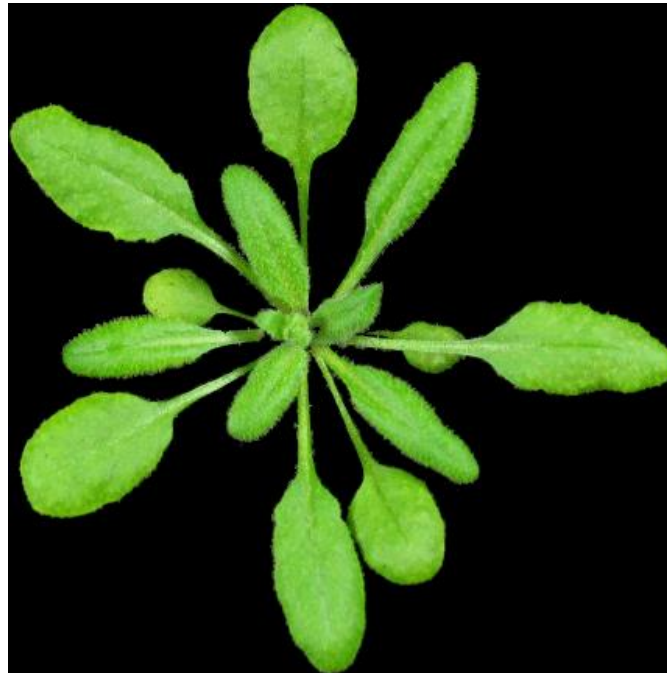
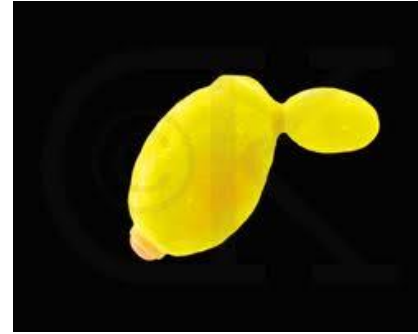
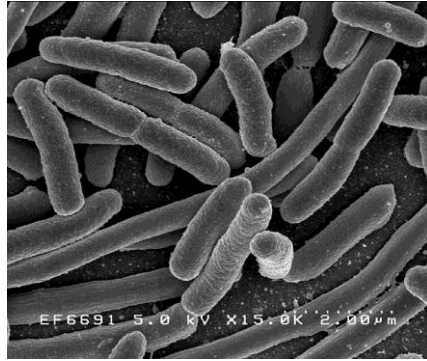


