



Utilizing Microfluidics to Optimize the Formation of Antioxidant Microparticles

VINSE



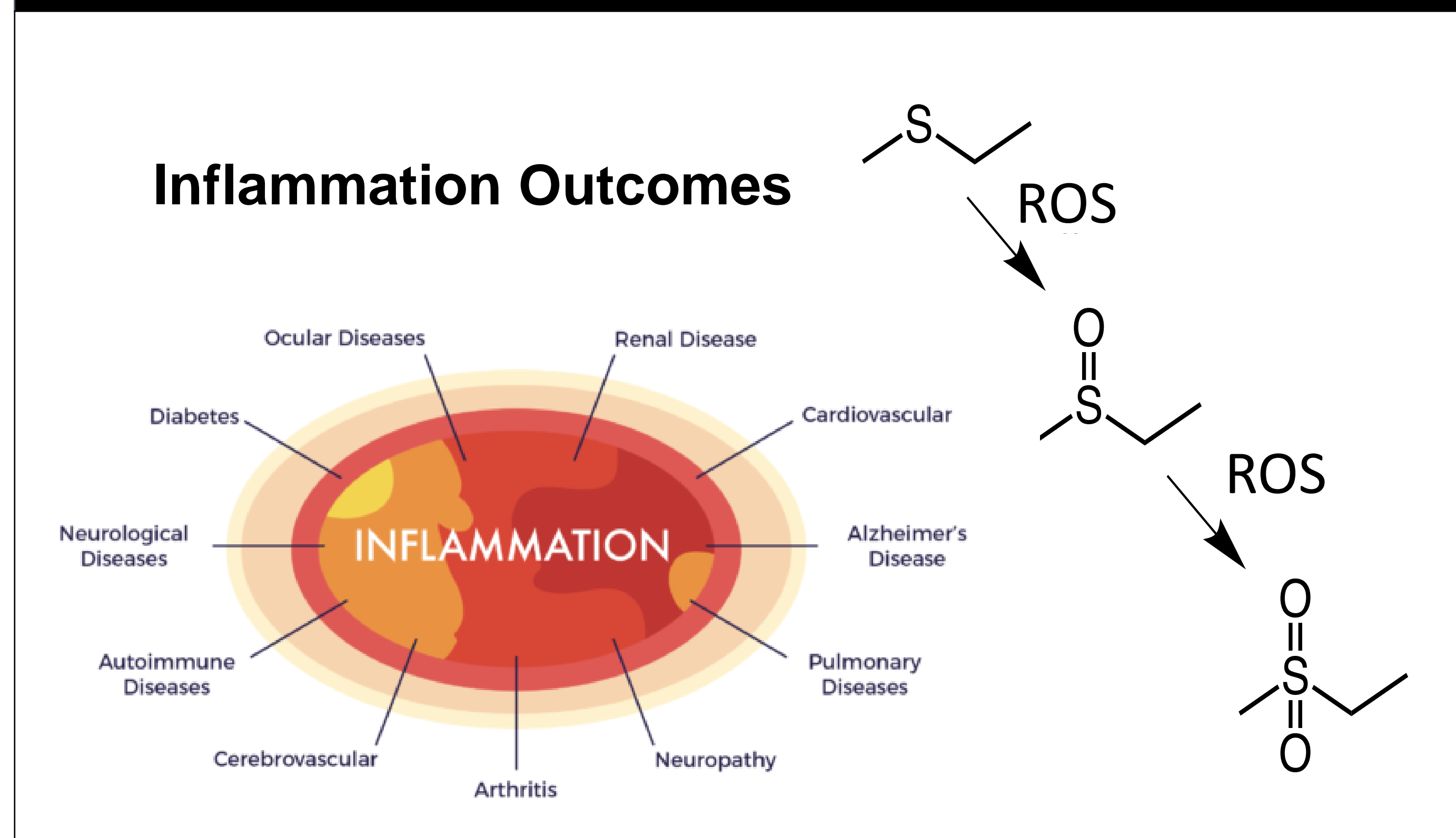
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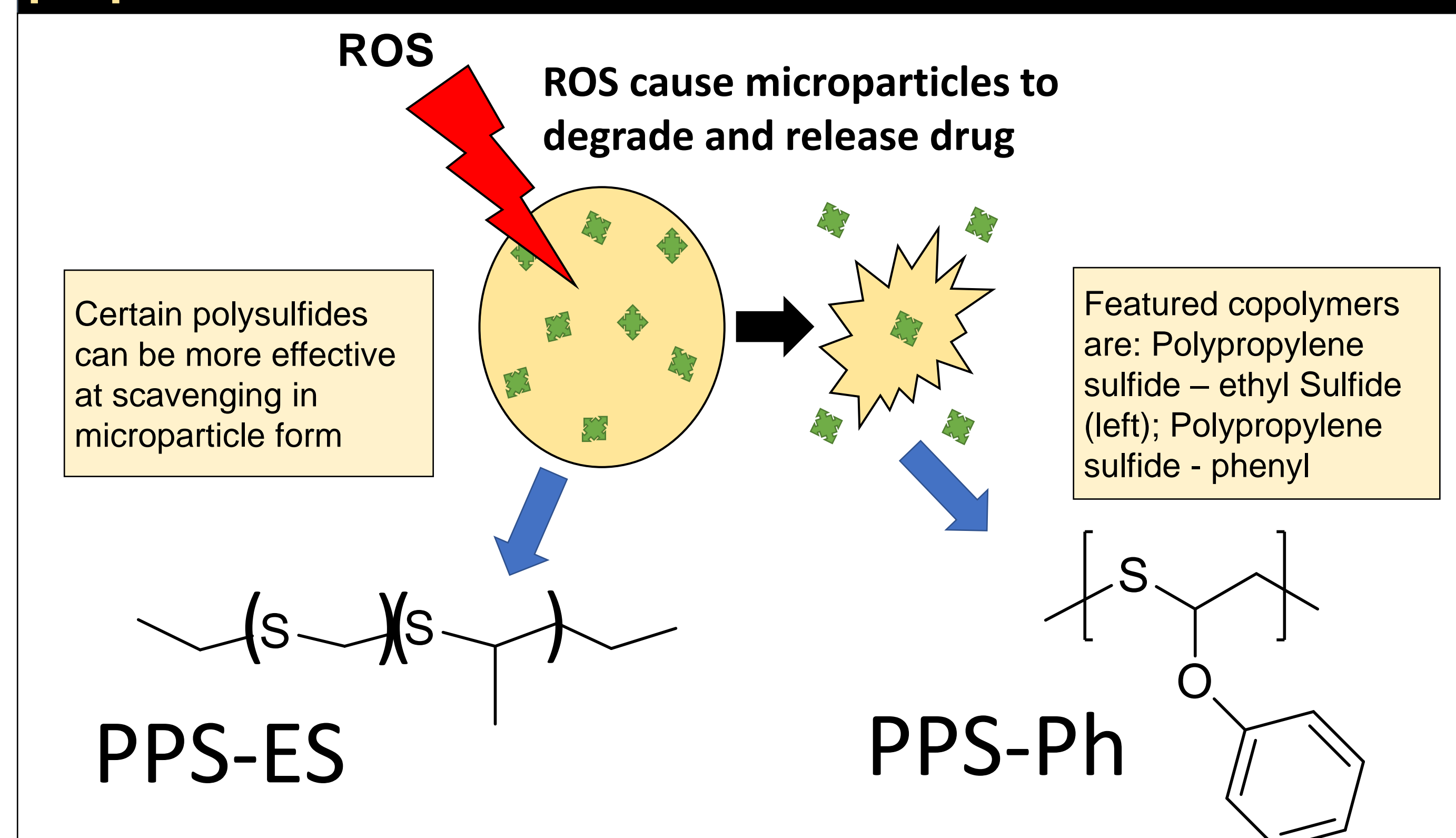
