

拟南芥 *VPS30* 基因结构和功能分析

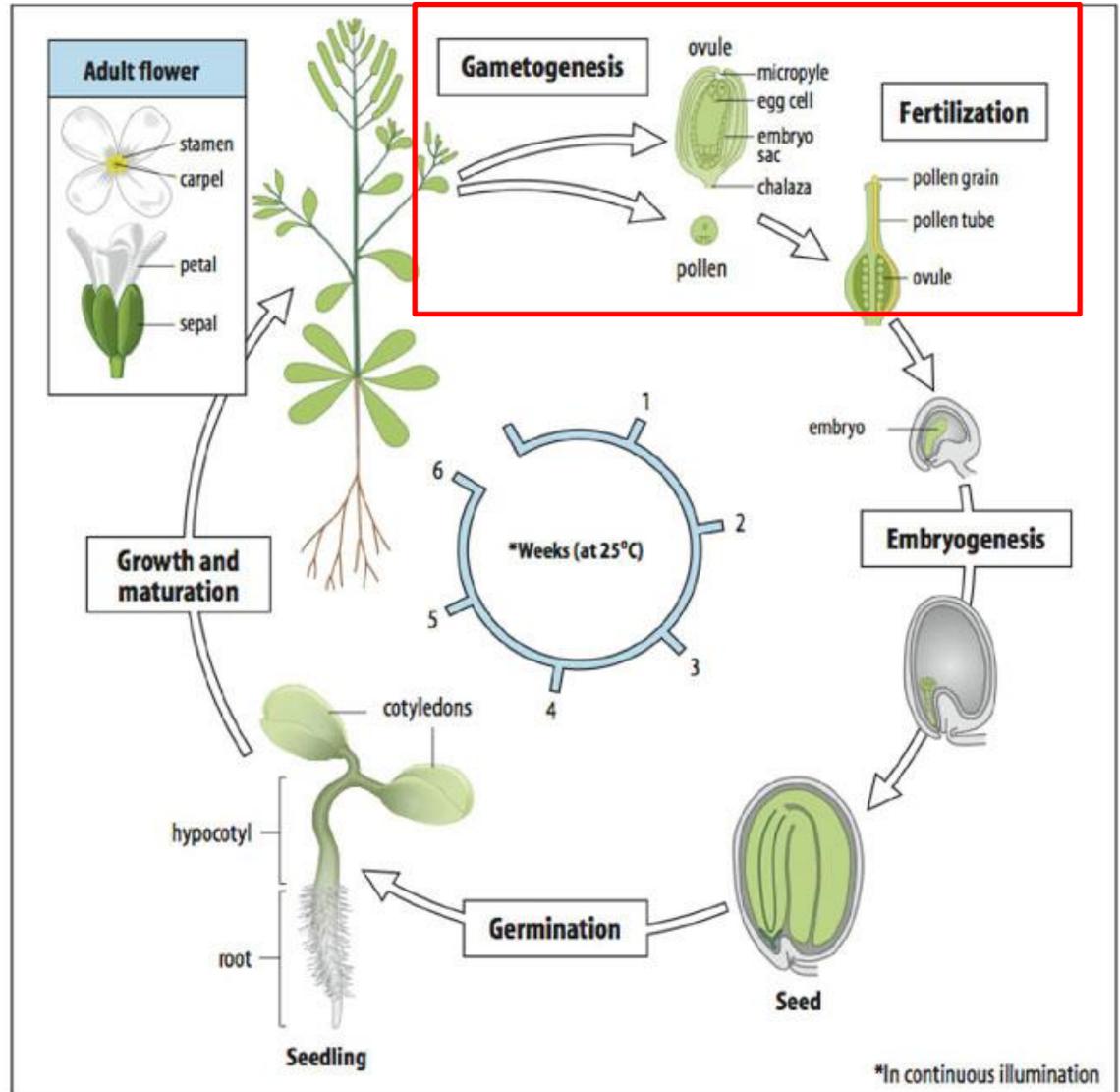
The structure and function analysis of *VPS30*
in *Arabidopsis thaliana*