拟南芥实验操作

Arabidopsis Laboratory Operation



模式微生物



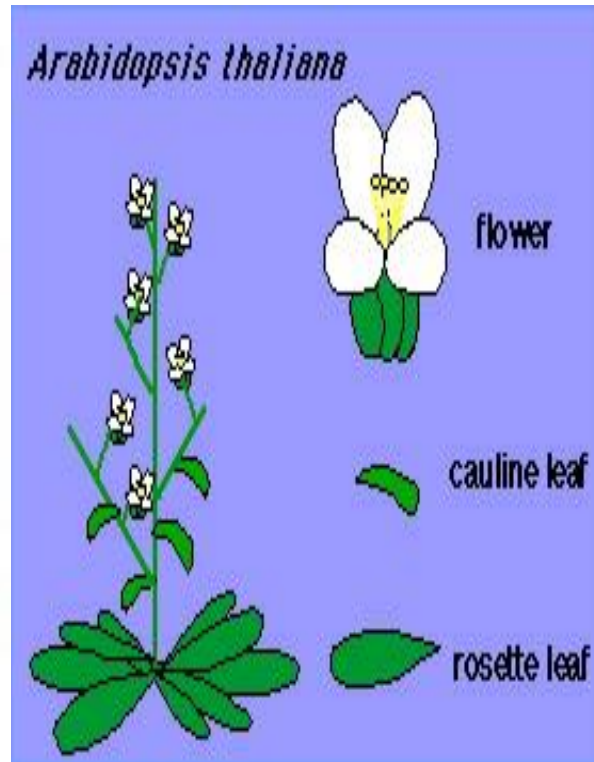
模式动物



模式植物

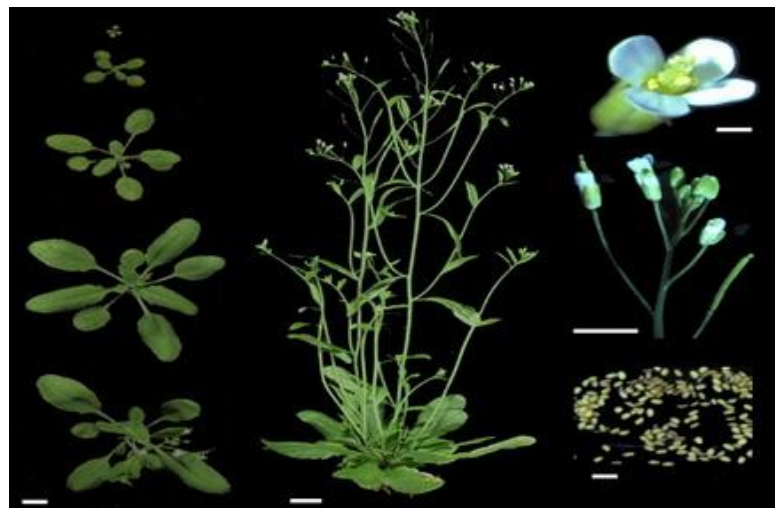


拟南芥 (*Arabidopsis thaliana*)



生长周期短、基因组小。

拟南芥，
拉丁名：*Arabidopsis thaliana*，
属于植物界的被子植物门，双子叶
植物纲，白花菜目，十字花科的拟
南芥属。



形态特征：

基生叶有柄呈莲座状，叶片倒卵形或匙形；
茎生叶无柄，披针形或线形。

总状花序顶生，花瓣4片，白色，匙形。

长角果线形，长1~1.5厘米。



拟南芥的优点

- ◆ 生长周期短（6-8周）
- ◆ 体积小，占地少
- ◆ 核基因组小
- ◆ 自交植物，遗传稳定性高
- ◆ 易产生突变体
- ◆ 农杆菌直接转化
- ◆ 功能基因保守



拟南芥的优点

- 单倍体基因组**125Mb**（水稻450Mb）
- 拟南芥基因组全序列测定
- **25,498**个基因，编码蛋白**11,000**个家族
- 90个基因座位的遗传图谱
- 物理图谱建立



