The bioinformatic analysis of Arabidopsis transcription factor MYB98

By G03 (Hao Lihong、 Sun Tianshu、 Yu He、 Wang Chaoyang)

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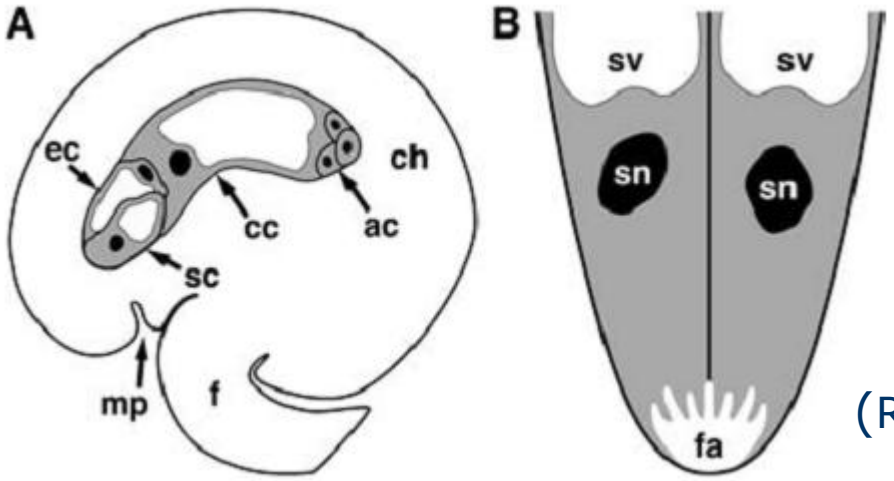
Why we are interested in MYB98



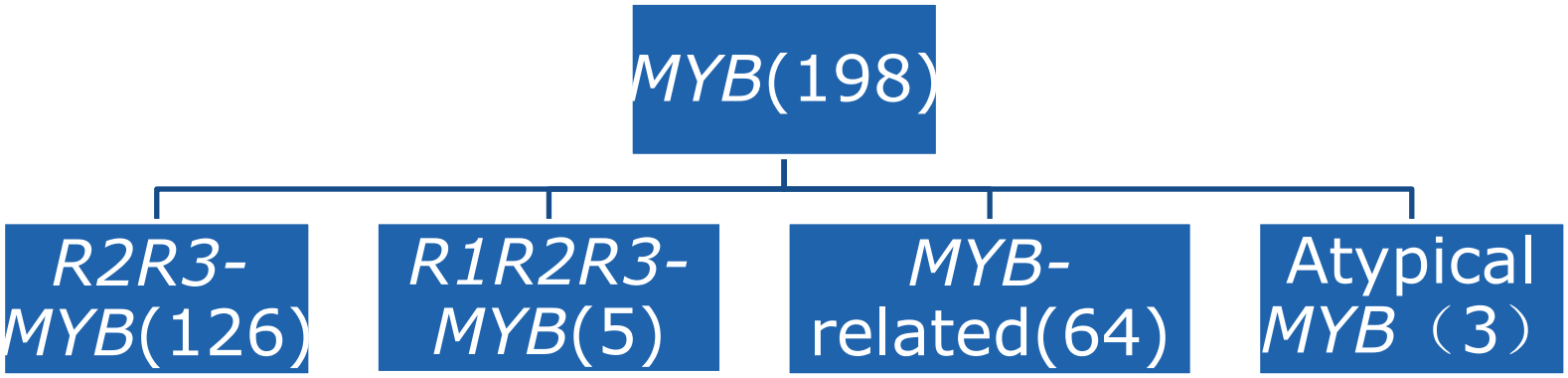
(Ryushiro D. K et al,2005)

- **Pollen tube guidance is one of the major issues about double fertilization.**
- **As we known the synergid cells play a central role during this process.**
- **MYB98 is a synergid cell-specific transcription factor who regulates many key genes involved in this process.**

MYB98 fundemental information

- **Name:At4g18770.1**
- **Length of nucleotides:1816bp**
- **Length of aa:427aa**
- **Belongs to MYB superfamily ,R2R3-MYB subfamily in *Arabidopsis thaliana***
- **Encodes a transcription factor**