徐桐
洪煜
兰子君
原荣荣

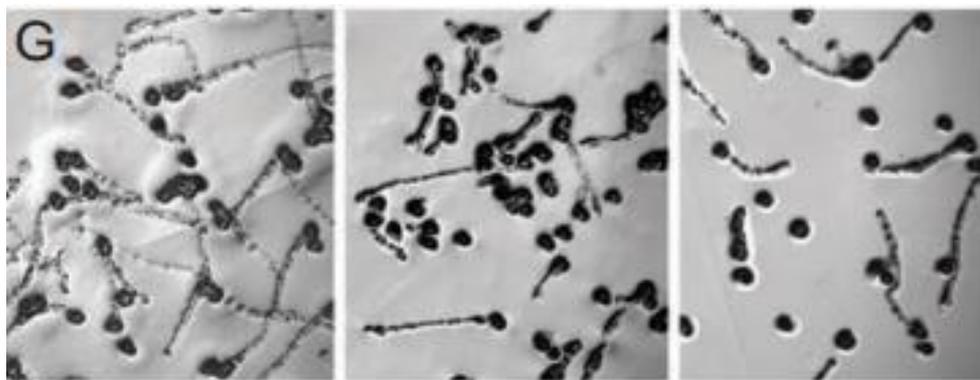
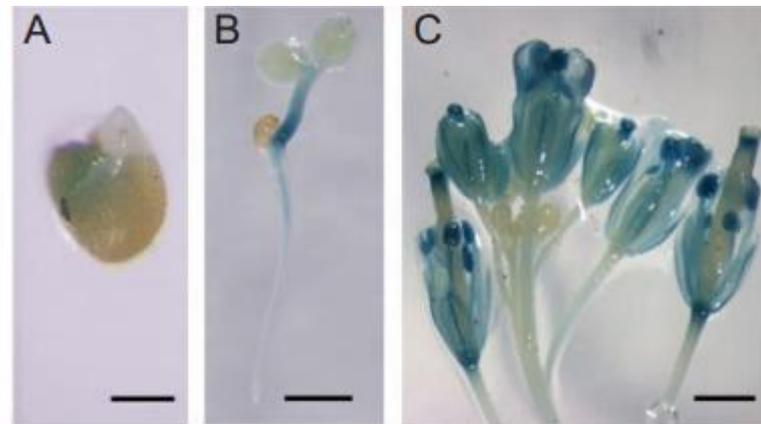
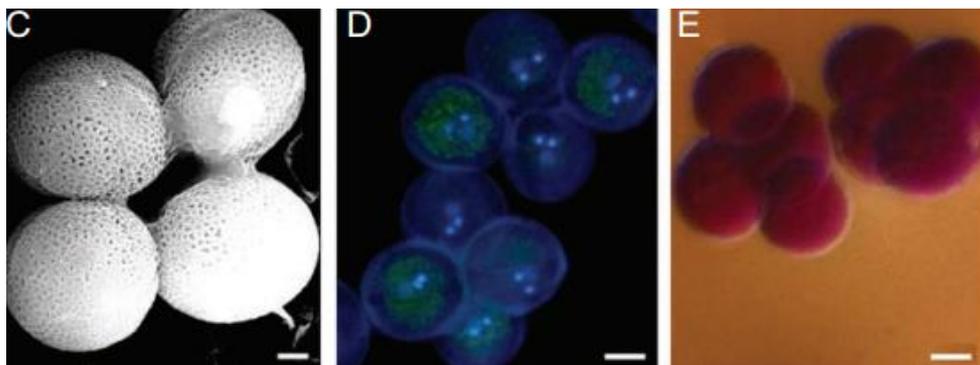
主要内容

- 背景介绍
- **VPS30**基因的基本信息分析
- **VPS30**基因的功能探索
- 总结
- 致谢

拟南芥生活史



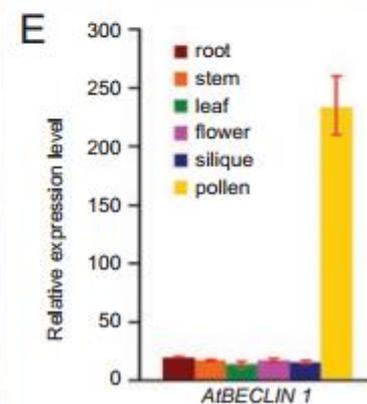
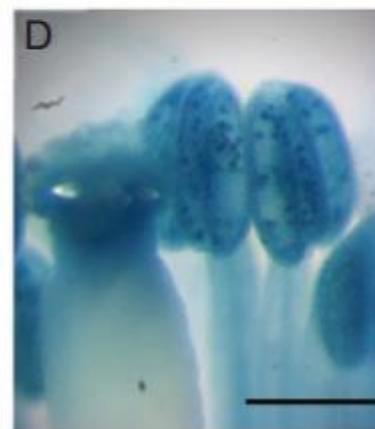
VPS30 基因的发现



wild-type

+/*bcl1*

SALK_109281



The phenotype of +/*bcl1*

The expression pattern of *VPS30*

VPS30基本信息检索

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Locus: AT3G61710 [Add a Comment](#)

Representative Gene Model [AT3G61710.1](#)

Gene Model Type protein_coding

Other names: ATATG6, ATBECLIN1, ATG6, AUTOPHAGY 6, BECLIN1

Description [?](#) Encodes autophagy protein 6 (ATG6), required for pollen germination and plant development.

