Photo-control of biomolecules and cells

Triggering of reaction using caged peptides

Caged peptides, whose activities are masked by the introduction of photocleavable groups, have recently been recognized as a useful tool to elucidate various biological phenomena with a high spatial and temporal resolution, even in living cells. AIST has developed techniques in design, synthesis and application of caged peptides. Here we would like to introduce the application of caged RGD (arginine-glycine- aspartic acid) peptide, by which the cell adhesion can be photocontrolled spatiotemporally.

Yoshiro Tatsu
Research Institute for Cell Engineering
y-tatsu@aist.go.jp
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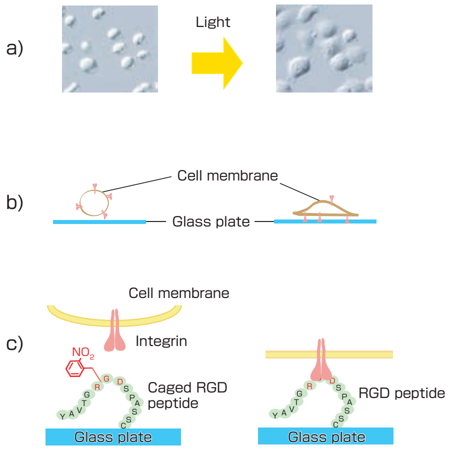

Micrographs and proposed mechanism of photo-triggered cell adhesion. Upon light irradiation, the caged RGD peptide moiety immobilized on the glass-bottom dish is converted to the RGD peptide, and cells adhere.

Development of RNA secondary structure prediction software

A major tool to help RNA medicine development and novel functional RNA discovery

We have developed a software tool to predict RNA secondary structures. Our tool achieved the world's best performance for RNA secondary structure benchmarks as of this date. The RNA secondary structure prediction is one of the widely used techniques in the field of biotechnology. The technique is indispensable for oligo-primer/probe design, siRNA design and micro RNA target prediction to name a few.

We are aiming to replace still widely used but outdated traditional prediction tools with our tool named CentroidFold. CentroidFold is backed by our original theory that maximizes the expected prediction accuracy. The theory promises the improvement of the prediction accuracy at mathematical precision. CentroidFold is provided in the form of a web application as well as a standalone software package. The web application can be accessed at **http://www.ncrna.org/centroidfold/**. The standalone software package can be downloaded from **http://www.ncrna.org/software/centroidfold/download/**.

Toutai Mituyama
Computational Biology Research Center
mituyama-toutai@aist.go.jp
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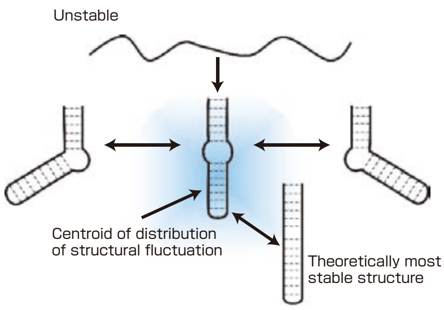

An RNA structure fluctuates and folds into one structure of a hypothetical distribution of structures. Theoretically the most stable structure is included in the distribution but it can differ from the centroid of the distribution which is a better prediction in many cases. CentroidFold computes the centroid structure instead of theoretically the most stable structure.