拟南芥的研究历史

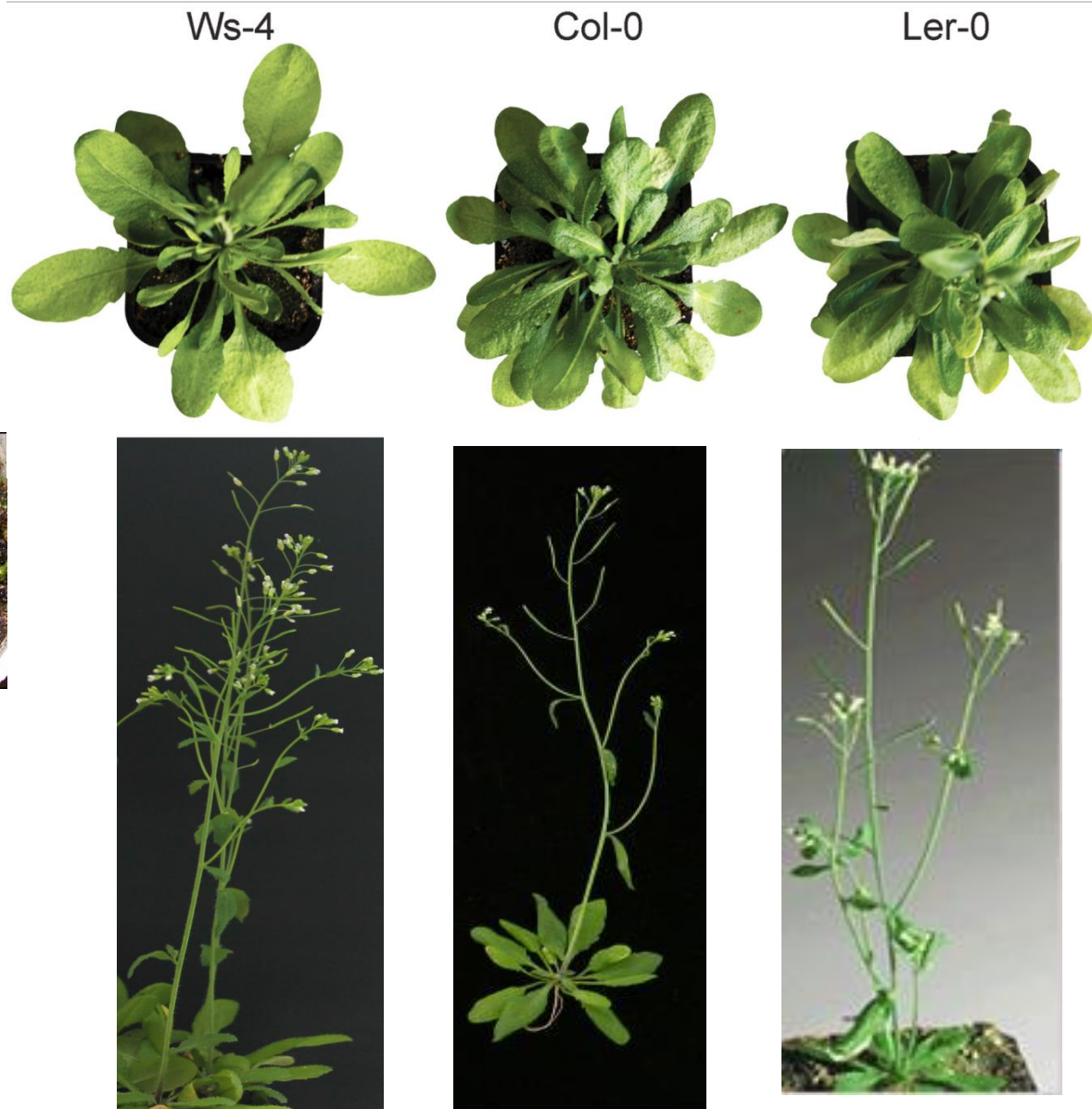
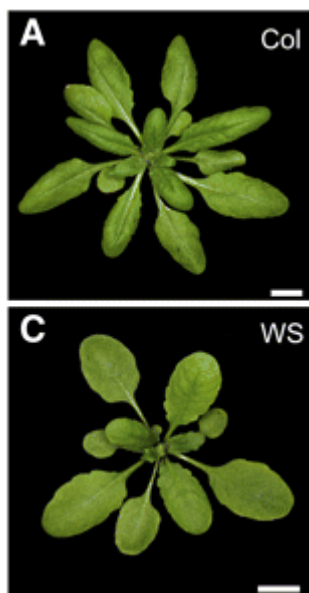
历史上对拟南芥科学研究的记载最早可追溯至16世纪，19世纪分类学家Heynhold将其命名为 *Arabidopsis thaliana*。

