



Contribution ID: 8

Type: Oral

## Diffusion, search and attack motions of antibodies

A fundamental feature of the antibody structure is the flexible linker between the 3 fragments that allows great flexibility and simultaneous binding to epitopes of antigens and receptors. Combining dynamic light scattering, neutron spin-echo spectroscopy and PFG-NMR we determine characteristic internal fragment dynamics on top of translational and rotational diffusion under crowding conditions. Short-time and long-time translational diffusion show an effective hard sphere like behavior within a colloidal picture. Internal fragment motions are characterized as “attack” and “search” motions complemented by rotational fragment motions. We find that the “attack” motions exposing the binding domain are highly preserved from low to physiologically relevant concentrations and higher, while “search” motions and overall rotational diffusion are suppressed under crowding conditions. Hydrodynamic interactions change the friction between fragments determining relaxation times while interparticle interactions influence the strength of the entropic spring between fragments.

A direct comparison shows that the internal fragment motions have a significant contribution to QENS data on shorter scale.

Biehl, R., Kruteva, M., Czakkel, O. et al. Diffusion, search and attack motions of antibodies. Commun Biol 8, 1461 (2025). <https://doi.org/10.1038/s42003-025-08995-9>

### Session

Biology/Health

**Primary author:** BIEHL, Ralf (Forschungszentrum Jülich)

**Co-authors:** KRUTEVA, Margarita (Forschungszentrum Jülich); CZAKKEL, Orsolya (Institut Laue Langevin); HOFFMANN, Ingo (ILL); RICHTER, Dieter (Forschungszentrum Jülich); STADLER, Andreas (Forschungszentrum Jülich)

**Presenter:** BIEHL, Ralf (Forschungszentrum Jülich)

**Session Classification:** Biology/Health