

USING POLYELECTROLYTE COMPLEXATION IN DE-NOVO PROTEIN DESIGN

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Polyelectrolyte complexation is used extensively in biology as a driving force to control both intramolecular and intermolecular association. First I illustrate the broad scope of polyelectrolyte complexation in biology by reviewing of a number of contrasting examples. Next, inspired by the biological examples, I discuss how polyelectrolyte complexation can be used as a driving force for engineering the intramolecular and intermolecular association of de-novo designed proteins. My own work in de-novo protein design is concerned with so-called „protein polymers”, polypeptides with repetitive sequences inspired by natural structural proteins such as collagen, elastin and silk. Examples that I will discuss are: (1) electrostatically driven assembly of virus-like capsids around DNA and RNA (2) electrostatically driven assembly of DNA bottle-brushes (3) control of the activity of antimicrobial peptides.



Figure 1. “DNA bottle-brush” assembled from DNA and fusion polypeptide of a DNA-binding domain and a long hydrophilic random chain domain [1].

References

[1] Hernandez-Garcia, A., Estrich, N.A., Werten, M.W.T., van Der Maarel, J.R.C., LaBean, T.H., de Wolf, F.A., Stuart, M/A.C., de Vries, R.: *ACS Nano*, **2017**, accepted for publication, DOI:10.1021/acsnano.6b05938.