C3d-binding Biomarkers for Detection of Complement-mediated Inflammation

**Background:**
The complement immune system is implicated in many acute and chronic inflammatory conditions and autoimmune diseases, including neurological (Alzheimer’s and multiple sclerosis), renal (lupus nephritis and glomerulonephritis), ocular (age-related macular degeneration), and systemic (lupus and rheumatoid arthritis). The complement protein C3d resides covalently attached in inflamed tissues, and it is an excellent biomarker target for complement-mediated inflammation, even at early disease stages prior to clinical manifestations.

**Brief Description:**
UCR researchers have discovered several small chemical compounds with intrinsic fluorescence properties that bind to complement C3d. These compounds can serve as molecular biomarkers for the detection of complement activation using fluorescence imaging. The compounds can be developed to become noninvasive *in vivo* diagnostics of complement-mediated inflammatory and autoimmune diseases, for spatiotemporal monitoring of disease progression, and for delivering therapeutics to sites of inflammation.

**Advantages:**
Small chemical compound diagnostics have several advantages compared to competing antibody-based diagnostic technologies:

- Higher bioavailability
- Less prone to degradation
- More cost-effective for large scale industrial production, and reduced market prices

**Applications:**

- Molecular biomarkers for complement activation
- Clinical diagnostics for inflammatory and autoimmune diseases
- Drug discovery and delivery
- Theranostic discovery

**Keywords:**
complement system, complement-mediated inflammatory and autoimmune diseases, complement protein C3d, C3d small molecule ligands, small molecules with fluorescence properties, complement biomarkers, noninvasive molecular diagnostics, theranostics

**Contact:**
Brian Suh, Director
brian.suh@ucr.edu
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