Construction of a galactose-modified peptide phage library and screening of peptide ligands binding to galectin-3

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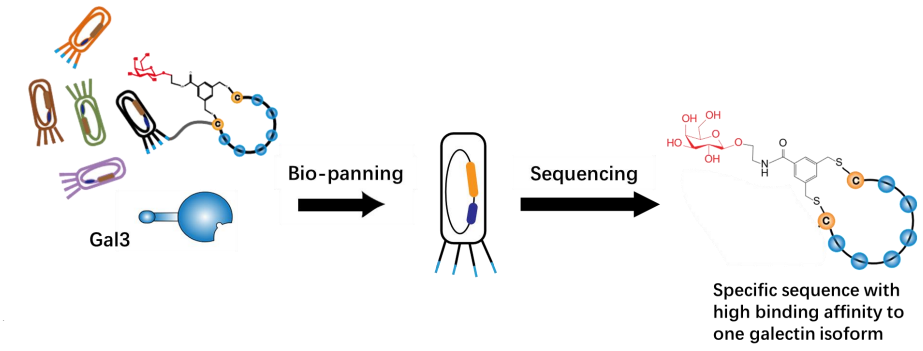
Peptide phage libraries modified with small molecules provide an efficient way to screen ligands against various proteins. Galectin-3 (Gal3), one of galactose binding proteins, has attracted much attention as a target for drug discovery. In previous research, we demonstrated the ligand screening of Gal3 using a stapled α-helix peptide phage library.[1] In order to improve the binding affinity and screening efficiency, it is necessary to design and construct a peptide library with a new peptide conformation ~~that~~ different from α-helix.

In our previous report, a mannose modified cyclic peptide phage library was effective for ligand screening to concanavalin A.[2] Based on this finding, we designed and constructed a galactose-modified cyclic peptide phage library to screen the specific ligand to Gal3. The peptide phage library with two cysteine residues (CX_6C) was constructed. A galactose derivative with the 3,5-dibromomethylbenzene moiety was synthesized for the modification of CX_6C peptide phage library. The phage modification was checked to make sure that the chemical modification was successful. Gal3 was prepared using an *E. coli* expression system, and the biotin-modified Gal3 was immobilized on streptavidin magnetic beads for screening. After three rounds of bio-panning, we identified several candidates of galactose-modified cyclic peptides that bind to Gal3. This approach will be promising for ligand discovery of other galectin isoforms.



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