

Dscam Protein Binding and Colloidal Aggregation: Micron-sized Legos

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Our research deals with soft matter physics specifically microspheres and proteins. We study Dscam (Down Syndrome Cell Adhesion) which is a unique protein because of its homophilic binding and alternative splicing pattern. The protein has three immunoglobulin domains that are spliced and combined to form 19,008 different isoforms. The Dscam comes from a Drosophila Fly because the human form is not known to be alternatively spliced. The purpose is to reverse the binding pattern of Dscam, and control Dscam self assembly. The proteins are attached to micron sized colloids and form aggregates. Microscopy is used to observe the aggregate's reaction to specific conditions. Dynamic and Static Light Scattering experiments are done to study the distribution of particles in solution. Eventually, photonic crystals used for optical computing can be engineered.



ISOFORMS TESTED FOR BINDING

All 3 variable domains identical



BINDING RESULT

yes
(homophilic)

1 variable domain differs
(not closely-related)



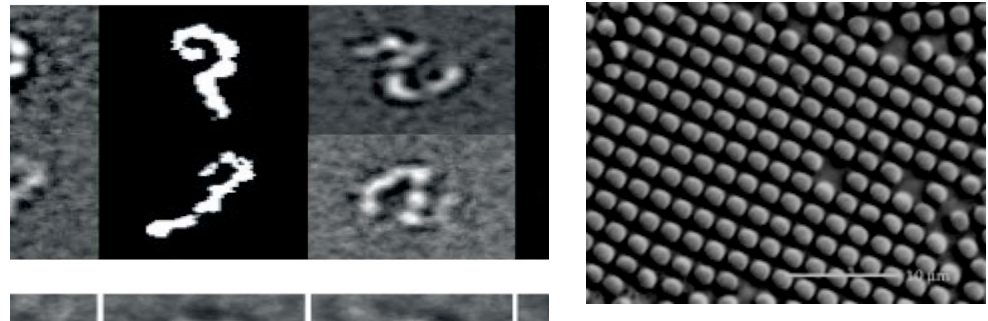
no

1 variable domain differs
(closely-related)



yes
(heterophilic)

Above: Dscam Binding specificities © 2007 Elsevier Inc.



Left: Dscam (Meijers, et al, Nature 2007). Right: Colloids (source unknown)

Supported by NSF DMR-0649199