现在人们在世界各地共收集到一千多个拟南芥生态型，这些生态型在形态发育、生理反应方面存在很大差异。

在拟南芥的众多生态型中最常用的三种是Landsberg erecta (Ler)、Columbia (Col)、Wassilewskija (Ws)。



三种生态型形态差异



拟南芥的种植

种子置于 1.5ml EP 管中，4℃春化3~4天；

种植土按**营养土:蛭石=3:1**混匀，分装至营养钵中；

用牙签点播种子至土壤上层，每钵5~7处；

覆膜保湿3~4天，于**70%湿度培养箱**中，**22±1 °C**恒温 9-12小时光照培养（花序长出后16~24小时光照培养）。



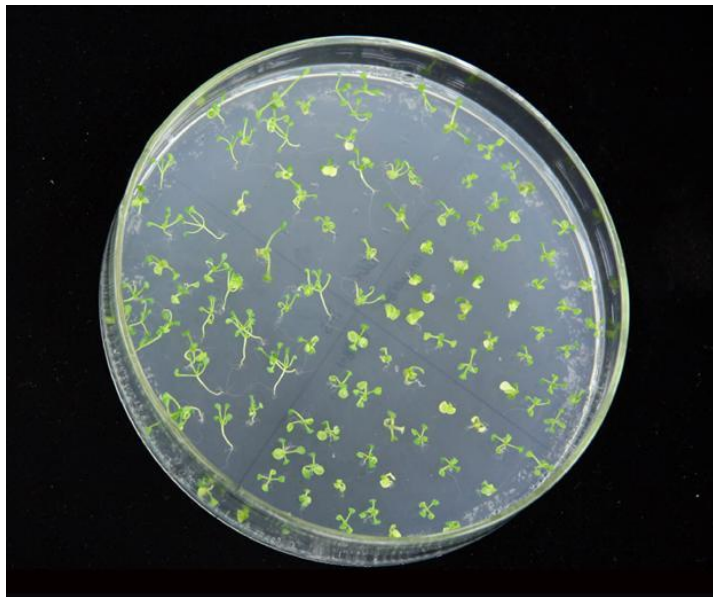
拟南芥的种子消毒及播种

- 种子春化（加蒸馏水放入4°C冰箱中过夜）
- 75%乙醇润洗一遍，再用75%酒精消毒45s-1m
（混匀，尽量将液体吸净，动作要快）
- 10%NaClO消毒12-15m（混匀，尽量将液体吸净，动作要快）
- 无菌水洗五遍，用tips将种子点在培养基表面
（尽量均匀）
- 封膜，做好标记，平放于培养架上培养