Other Gene Models [AT3G61710.2](#) [AT3G61710.3](#)
(splice variant) (splice variant)

Map Detail Image

Chr3:22839315..22842432

22840k 22841k 22842k

Protein Coding Gene Models

- AT3G61710.1 (ATG6, ATATG6, BECLIN1, AtBECLIN1)
- AT3G61710.3 (BECLIN1, AtBECLIN1)
- AT3G61710.2 (BECLIN1, AtBECLIN1)

SMART预测结构域

SMART

SETUP

FAQ

ABOUT

GLOSSARY

WHAT'S NEW

Domains within *Arabidopsis thaliana* protein [BECN1_ARATH \(Q9M367\)](#)

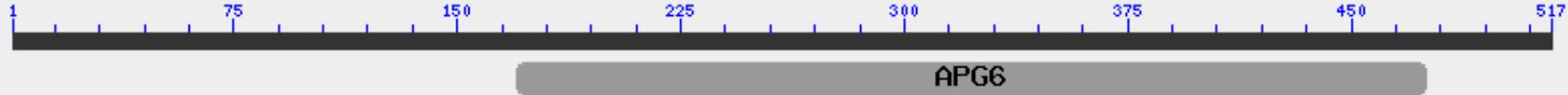
Beclin-1-like protein



APG6是一个保守的结构域，在自噬过程中起作用

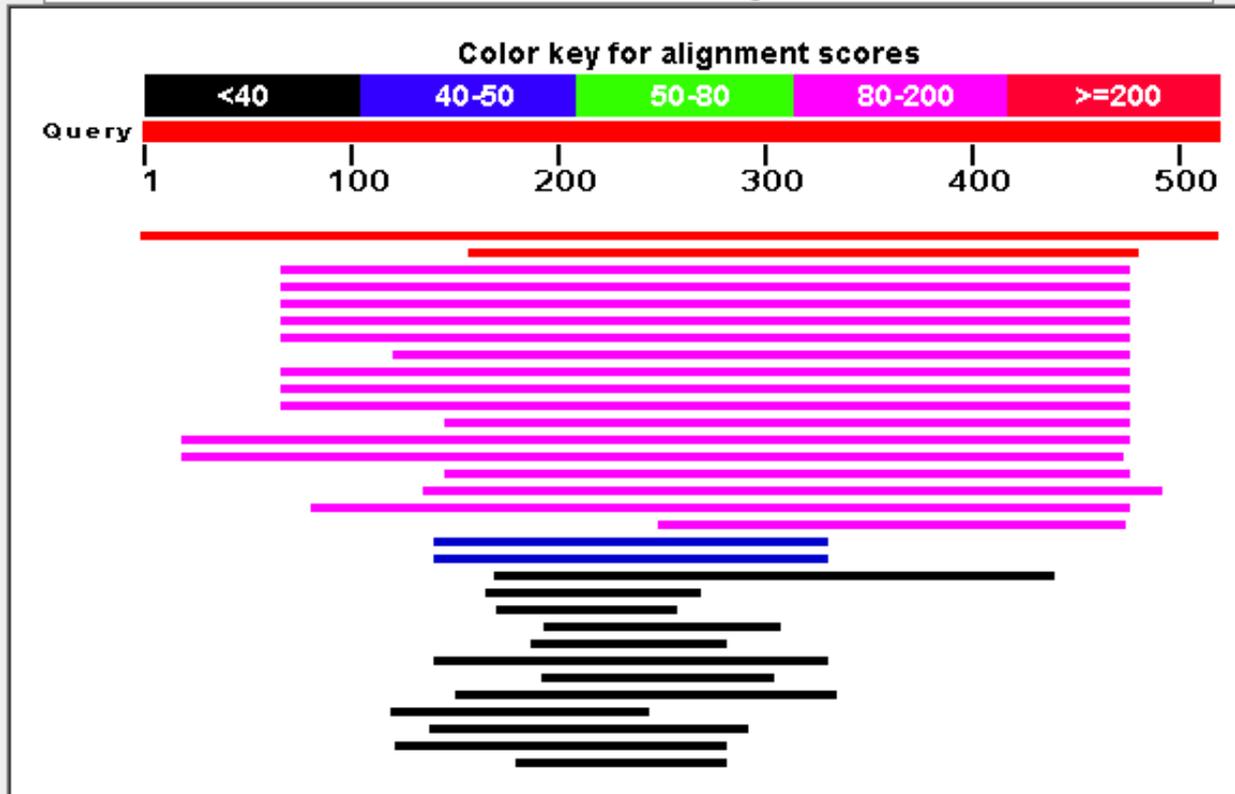
NCBI BLAST 寻找同源蛋白

Putative conserved domains have been detected, click on the image below for detailed results.