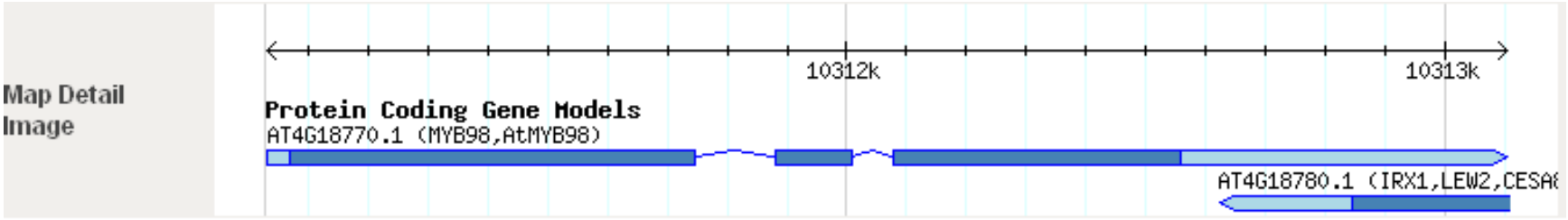
About *A.thaliana* MYB superfamily



- **MYB proteins are a superfamily of transcription factors that play regulatory roles in developmental processes and defense responses in plants.**

(Chen Yanhui et al.2006)

MYB98 gene structure



(From TAIR)

Domain prediction of MYB98 protein

Confidently predicted domains, repeats, motifs and features:

Name	Start	End	E-value
low complexity	42	72	N/A
SANT	216	265	1.61e-17
SANT	268	316	2.76e-16
low complexity	362	379	2.76e-16

SANT :"SWI3, ADA2, N-CoR and TFIIIB'' DNA-binding domains

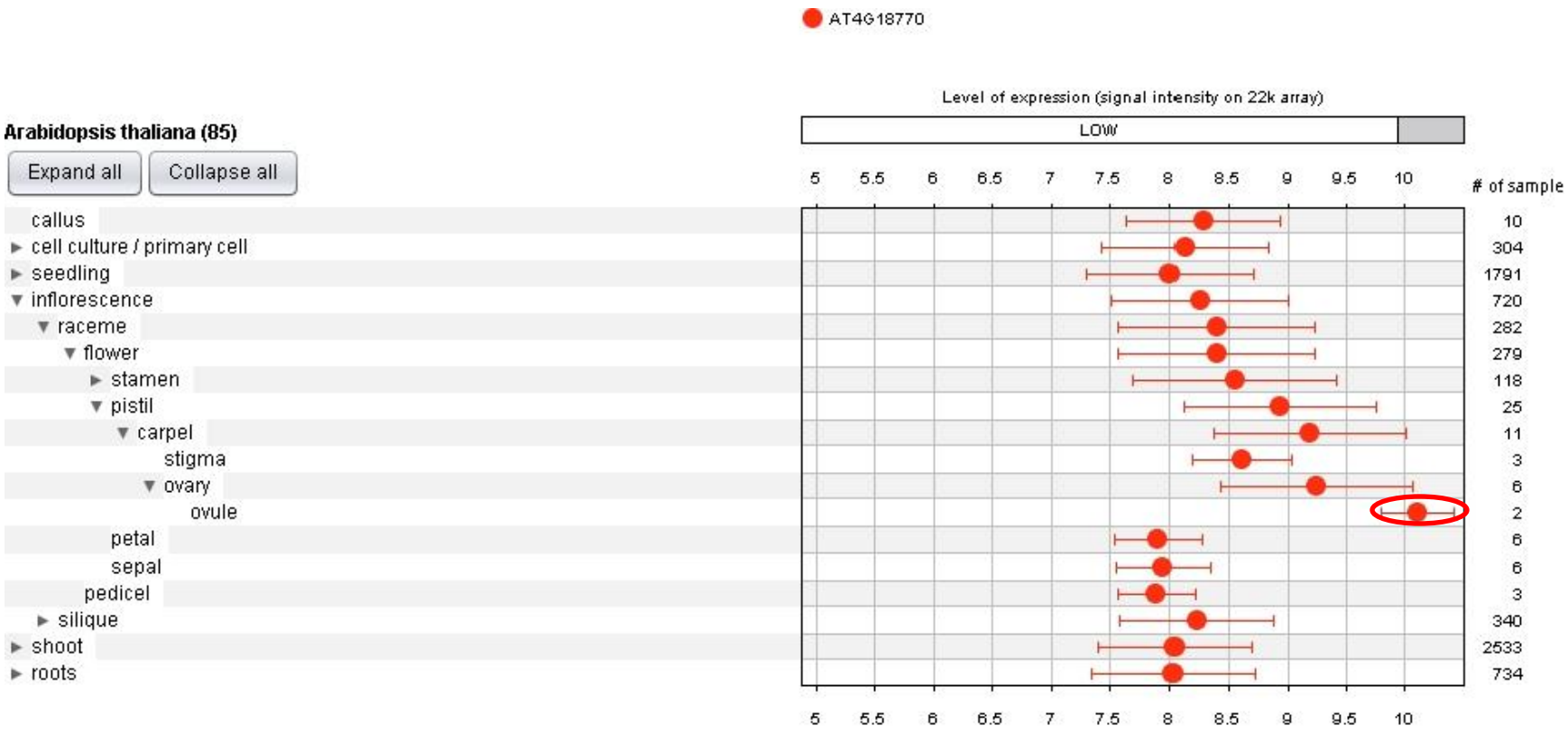
The SANT domain has a strong structural similarity to the DNA-binding domain of Myb-related proteins