拟南芥的种植

无菌培养



温室生长

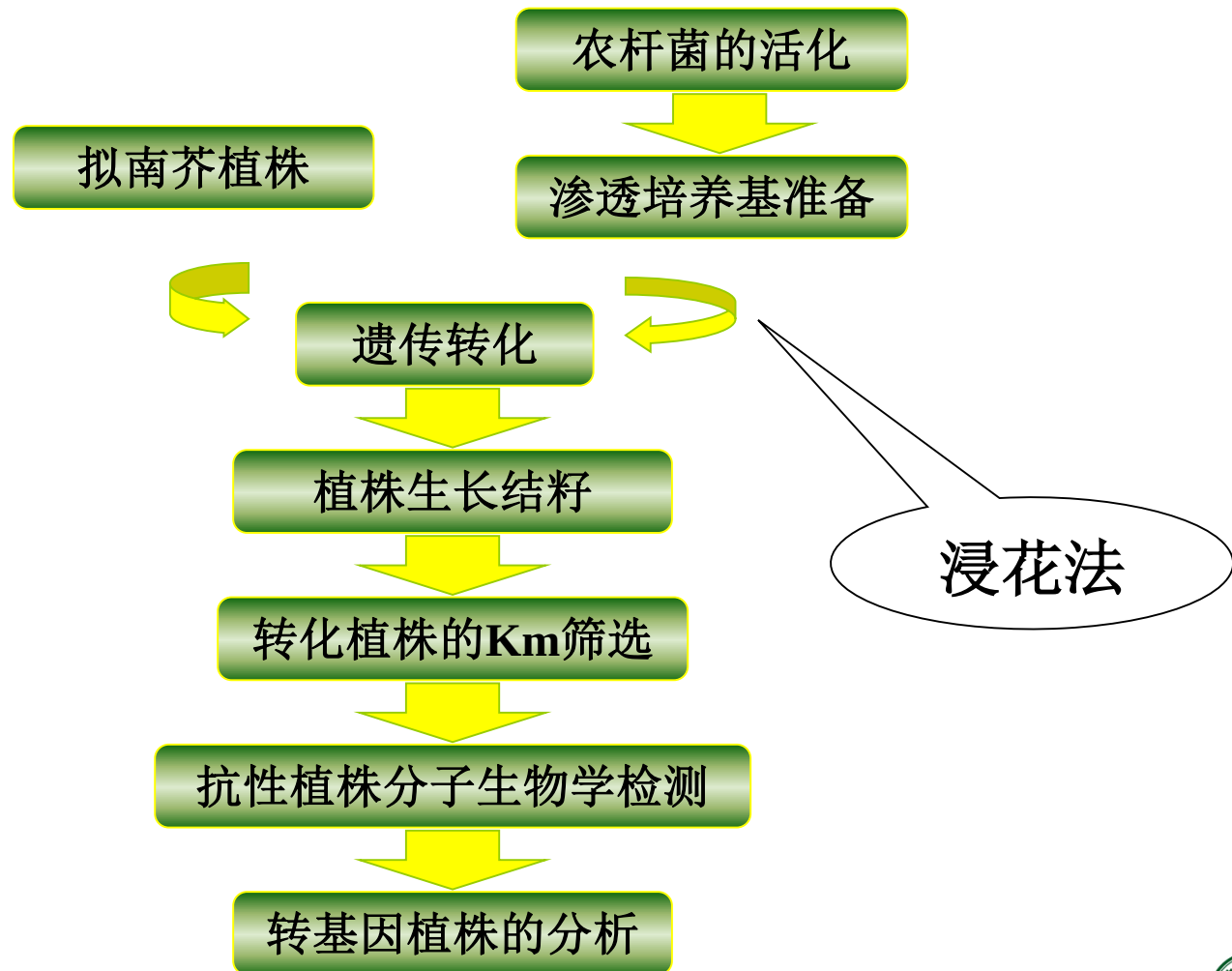


拟南芥的种子消毒及播种注意事项

- ◆ 严格无菌操作！
- ◆ 消毒过程动作要快！
- ◆ 枪头不要重复使用，物品不要拿出超净台！
- ◆ 点种时每个位置尽量只点一颗种子！
- ◆ 操作时尽量避免说话和人员走动！



拟南芥遗传转化



实验流程

1. 挑取活化的含目的基因质粒的单克隆阳性农杆菌GV3101菌株至5ml 新鲜YEB液体培养基（50 μ g/ml Kan, 125 μ g/ml Rif）中，28 $^{\circ}$ C摇培24h。
2. 取上述菌液0.1ml 接至50ml 新鲜YEB液体培养基（50 μ g/ml Kan, 125 μ g/ml Rif）中，28 $^{\circ}$ C 220rpm培养2~4h，使OD值达到0.8左右。
3. 取上述菌液1ml于EP管中，室温22 $^{\circ}$ C，5500g，离心15min，弃去上清，用转化介质重悬沉淀至OD值达到0.8左右。
4. 将待转化的拟南芥植株平放，将花蕾部分插入2mlEP管中，加入上述转化液，浸染5min。轻轻甩掉浸液，做好标记。



遗传转化植株



农杆菌介导转化拟南芥



转化后的管理

- 在箱底撒水保湿，然后将花盆平放到箱子中，并用塑料袋罩住箱子暗培养**16-24h**（过夜）后，将拟南芥放置于塑料培养池内，并浇足**horgland**营养液，恢复正常培养。
- 转化后拟南芥的培养恢复正常管理，一旦再出现侧蘖或主苔出现分枝，及时剪除。