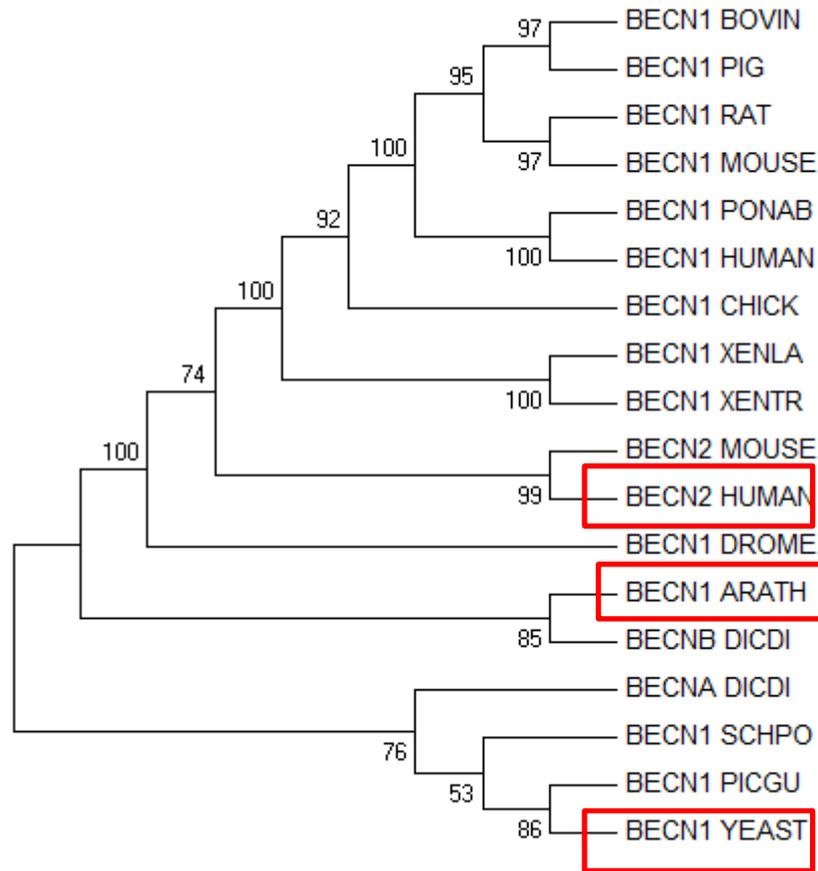


Distribution of 32 Blast Hits on the Query Sequence

Mouse-over to show define and scores, click to show alignments



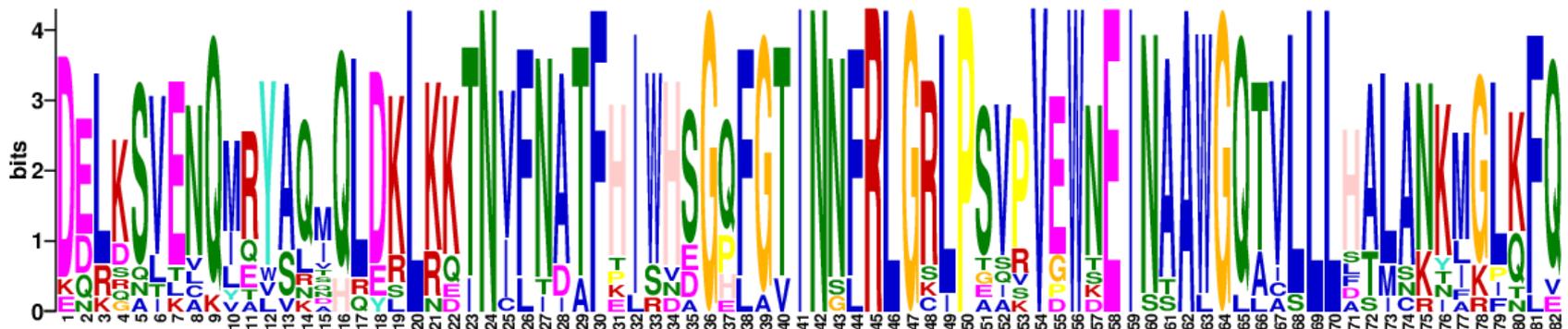
Phylogenetic tree



盘基网柄菌

MEME 预测结构域

Name ?	p-value ?	Motif Location ?
1. BECN1_BOVIN	0.00e+0	
2. BECN1_ARATH	1.64e-58	
3. BECN1_PIG	0.00e+0	
4. BECN1_RAT	0.00e+0	
5. BECN1_DROME	1.08e-101	
6. BECN1_CHICK	0.00e+0	
7. BECN1_XENLA	0.00e+0	
8. BECN1_PONAB	0.00e+0	
9. BECN1_XENTR	0.00e+0	
10. BECN1_HUMAN	0.00e+0	
13. BECN2_MOUSE	5.76e-135	
14. BECN1_MOUSE	0.00e+0	
15. BECNB_DICDI	1.09e-60	
16. BECN1_YEAST	7.09e-48	
18. BECN2_HUMAN	1.47e-161	



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[Sorting through the roles of beclin 1 in microglia and neurodegeneration.](#)

1. O'Brien CE, Wyss-Coray T.

J Neuroimmune Pharmacol. 2014 Jun;9(3):285-92. doi: 10.1007/s11481-013-9519-8. Epub 2014 Jan 3. Review.