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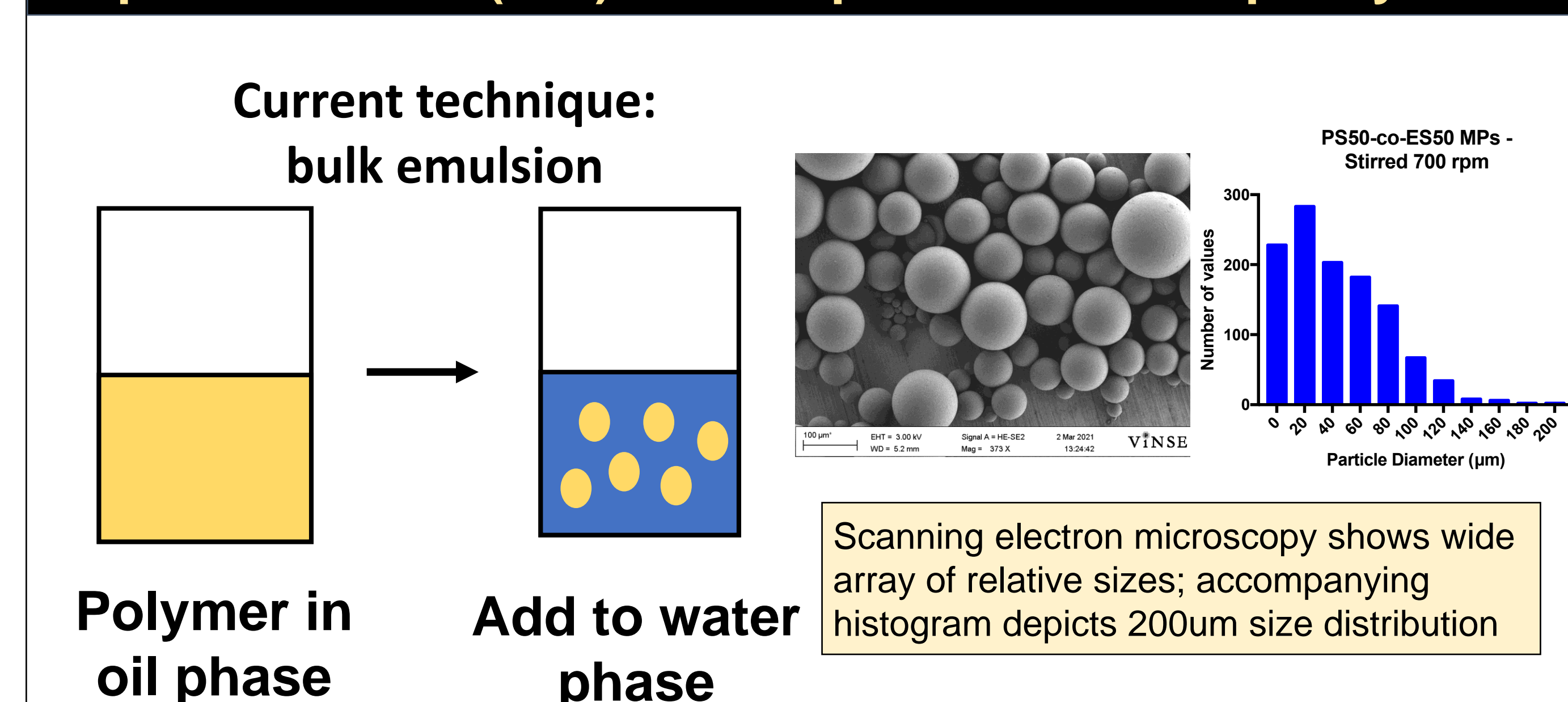
Reactive Oxygen Species (ROS) induce Inflammation, leading to cascading diseases; Polysulfides may solve via scavenging ROS away



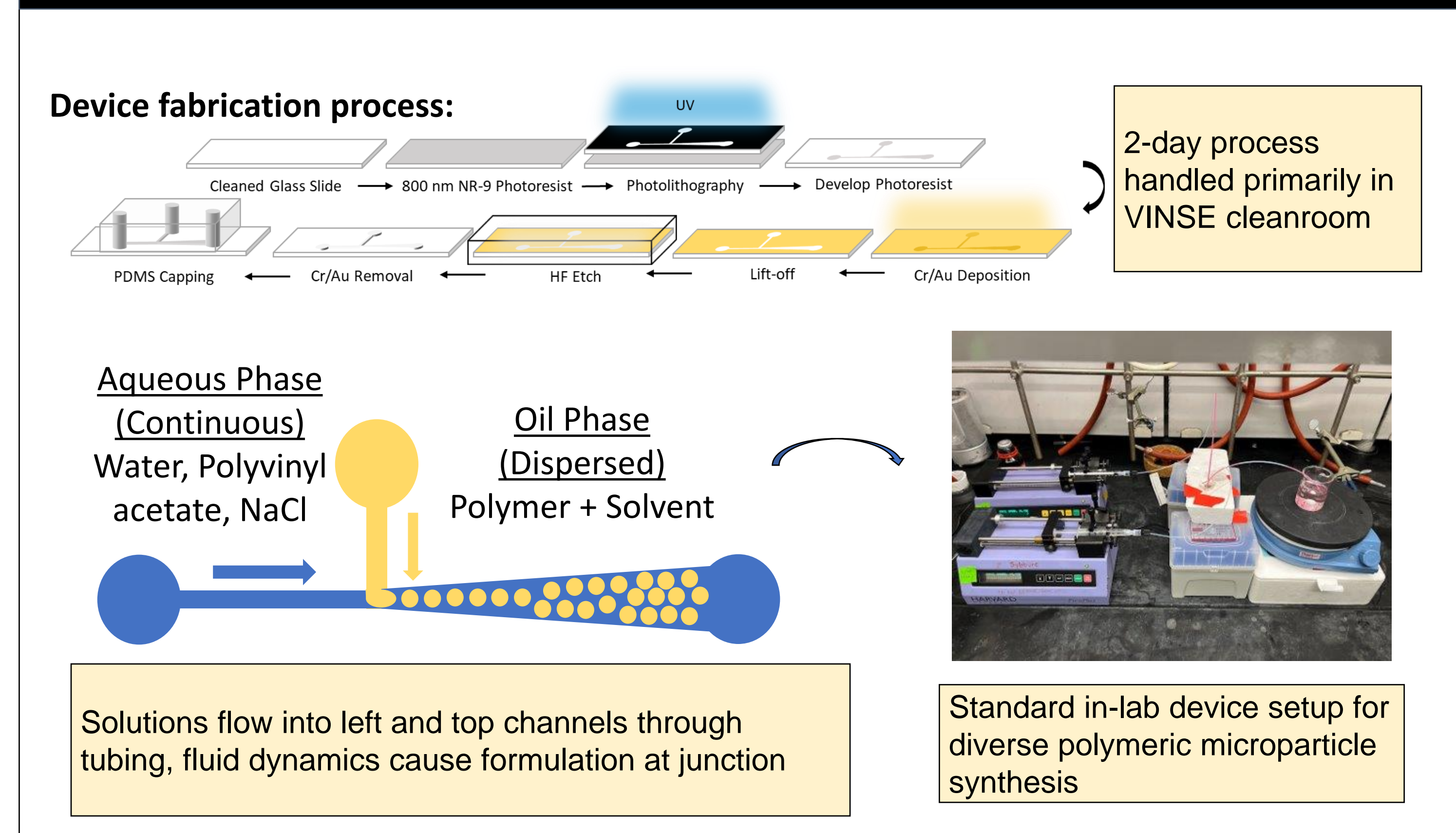
