Generation of Aptamer Ligands By SELEX Procedures

Creative Biolabs®
Targeted Delivery

INTRODUCTION

Systematic Evolution of Ligands by Exponential Enrichment (SELEX) is a core *in vitro*/*in vivo* selection technology for generating aptamers—short single-stranded DNA (ssDNA) or RNA molecules with high affinity and specificity for target molecules.

SELEX PROCEDURES

General SELEX procedures can be divided into the following four steps:

1) Library Preparation
A random oligonucleotide library is chemically synthesized. For DNA/RNA SELEX, ssDNA/RNA library is established.

2) Target Binding & Negative/Positive Selection
The library is first incubated with negative targets and then incubated with target molecules to select the aptamers with specific binding for targets. In the end, the positive aptamers are collected by high salt buffers.

3) Amplification of Aptamer Ligands
Target-bound ssDNA is amplified via PCR to generate double-stranded DNA (dsDNA), while target-bound RNA is first reverse-transcribed into cDNA, which is then amplified via PCR.

4) Iteration
dsDNA is denatured to recover ssDNA for the next SELEX cycle, while the amplified cDNA can be directed used for subsequent cycles.

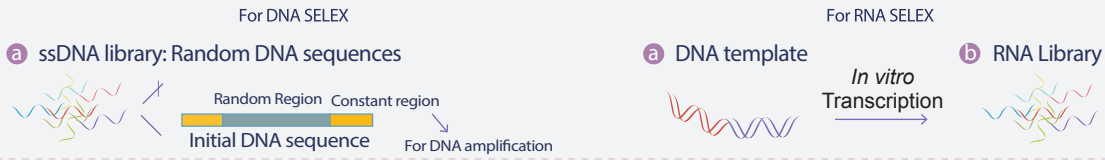
OTHER TYPES OF SELEX

To select aptamers specific for certain proteins, cells, *in vivo* tissues, purified proteins, specific cells, and animals could be used for positive selection.

General SELEX Procedures

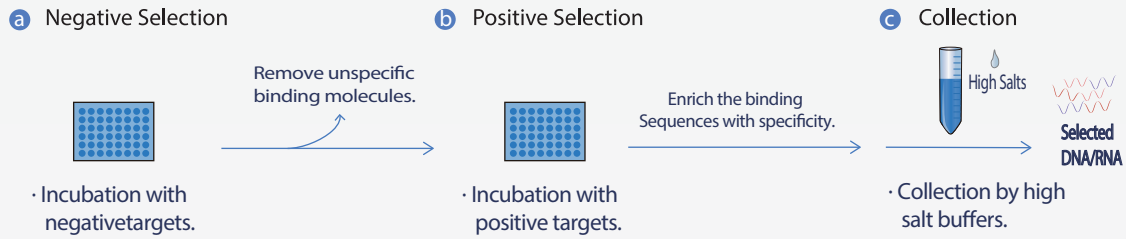
Stage 1: Library Preparation

Purpose: Construction of Random Oligonucleotide Library (ssDNA/RNA Library).



Stage 2: Target Binding & Negative/Positive Selection

Purpose: Selection of Aptamers Specific for Targets.

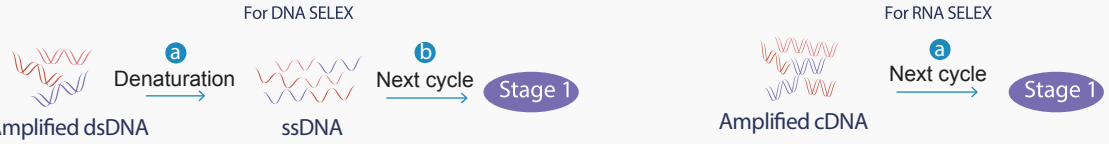


Stage 3: Amplification of Aptamer ligands

Purpose: Amplification of Targeting Aptamer Ligands.

Stage 4: Iteration

Purpose: Enrichment of Specific Aptamers and Reduction of Non-Specific Sequences.

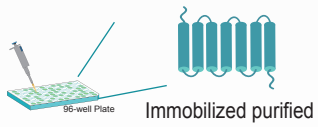


Final Step: DNA sequencing to identify families and motifs.

Other Types of SELEX

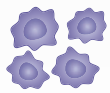
A. Protein SELEX

· Use target proteins for positive selection.



B. Cell SELEX

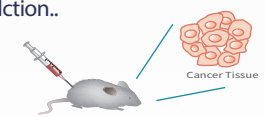
· Use target whole cells (e.g., tumor cells) for positive selection.



Myeloma cells

C. *In vivo* SELEX

· Injection into animals (e.g., mice with tumor xenografts) for positive selction..



WHAT CAN WE DO

- Aptamer library design & synthesis.
- Target immobilization & partition strategy (beads, CE, microfluidics, cell-SELEX).
- SELEX execution with staged counter-selection and stringency ramp.
- Affinity & kinetics (SPR/BLI/MST/ITC) & specificity.

OTHER SERVICES

- Liposomes
- CPPs
- Fc Fusion Proteins
- Graphene Oxide
- Hyaluronic Acid

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