转化后的管理

- 转化5-6周后，为了加速拟南芥成熟可以适当少浇营养液。待拟南芥个别角果开始枯黄后，可将其角果剪下放于培养皿内干燥。拟南芥角果大部分枯黄后，即可收取全部种子存于1.5ml 的EP管中（在盖上扎一小孔以便干燥）。种子完全干燥后，放于1.5ml 新EP管中4°C短期保存。如需要可放于 -20°C冰箱内长期保存。





The Plant Journal (1998) **16**(6), 735–743

TECHNICAL ADVANCE

Floral dip: a simplified method for *Agrobacterium*-mediated transformation of *Arabidopsis thaliana*

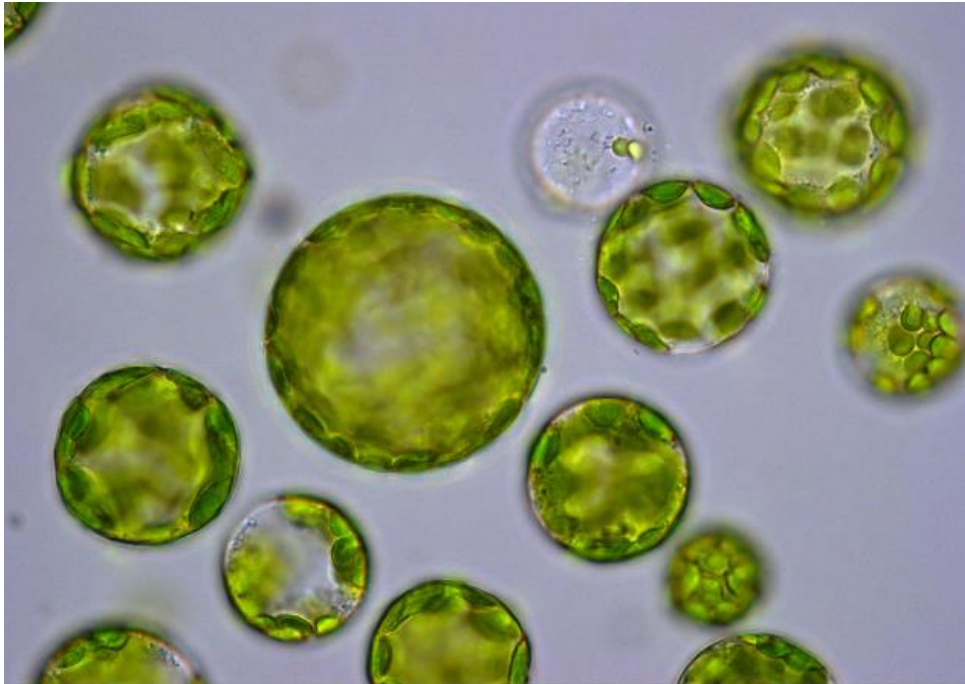
PROTOCOL

***Agrobacterium*-mediated transformation of *Arabidopsis thaliana* using the floral dip method**



拟南芥原生质体瞬时转化

原生质体是一种常用的植物瞬时表达系统，结合一些报告基因使用，它具有检测速度快、操作简单等优点。



应用：

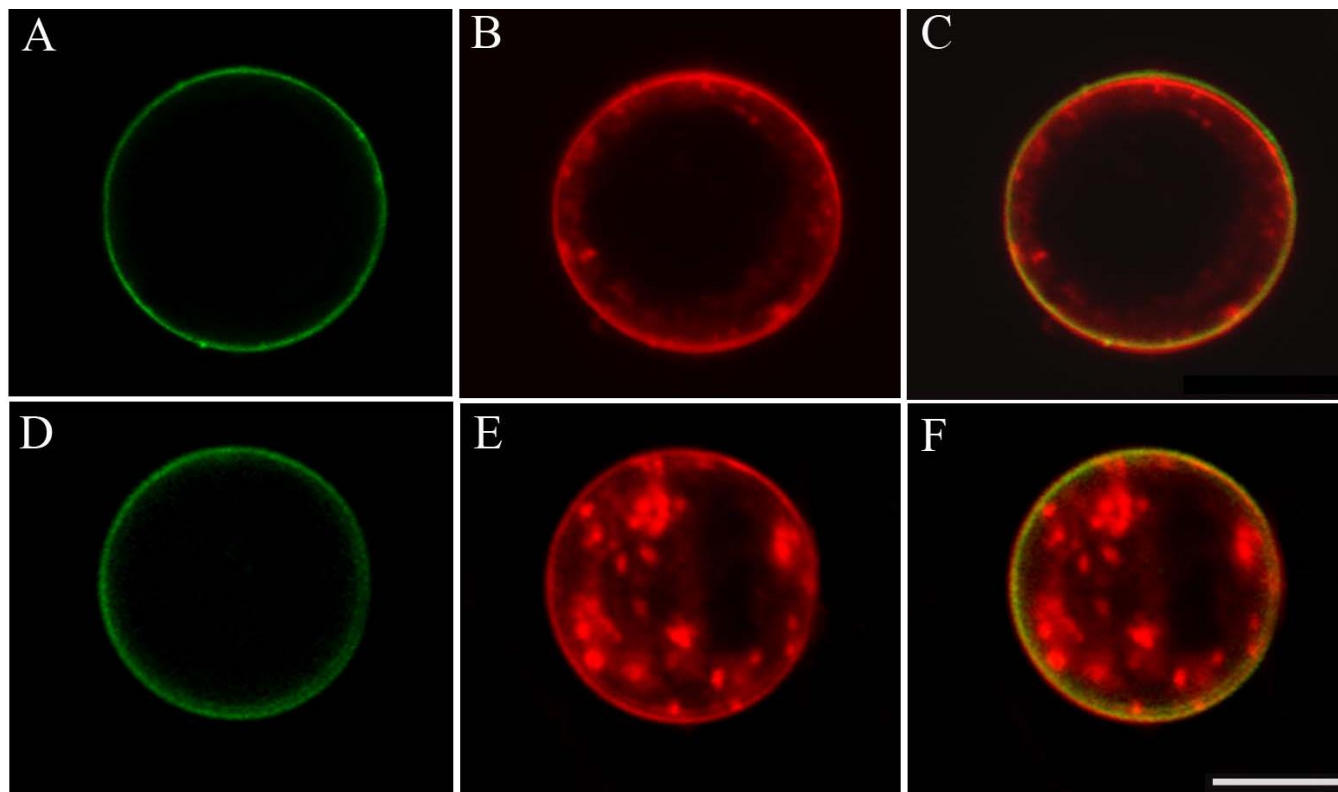
基因表达

蛋白亚细胞定位

蛋白活性检测

蛋白间相互作用

蛋白亚细胞定位



拟南芥研究常用网站:

1. NCBI <http://www.ncbi.nlm.nih.gov/>

NCBI

Resources

How To

Sign in to NCBI

NCBI

National Center for Biotechnology Information

All Databases

Search

NCBI Home

Resource List (A-Z)

All Resources

Chemicals & Bioassays

Data & Software

DNA & RNA

Domains & Structures

Genes & Expression

Genetics & Medicine

Genomes & Maps

Homology

Literature

Proteins

Sequence Analysis

Taxonomy

Training & Tutorials

Variation

Welcome to NCBI

The National Center for Biotechnology Information advances science and health by providing access to biomedical and genomic information.

[About the NCBI](#) | [Mission](#) | [Organization](#) | [Research](#) | [NCBI News](#)

Get Started

- [Tools](#): Analyze data using NCBI software
- [Downloads](#): Get NCBI data or software
- [How Tos](#): Learn how to accomplish specific tasks at NCBI
- [Submissions](#): Submit data to GenBank or other NCBI databases

NCBI YouTube channel

Learn how to get the most out of NCBI tools and databases with video tutorials on the NCBI YouTube Channel.