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[Atg38 is required for autophagy-specific phosphatidylinositol 3-kinase complex integrity.](#)

2. Araki Y, Ku WC, Akioka M, May AI, Hayashi Y, Arisaka F, Ishihama Y, Ohsumi Y.

J Cell Biol. 2013 Oct 28;203(2):299-313. doi: 10.1083/jcb.201304123.

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[Role of membrane association and Atg14-dependent phosphorylation in beclin-1-mediated autophagy.](#)

3. Fogel AI, Dlouhy BJ, Wang C, Ryu SW, Neutzner A, Hasson SA, Sideris DP, Abeliovich H, Youle RJ. Mol Cell Biol. 2013 Sep;33(18):3675-88. doi: 10.1128/MCB.00079-13. Epub 2013 Jul 22.

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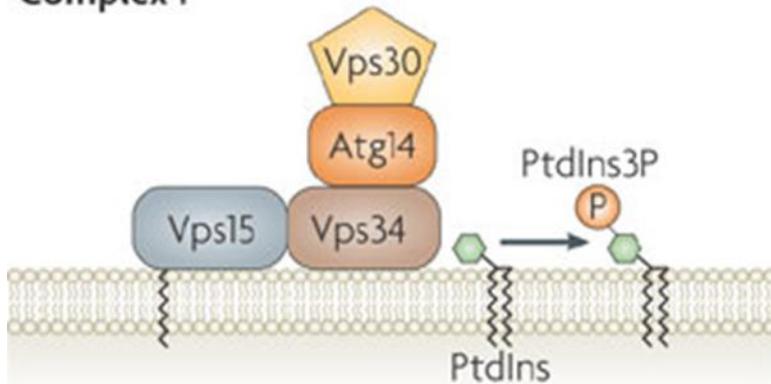
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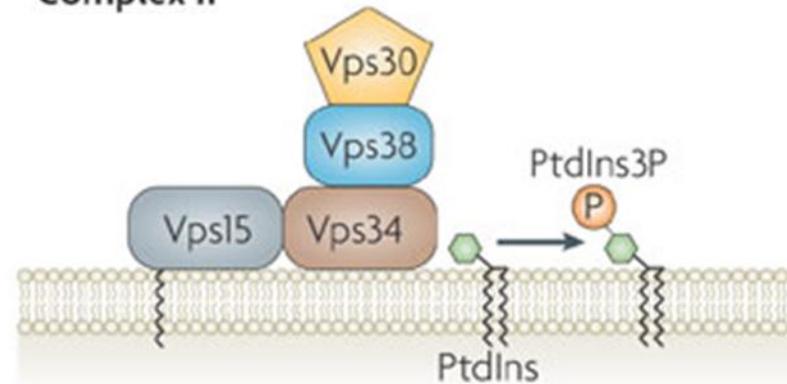
4. Huang S, Jia K, Wang Y, Zhou Z, Levine B.