Polysulfide microparticle incorporates polysulfide scavenging and particle drug loading for dual-benefit purpose



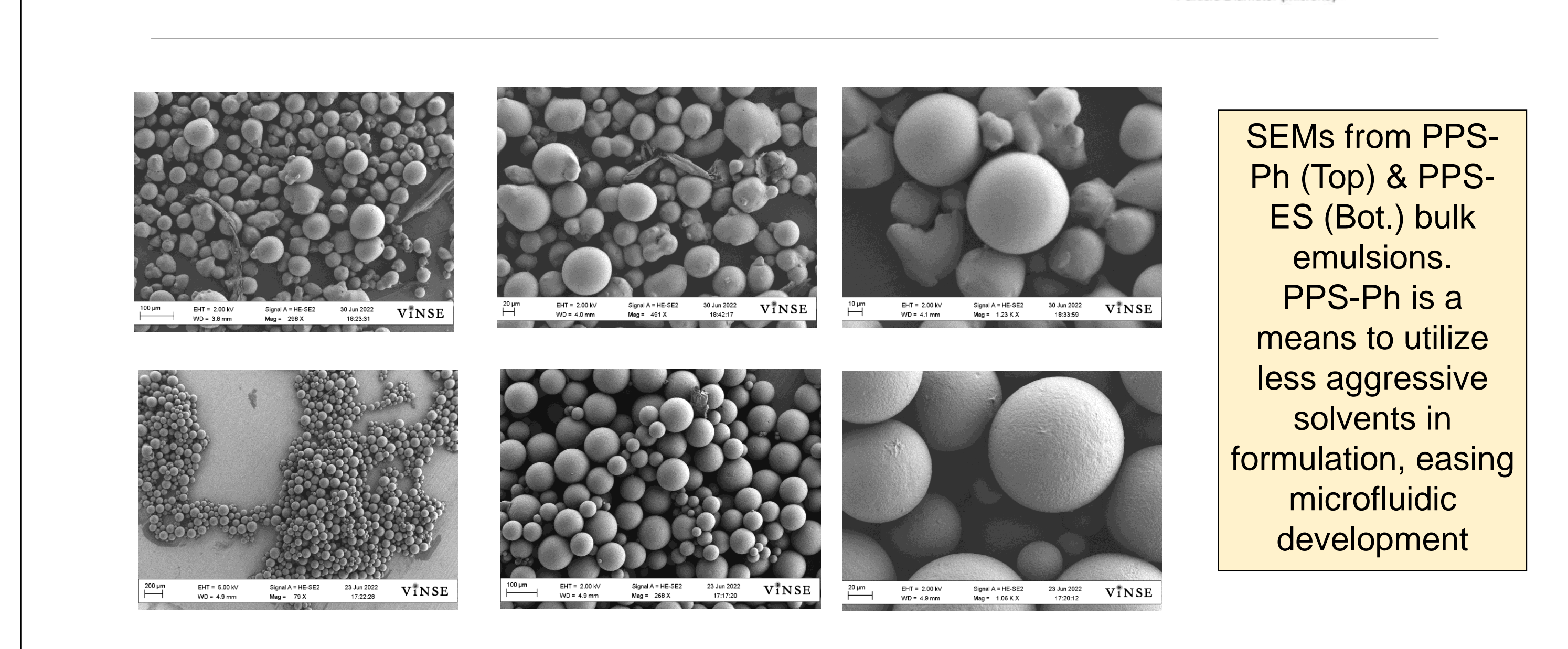
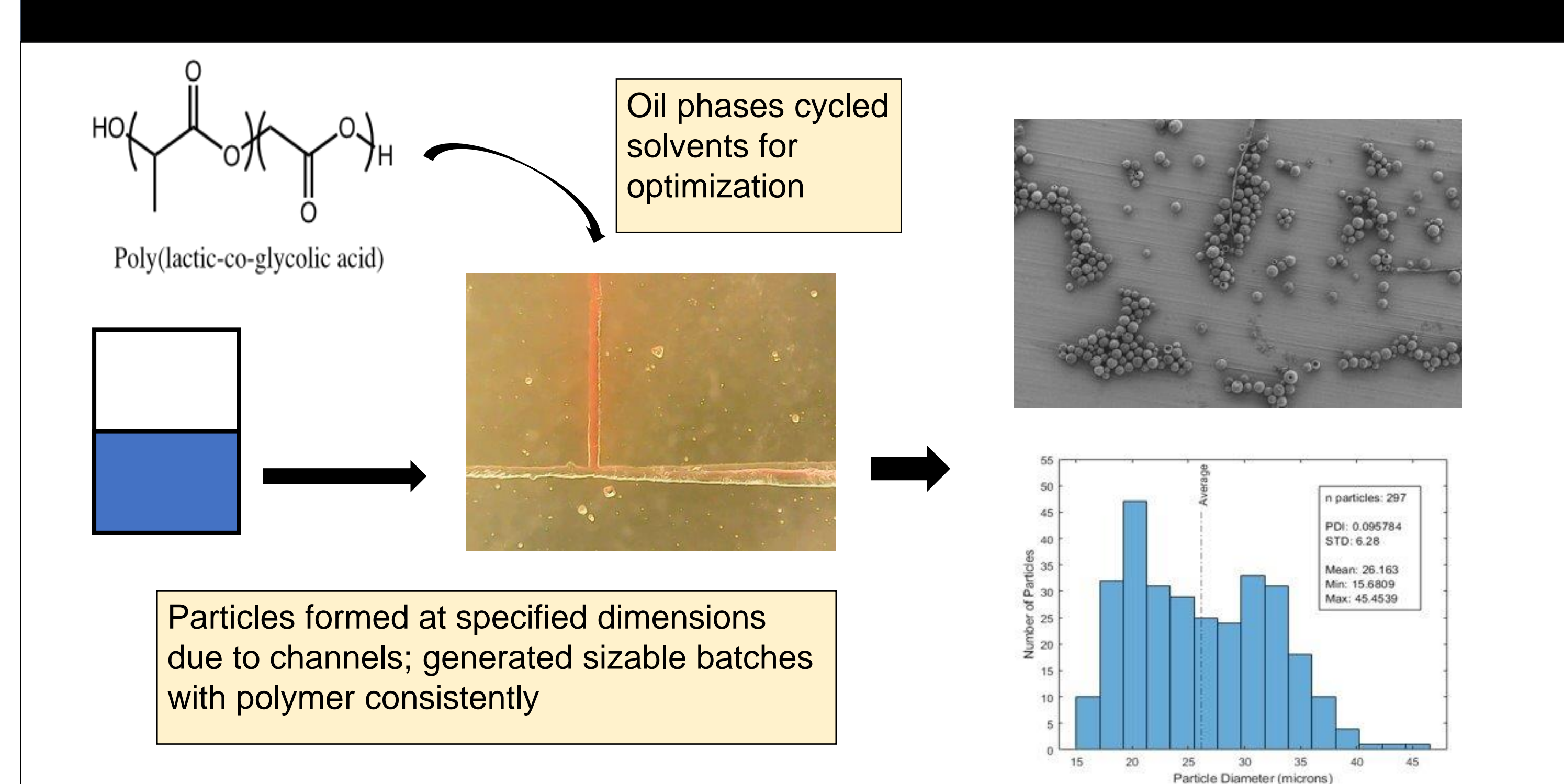
Synthesis of particles simplified, but inconsistently