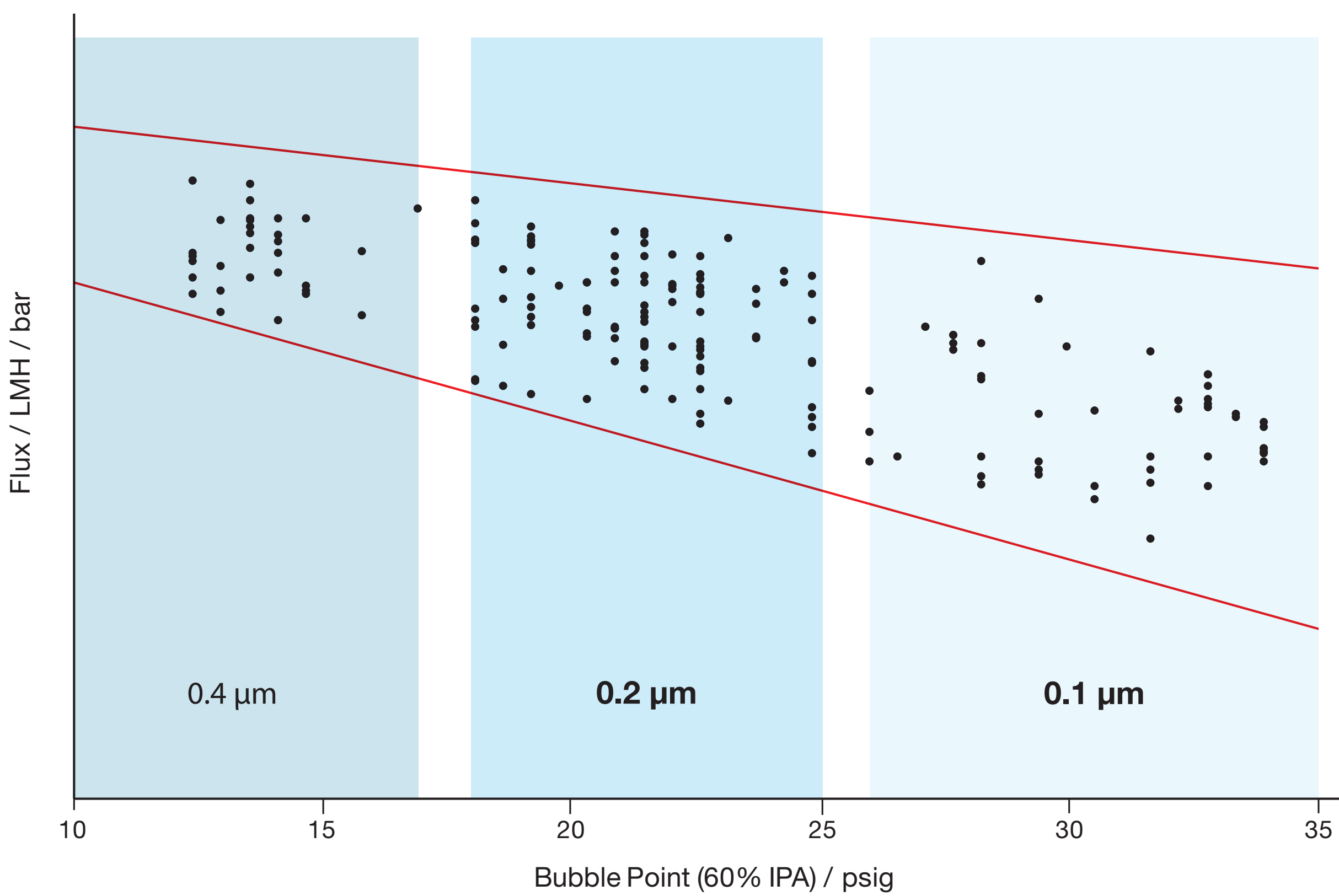
SeptraPor® filters' narrow bubble point ranges were established using industry-standard microbial retention assays, and have no overlap between pore sizes for improved process reproducibility. **Supplier A** has overlapping bubble point ranges which creates arbitrary pore size designations, while **Supplier B** has broad bubble point ranges that can lead to process variability over the entire acceptable spectrum.