VPS30在酵母中的工作模型

Complex I



Complex II



Downstream effectors

Atg18–Atg2
Atg12–Atg5–Atg16
Atg9
Atg27

Biological response

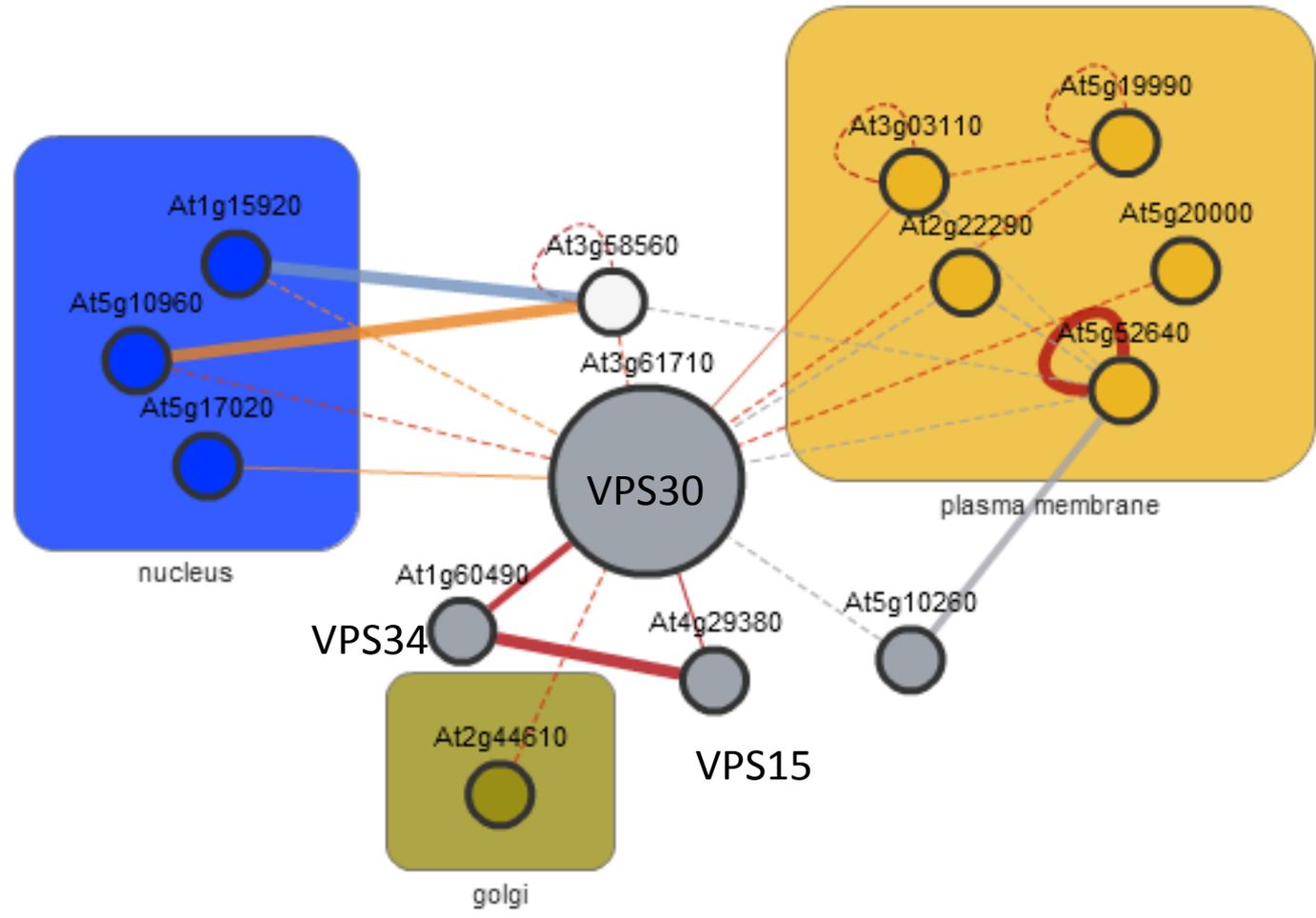
Autophagy

Nature Reviews | [Molecular Cell Biology](#)