Regions

☐	Domain	212 - 267	56	HTH myb-type 1
☐	Domain	268 - 318	51	HTH myb-type 2

(From Uniprot)

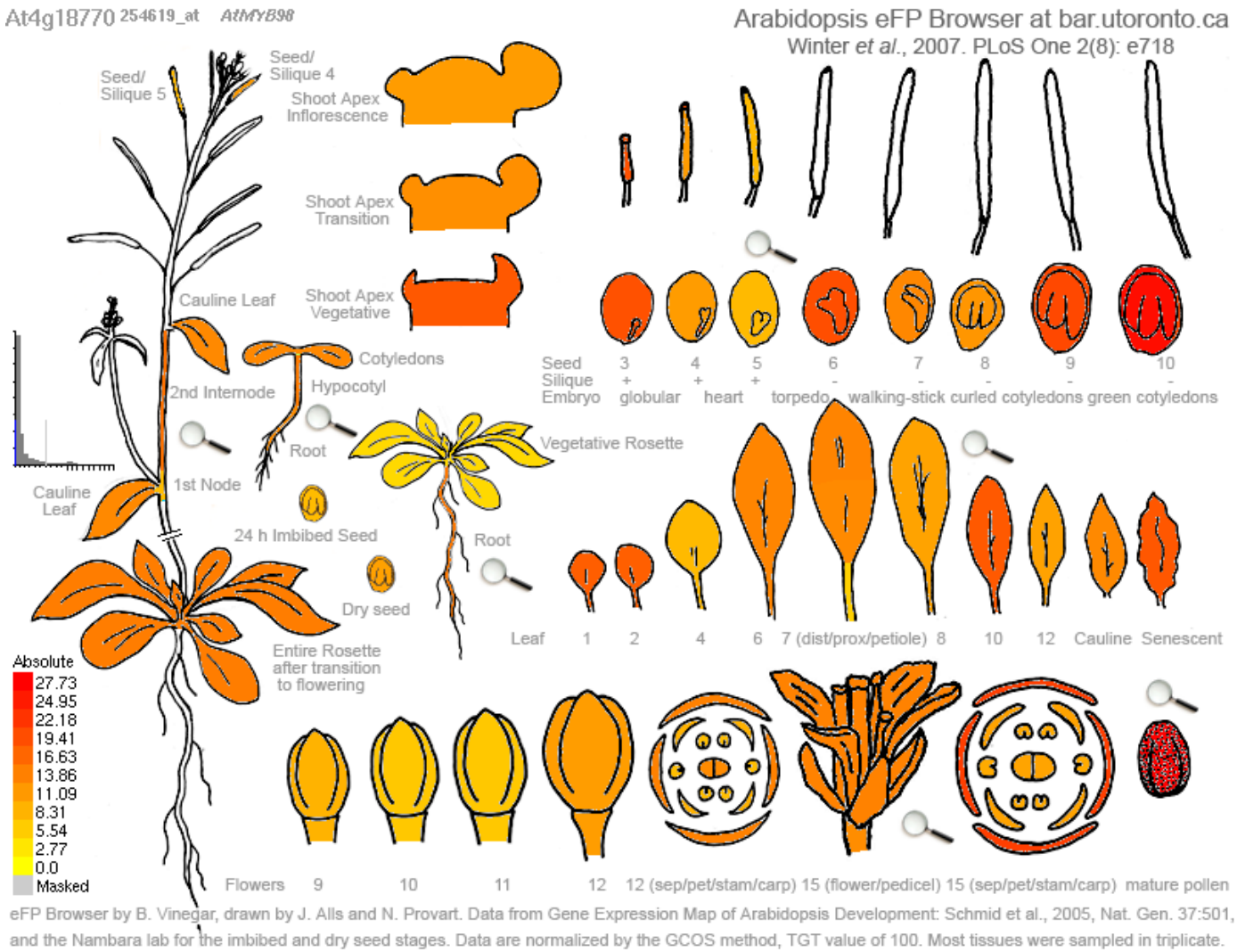
Tissue expression pattern of MYB98（1）



(From Genevestigator)

MYB98 is expressed ubiquitously among almost all the plant tissues,especially in ovule.

Tissue expression pattern of MYB98（2）



Subcellular location prediction

MYB98 details nucl: 14.0

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----- Final Results -----

                          nucleus --- Certainty= 0.760(Affirmative) < succ>