GO

YouTube

Popular Resources

[PubMed](#)

[Bookshelf](#)

[PubMed Central](#)

[PubMed Health](#)

[BLAST](#)

[Nucleotide](#)

[Genome](#)

[SNP](#)

[Gene](#)

[Protein](#)

[PubChem](#)

NCBI Announcements

New NCBI Insights blog post: Designing exon-specific primers for the human genome

Dec 2, 2014

NCBI to hold two-day genomics hackathon in January

Nov 26, 2014

From January 5th to 7th, NCBI will host a

NCBI BioSample includes curated list of over 400 known misidentified and contaminated cell lines

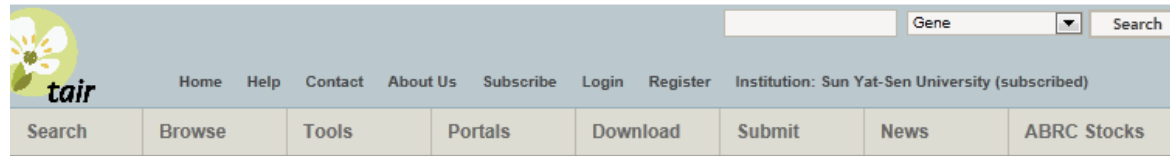
Nov 24, 2014

[More...](#)



2. tair (The Arabidopsis Information Resource)

<http://www.arabidopsis.org/>



The Arabidopsis Information Resource

The poster is for the 'INTERNATIONAL CONFERENCE ON ARABIDOPSIS RESEARCH ICAR 2018'. It features a green background with a stylized green plant in the center. The text '25 - 29 June 2018' and 'Turku · Finland' is in green. The website 'icar2018.arabidopsisresearch.org' is at the bottom left. The ICAR 2018 logo is on the right, with '29TH INTERNATIONAL CONFERENCE ON ARABIDOPSIS RESEARCH' written below it.

About TAIR

The Arabidopsis Information Resource (TAIR) maintains a database of genetic and molecular biology data for the model higher plant *Arabidopsis thaliana*. Data available from TAIR includes the complete genome sequence along with gene structure, gene product information, gene expression, DNA and seed stocks, genome maps, genetic and physical markers, publications, and information about the Arabidopsis research community. Gene product function data is updated every week from the latest published research literature and community data submissions. TAIR also provides extensive linkouts from our data pages to other Arabidopsis resources.

The Arabidopsis Biological Resource Center at The Ohio State University collects, reproduces, preserves and distributes seed and DNA resources of *Arabidopsis thaliana* and related species. Stock information and ordering for the ABRC are fully integrated into TAIR.

Breaking News

12th public release of TAIR@Phoenix data

[Oct 2, 2017]
12th public release of data curated under TAIR's subscription-based funding model. Files contain new publications, annotations, gene symbols and other data through September 30, 2016.

Mark your calendars

[Oct 2, 2017]
ICAR 2018 will be in Turku, Finland on June 25 - 29, 2018. Save the date!

Featured Paper

[Sep 14, 2017]
Long Y., et al., (2017) In vivo FRET-FLIM reveals cell-type-specific protein interactions in Arabidopsis roots
DOI: [10.1038/nature23317](https://doi.org/10.1038/nature23317)

Missed our Latest Newsletter?

[Aug 24, 2017]
[It's available here](#) New tools, new data, and more.

Featured Paper

[Aug 11, 2017]
Leonelli, S., et al., (2017) [Data management and best practice for plant science.](#)

11th public release of TAIR@Phoenix data

[July 3, 2017]
11th public release of data



3. 拟南芥T-DNA插入突变体

<http://signal.salk.edu/cgi-bin/tdnaexpress/>



T-DNA Express: Arabidopsis Gene Mapping Tool (Aug. 2, 2016)



ABRC: The Arabidopsis Biological Resource Center
NASC: European Arabidopsis Stock Center