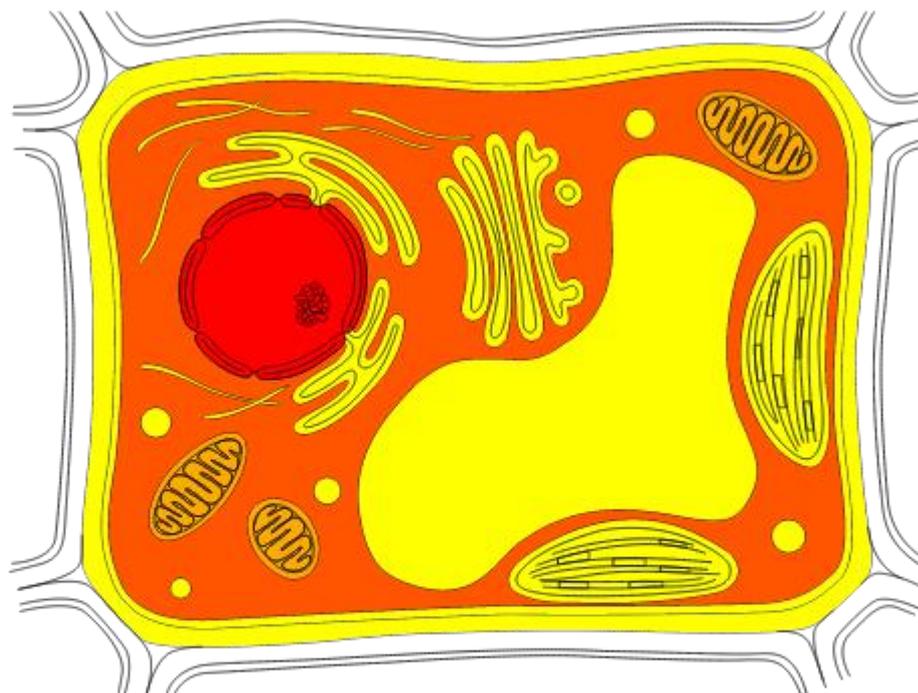
Vps27 (FYVE)
Vps5 (PX)
Vps17 (PX)
Vps29

Vacuole protein
sorting

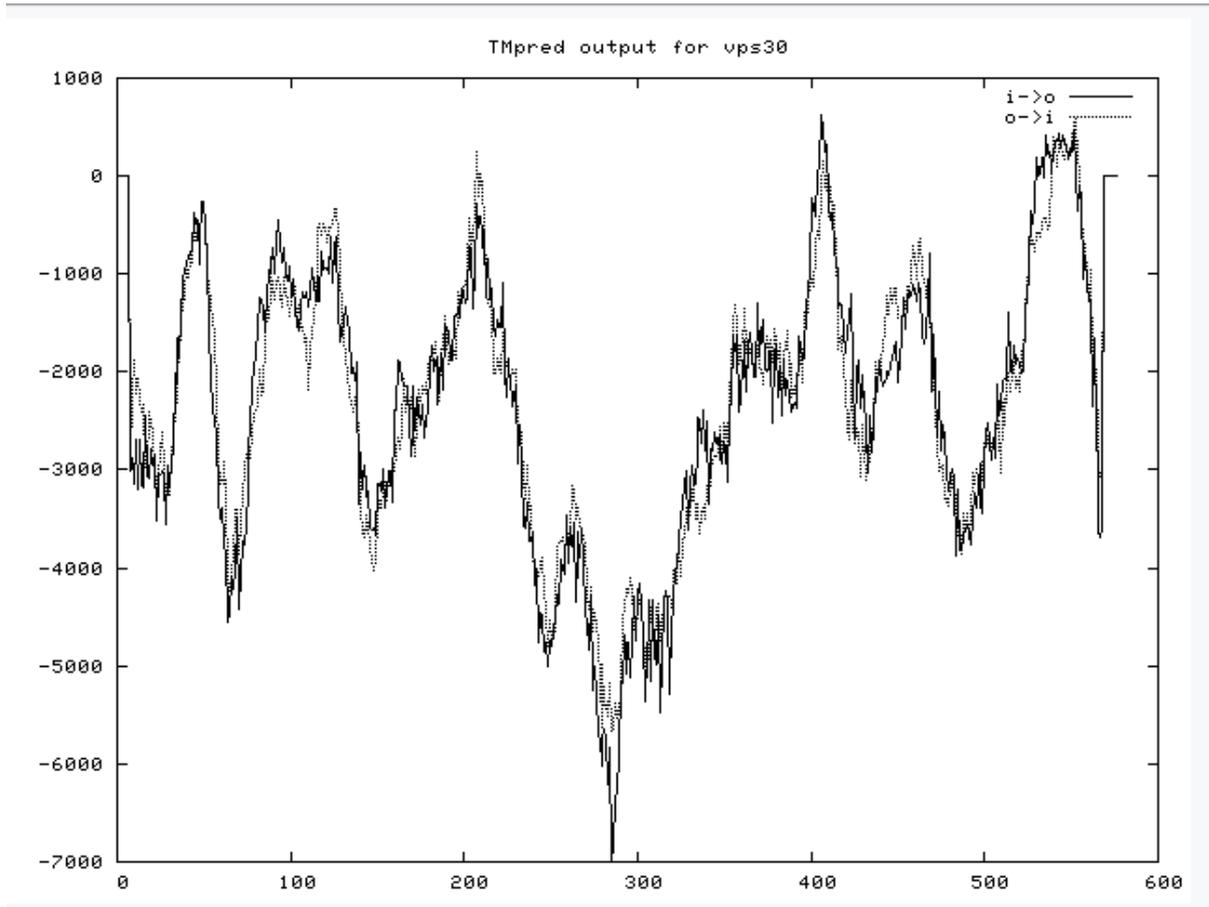
互作蛋白预测



亚细胞定位分析



Tmpred 预测跨膜结构域



VPS30 不含跨膜结构域

SWISS-MODEL 同源模建

Model Summary:



Model information:

Modelled residue range:

285 to 478

Based on template:

4ddpA (1.55 Å) Template (4ddp): MONOMER

Sequence Identity [%]:

35.749

Evalue:

0

Quaternary structure information:

