

NTHRYS

OPC PVT LTD

SECTION • PLT

Plant Molecular Biology

Hands-on wet-lab training in plant molecular biology — plant nucleic-acid extraction, plant tissue culture, plant transformation, plant genome editing and engineering, marker-assisted analysis, and functional and applied plant molecular methods.

06

CATEGORIES

30

PROTOCOLS

PLT

SECTION ID

2026

EDITION

Categories & Protocols

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

PLT-NA	Plant Nucleic Acid Extraction CTAB DNA, plant RNA & inhibitor removal	05
PLT-TC	Plant Tissue Culture Explant establishment, callus & regeneration	05
PLT-TR	Plant Transformation Agrobacterium, biolistic, floral-dip & protoplast	05
PLT-GE	Plant Genome Editing & Engineering Plant CRISPR, transgene-free & stable lines	05
PLT-MA	Marker-Assisted Analysis SSR/SNP genotyping, QTL mapping & MAS	05
PLT-FN	Functional & Applied Plant Methods Expression analysis, VIGS & reporter assays	05
TOTAL	All training protocols in section PLT	30

CODE FORMAT

PLT • **TR** • **01**

PLT section

TR category

01 protocol

01

■ CATEGORY · PLT-NA

Plant Nucleic Acid Extraction

CTAB DNA, plant RNA & inhibitor removal

05

PROTOCOLS

CODE

TRAINING PROTOCOL

DESCRIPTION

PLT-NA-01

**Plant Genomic DNA
Extraction (CTAB)**

High-quality plant gDNA.

PLT-NA-02

Plant RNA Extraction

RNase-careful plant RNA.

PLT-NA-03

**Polysaccharide /
Polyphenol Removal**

Inhibitor clean-up.

PLT-NA-04

Chloroplast / Organelle DNA

Organellar genome recovery.

PLT-NA-05

**Recalcitrant-Tissue
Extraction**

Tough / woody-tissue prep.

02

CATEGORY • PLT-TC

Plant Tissue Culture

Explant establishment, callus & regeneration

05

PROTOCOLS

CODE

TRAINING PROTOCOL

DESCRIPTION

PLT-TC-01

Explant Sterilisation & Establishment

Contamination-free culture.

PLT-TC-02

Callus Induction

Undifferentiated-tissue growth.

PLT-TC-03

Organogenesis & Regeneration

Shoot / root regeneration.

PLT-TC-04

Somatic Embryogenesis

Embryo-route regeneration.

PLT-TC-05

Micropropagation

Clonal in vitro multiplication.



■ CATEGORY · PLT-TR

Plant Transformation

Agrobacterium, biolistic, floral-dip & protoplast



PROTOCOLS

CODE

TRAINING PROTOCOL

DESCRIPTION

PLT-TR-01

Agrobacterium-Mediated Transformation

T-DNA gene delivery.

PLT-TR-02

Biolistic / Gene-Gun Transformation

Particle bombardment.

PLT-TR-03

Floral-Dip Transformation

In planta Arabidopsis method.

PLT-TR-04

Protoplast Transformation

Cell-wall-free delivery.

PLT-TR-05

Transient Expression (Agroinfiltration)

Rapid leaf expression.

04

■ CATEGORY · PLT-GE

Plant Genome Editing & Engineering

Plant CRISPR, transgene-free & stable lines

05

PROTOCOLS

CODE

TRAINING PROTOCOL

DESCRIPTION

PLT-GE-01

CRISPR in Plants

Targeted plant-genome edits.

PLT-GE-02

Transgene-Free Editing

Marker-free edited plants.

PLT-GE-03

Selectable-Marker Systems

Transformant selection.

PLT-GE-04

Stable-Line Generation

Heritable edited lines.

PLT-GE-05

Editing Verification in
Plants

Edit confirmation & zygosity.



■ CATEGORY · PLT-MA

Marker-Assisted Analysis

SSR/SNP genotyping, QTL mapping & MAS



PROTOCOLS

CODE

TRAINING PROTOCOL

DESCRIPTION

PLT-MA-01

**Molecular-Marker
Genotyping (SSR / SNP)**

Marker-based profiling.

PLT-MA-02

QTL Mapping

Trait-locus localisation.

PLT-MA-03

Marker-Assisted Selection

Trait-linked breeding.

PLT-MA-04

DNA Barcoding of Plants

Species identification.

PLT-MA-05

Genetic-Diversity Analysis

Population-structure analysis.



■ CATEGORY · PLT-FN

Functional & Applied Plant Methods

Expression analysis, VIGS & reporter assays



PROTOCOLS

CODE

TRAINING PROTOCOL

DESCRIPTION

PLT-FN-01

Gene-Expression Analysis in Plants

Plant transcript profiling.

PLT-FN-02

VIGS (Virus-Induced Gene Silencing)

Rapid loss-of-function.

PLT-FN-03

Reporter-Gene Assays (GUS / GFP)

Promoter & expression readout.

PLT-FN-04

Transgene Copy-Number & Stability

Insertion characterisation.

PLT-FN-05

Phenotyping & Trait Validation

Linking genotype to trait.

Engineer plant genomes & traits

Every protocol in Section PLT is delivered as hands-on bench training — from CTAB extraction and tissue culture through Agrobacterium transformation, plant CRISPR and marker-assisted selection. Plant systems bring their own chemistry and regeneration biology to every molecular workflow.

30 protocols

6 categories

PLT section

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