

# **Interfacing Microgels with Biology**

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Examples of hydrogel microparticle and nanoparticle constructs designed to be interfaced with various biological systems are presented. Three levels of complexity in biological interfacing will be presented: (1) simple non-fouling microstructured films, (2) bioresponsive microgels for bioanalytics, and (3) core/shell constructs for targeted chemotherapy. In the first example, *in vitro* and *in vivo* models of inflammation are used to demonstrate the efficacy of microgel monolayers in the mediation of inflammatory responses arising from biomaterial implantation. The second example will illustrate how the thermodynamics of antibody:antigen association can be coupled to hydrogel swelling, thereby producing a bioresponsive material appropriate for bioassays and sensors. Finally, a more complex nanogel architecture that has been designed to enable efficient targeting of cancerous growths will be discussed.