Porosity ( $\mu\text{m}$ )	Bubble Point (60% IPA)	Max Diffusive Flow ( $\text{mL}/\text{min}/\text{m}^2$ ) @ 15 psig	Max Transmembrane Pressure @ 25 °C
0.4	9 – 17 psig	$\leq 30$	10 psig
0.2	18 – 25 psig	$\leq 30$	15 psig
0.1	26 – 38 psig	$\leq 30$	20 psig

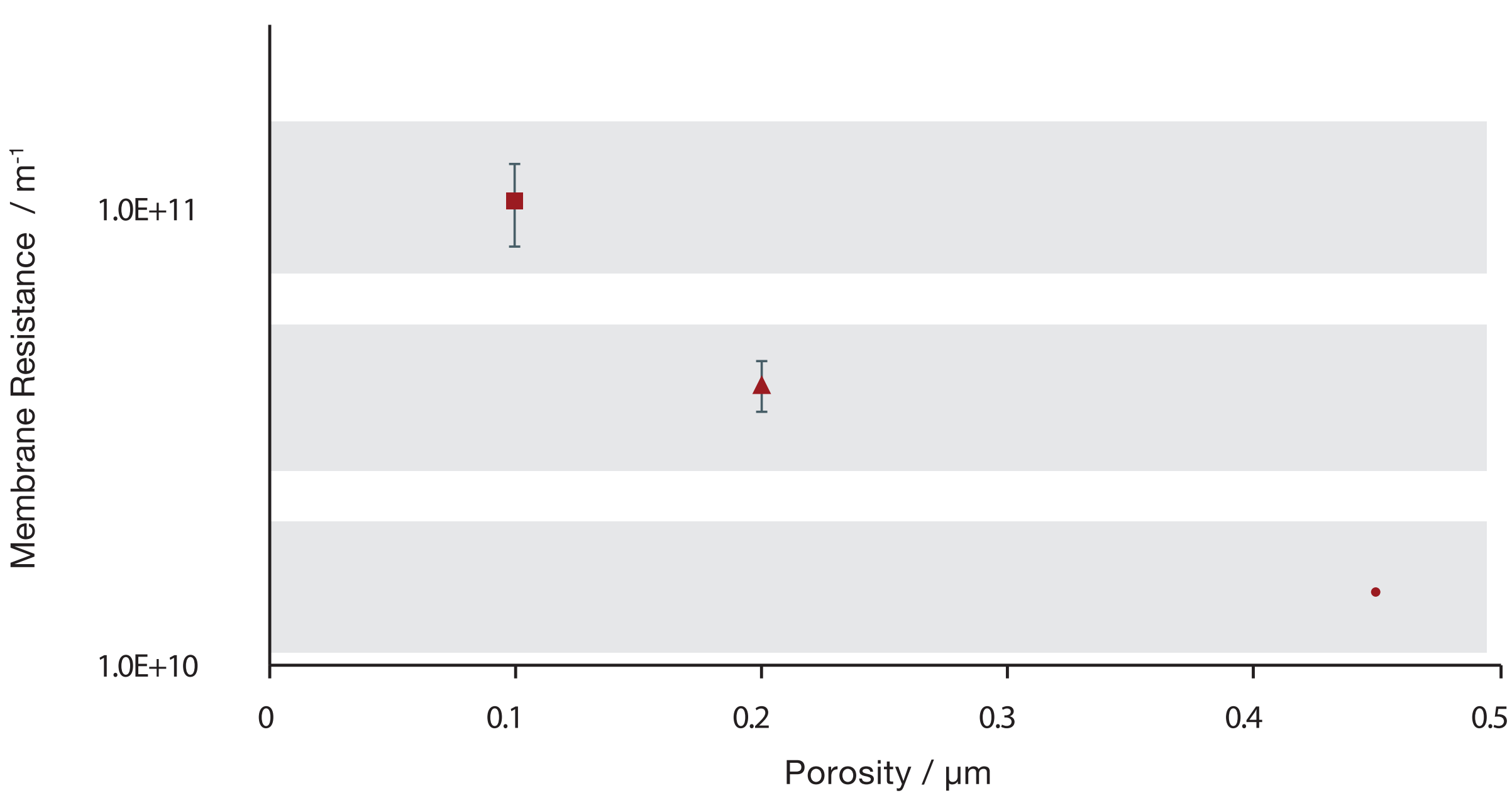
SeptraPor® membranes must meet strict specifications to ensure lot to lot reproducibility of your perfusion process.

### Flux Range for SeptraPor® Hollow Fibers



SeptraPor® filter membranes must meet minimum flux criteria for a given bubble point value to ensure consistent performance in your process.

### Correlation of Hollow Fiber Porosity to Membrane Resistance



## Conclusion

SeptraPor® hollow fiber filters' narrow bubble point and flux ranges improve lot-to-lot membrane consistency, which provides the benefit of reproducible process performance.

