

# NTHRYS

OPC PVT LTD

SECTION • VEC

# Vector Design & Construction

Hands-on wet-lab training in engineering plasmid and delivery vectors — expression vector design, cloning and shuttle backbones, selection and reporter elements, viral and delivery vectors, large-capacity and specialised vectors, and vector validation and optimisation.

06

CATEGORIES

30

PROTOCOLS

VEC

SECTION ID

2026

EDITION

# Categories & Protocols

Section **VEC** spans 6 category streams and 30 bench protocols. Every protocol carries a unique code for enrolment, tracking and certification.

|        |                                                                                                    |           |
|--------|----------------------------------------------------------------------------------------------------|-----------|
| VEC-EX | <b>Expression Vector Design</b><br>Promoters, RBS/Kozak, tags & inducible systems                  | 05        |
| VEC-CL | <b>Cloning &amp; Shuttle Vector Construction</b><br>MCS, shuttle backbones, origins & copy number  | 05        |
| VEC-SE | <b>Selection &amp; Reporter Elements</b><br>Resistance, auxotrophic markers & reporters            | 05        |
| VEC-VI | <b>Viral &amp; Delivery Vector Construction</b><br>Lentiviral, AAV, adenoviral & packaging design  | 05        |
| VEC-LC | <b>Large-Capacity &amp; Specialised Vectors</b><br>BAC, YAC, cosmid/fosmid & episomal vectors      | 05        |
| VEC-VA | <b>Vector Validation &amp; Optimisation</b><br>Sequencing, codon optimisation & functional testing | 05        |
| TOTAL  | <b>All training protocols in section VEC</b>                                                       | <b>30</b> |

## CODE FORMAT

**VEC** • **VI** • **01**

VEC section

VI category

01 protocol

01

■ CATEGORY · VEC-EX

## Expression Vector Design

Promoters, RBS/Kozak, tags &amp; inducible systems

05

PROTOCOLS

CODE

TRAINING PROTOCOL

DESCRIPTION

VEC-EX-01

**Promoter Selection & Design**

Constitutive / tissue-specific drive.

VEC-EX-02

**RBS / Kozak Optimisation**

Translation-initiation tuning.

VEC-EX-03

**Fusion Tag & Linker Design**

Purification &amp; solubility tags.

VEC-EX-04

**Inducible Expression Systems**

Tet, IPTG &amp; arabinose control.

VEC-EX-05

**Terminator & PolyA Elements**

Transcript termination design.

02

CATEGORY • VEC-CL

## Cloning & Shuttle Vector Construction

MCS, shuttle backbones, origins &amp; copy number

05

PROTOCOLS

CODE

TRAINING PROTOCOL

DESCRIPTION

VEC-CL-01

Multiple Cloning Site Design

Flexible insertion sites.

VEC-CL-02

Shuttle Vector Construction

Cross-host replication design.

VEC-CL-03

Origin of Replication Selection

Host-compatible replication.

VEC-CL-04

Copy-Number Tuning

High vs low-copy backbones.

VEC-CL-05

Modular Backbone Assembly

Standardised part assembly.



■ CATEGORY · VEC-SE

## Selection & Reporter Elements

Resistance, auxotrophic markers & reporters



PROTOCOLS

CODE

TRAINING PROTOCOL

DESCRIPTION

VEC-SE-01

**Antibiotic Resistance Markers**

Selectable-marker design.

VEC-SE-02

**Auxotrophic / Selection Markers**

Nutritional selection systems.

VEC-SE-03

**Reporter Gene Insertion**

GFP, luciferase & lacZ.

VEC-SE-04

**Counter-Selection Systems**

Negative-selection cassettes.

VEC-SE-05

**Dual-Selection Cassettes**

Combined positive/negative.

04

■ CATEGORY · VEC-VI

## Viral & Delivery Vector Construction

Lentiviral, AAV, adenoviral &amp; packaging design

05

PROTOCOLS

CODE

TRAINING PROTOCOL

DESCRIPTION

VEC-VI-01

**Lentiviral Transfer Vector Design**

Integrating delivery vectors.

VEC-VI-02

**AAV Vector Construction**

ITR-flanked AAV cassettes.

VEC-VI-03

**Adenoviral Vector Construction**

High-capacity adeno vectors.

VEC-VI-04

**Retroviral Vectors**

Stable-integration vectors.

VEC-VI-05

**Packaging & Helper Plasmid Design**

Trans-element supply.



■ CATEGORY · VEC-LC

## Large-Capacity & Specialised Vectors

BAC, YAC, cosmid/fosmid & episomal vectors



| CODE      | TRAINING PROTOCOL                 | DESCRIPTION                       |
|-----------|-----------------------------------|-----------------------------------|
| VEC-LC-01 | BAC Construction                  | Bacterial artificial chromosomes. |
| VEC-LC-02 | YAC Construction                  | Yeast artificial chromosomes.     |
| VEC-LC-03 | Cosmid / Fosmid Vectors           | Mid-large insert cloning.         |
| VEC-LC-04 | Artificial Chromosome Engineering | Large-genome construction.        |
| VEC-LC-05 | Minicircle & Episomal Vectors     | Backbone-free / non-integrating.  |



■ CATEGORY · VEC-VA

## Vector Validation & Optimisation

Sequencing, codon optimisation & functional testing



PROTOCOLS

CODE

TRAINING PROTOCOL

DESCRIPTION

VEC-VA-01

Sequence Verification & Annotation

Full-construct confirmation.

VEC-VA-02

Codon Optimisation

Host-tuned expression.

VEC-VA-03

Functional Expression Testing

Confirming construct activity.

VEC-VA-04

Stability & Maintenance Testing

Construct retention checks.

VEC-VA-05

In Silico Vector Design Tools

Computer-aided construction.

# Engineer the perfect vector

Every protocol in Section VEC is delivered as hands-on training in vector engineering — from promoter, tag and selection design through viral, shuttle and large-capacity construction and validation. The vector decides where, when and how strongly your gene is expressed.

**30** protocols

**6** categories

**VEC** section

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