Template (4ddp): MONOMER

Model built: SINGLE CHAIN

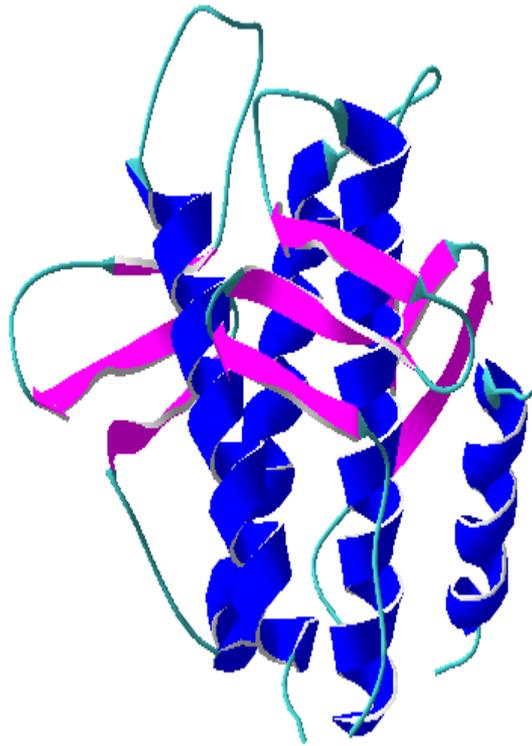
Quality information:

QMEAN Z-Score: -4.4

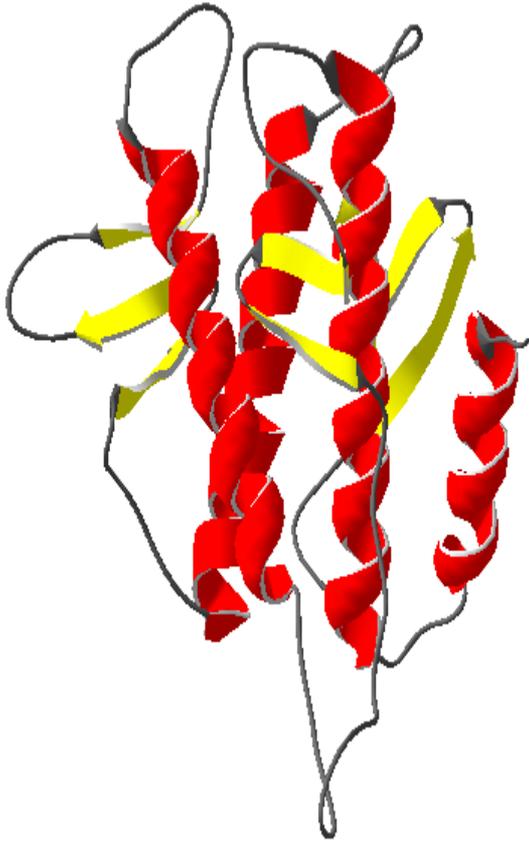
Ligand information:

Ligands in the template: none.

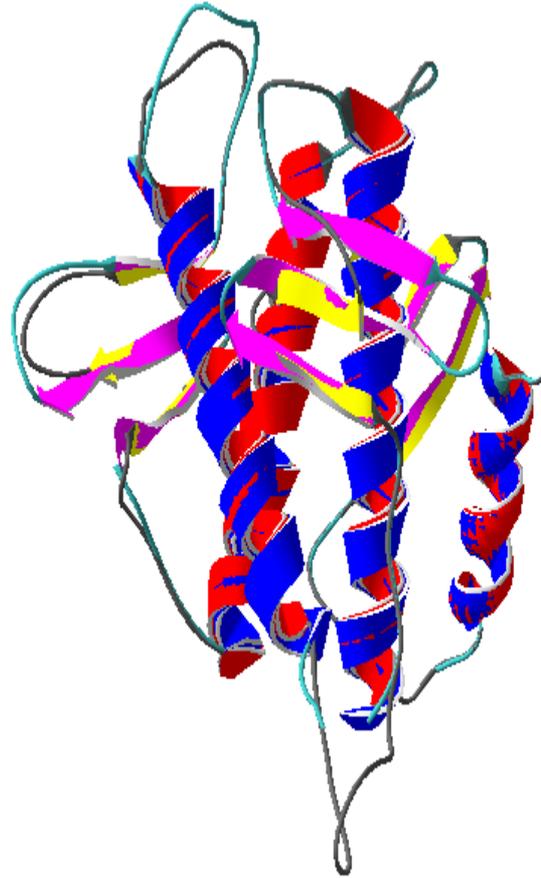
Ligands in the model: none.



C-terminal structure of Human beclin



The model of VPS30



Fit together
RMS: 0.49

总结

方法	信息	对实验的指导
文献检索	VPS30在人和酵母中与其它蛋白形成复合体，参与自噬过程	设计实验验证其在拟南芥中是否参与自噬以及是否形成复合体
定位分析	定位在细胞质和细胞核中	确定亚细胞定位
互作蛋白预测	可能与VPS34 VPS15等蛋白互作	设计实验验证互作 体外：酵母双杂等 体内：Co-IP
结构和功能域预测	C端结构域对蛋白行使自噬功能重要	设计实验验证C端功能域 截短实验 点突实验

致谢

- 感谢罗老师这学期辛苦的付出
- 感谢助教为我们讲序列比对的算法
- 感谢小组成员兰子君、徐桐、洪煜

谢谢