sized; new methods required over bulk emulsion for lower poly dispersion index (PDI) and keeps in-house simplicity



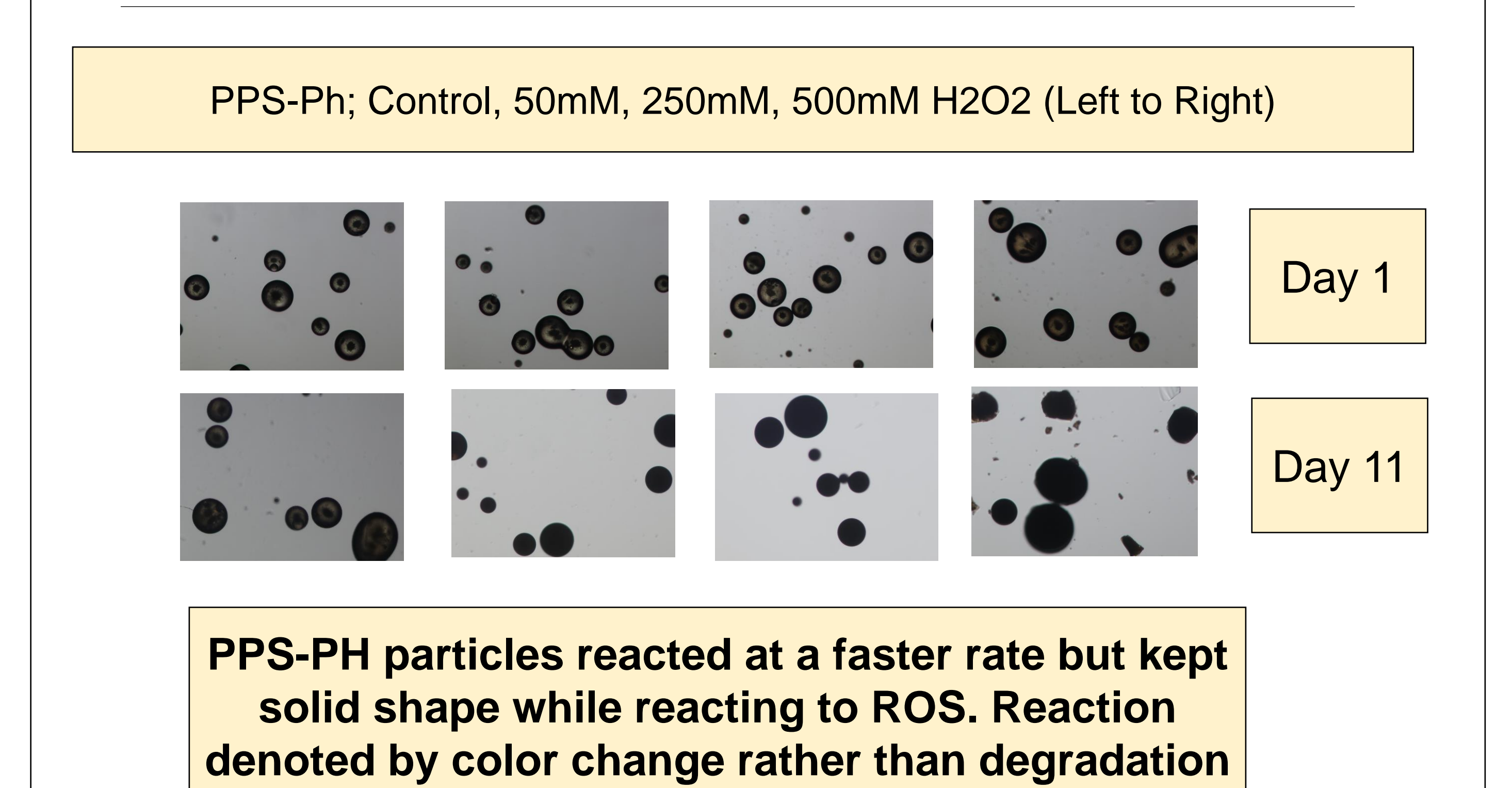
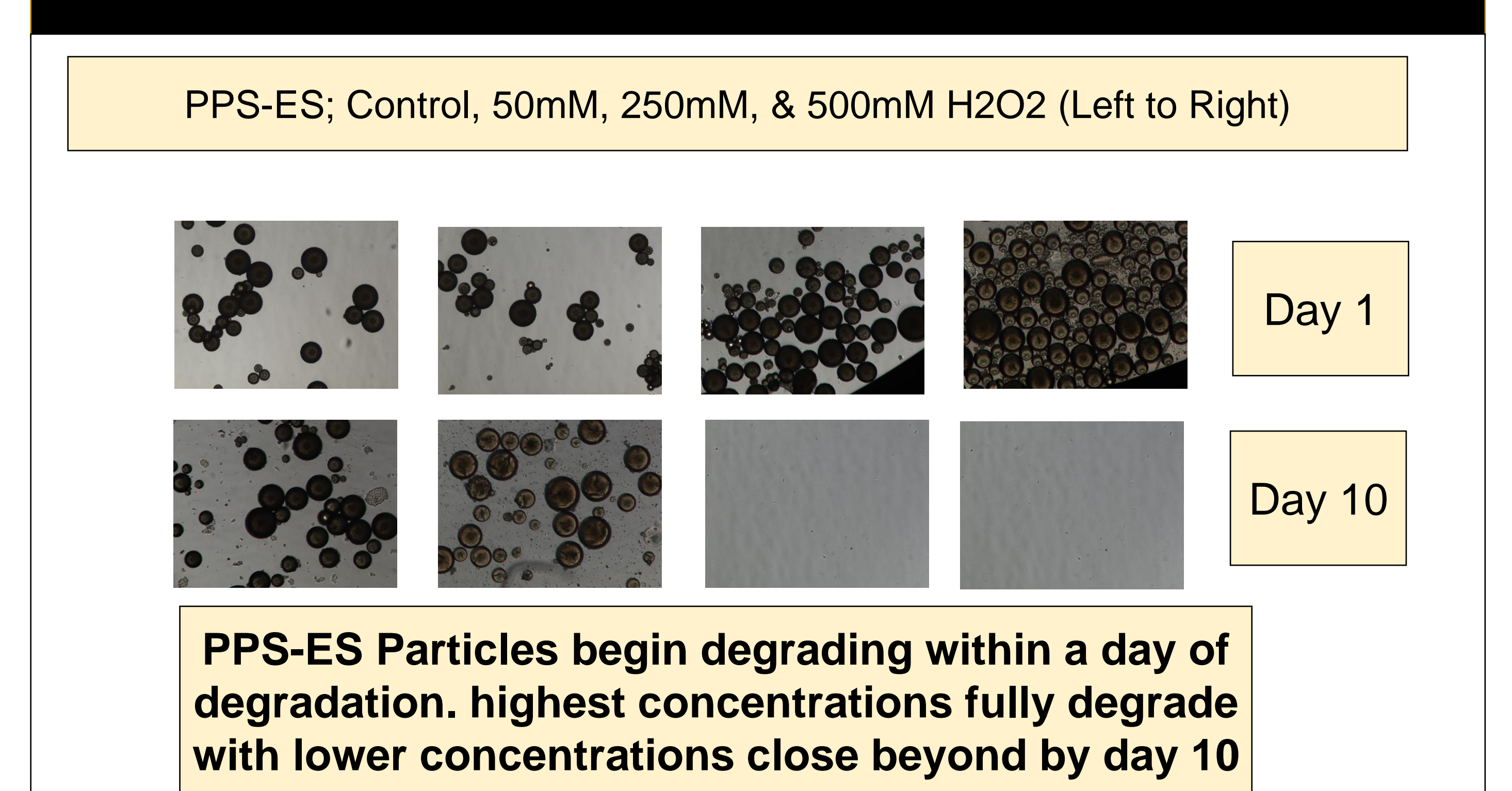
Multi-step fabrication process for microfluidic devices develops long-lasting, customizable channels that formulate monodisperse particles of desired sizes; forms the centerpiece of our general microfluidic setup



Successful outcomes for device formulations seen through PLGA microparticle synthesis. Transitioning to antioxidant particle synthesis brought issues to light, as well as potential alternatives.



Particles produced from different polymers (PPSES/PPS-Ph) through bulk emulsion were degraded in ROS Hydrogen Peroxide (H2O2) to compare scavenging reactivity



Conclusions: Consistent means of particle production found in microfluidics, but more formation optimization required to make consistent jump to antioxidant particle formulation

Future Work

- Continue device fabrication to test wider range of formulations
- Better polymer-solvent combinations needed for more crystalline synthesis.
- Changes necessary to keep particle formulation flow constant (pressure-control)

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