              microbody (peroxisome) --- Certainty= 0.191(Affirmative) < succ>
           mitochondrial matrix space --- Certainty= 0.100(Affirmative) < succ>
 endoplasmic reticulum (membrane) --- Certainty= 0.000(Not Clear) < succ>


----- The End -----
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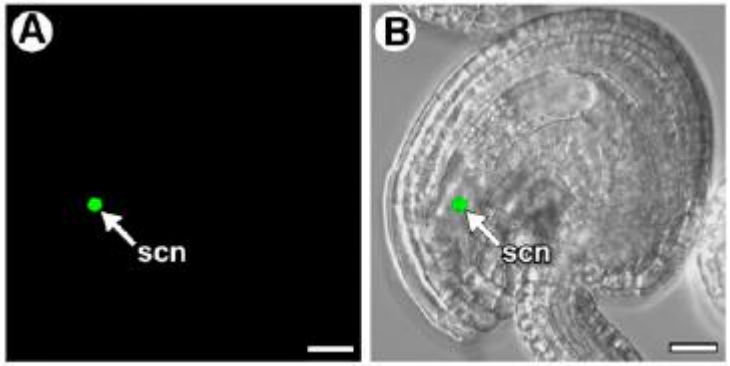
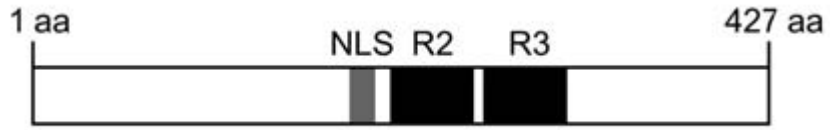
(From PSORT)



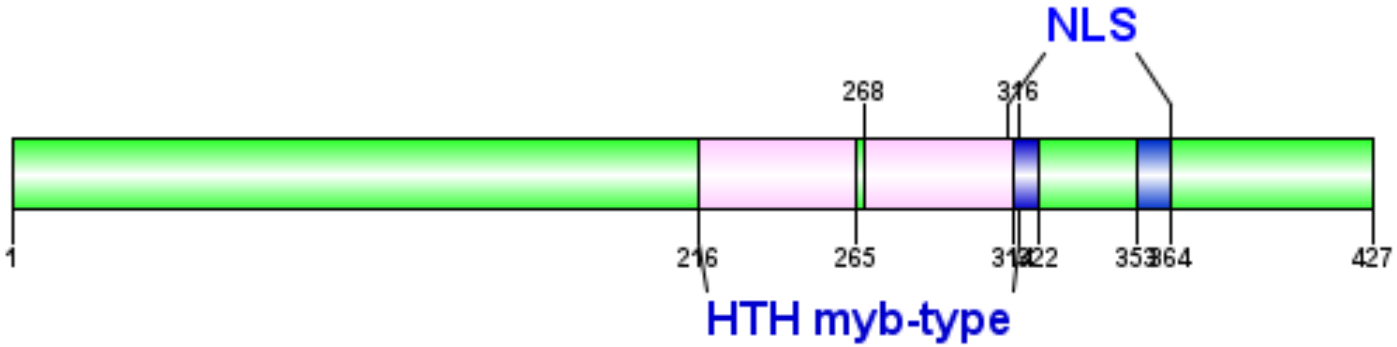
(Jayson A.Punwani et al.2007)

(By NLS tradamus)

MYB98 protein structure

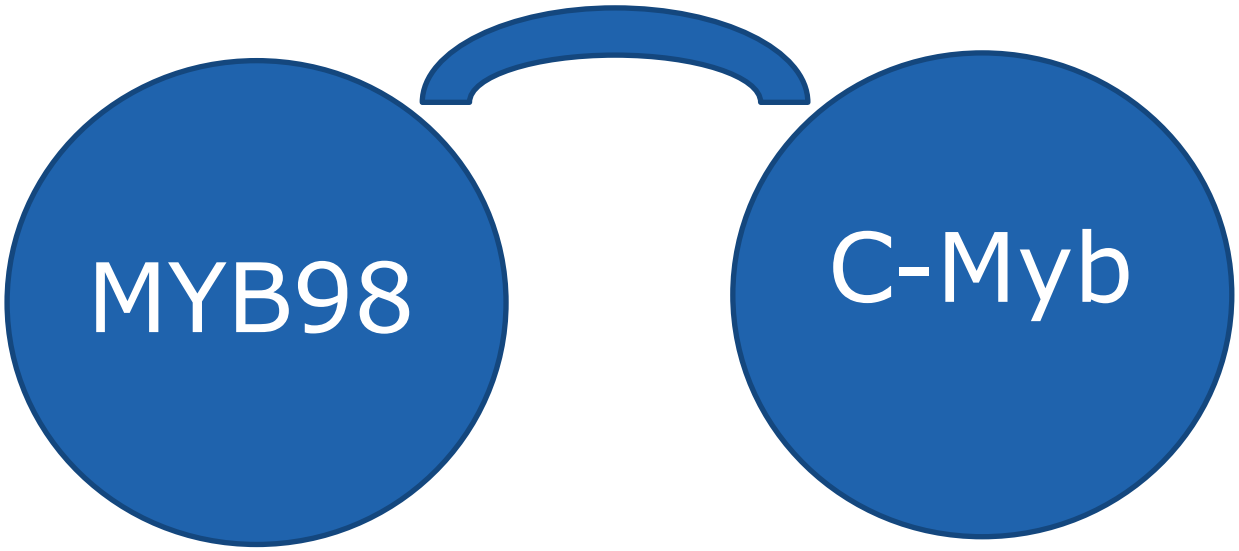


(Ryushiro D. Kasahara et al,2005)

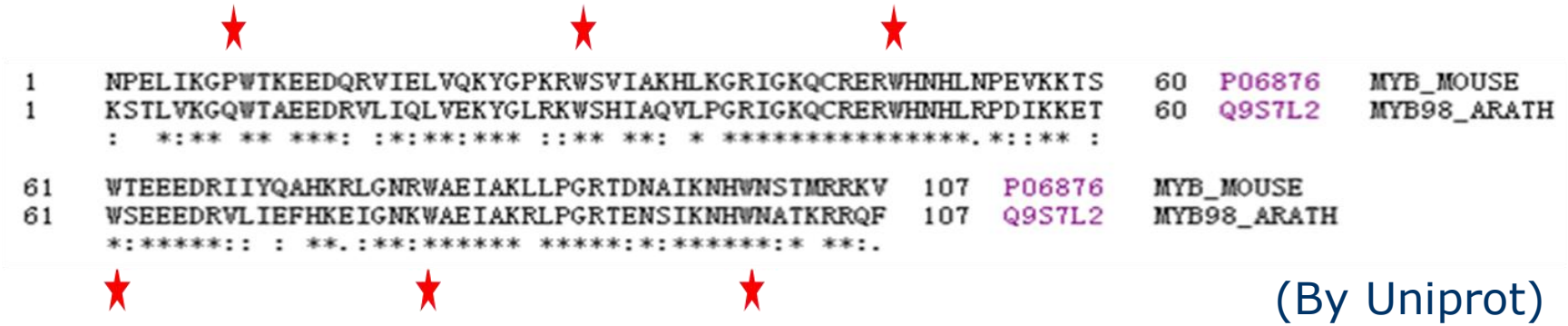


(By myself with DOG software)

Any linker



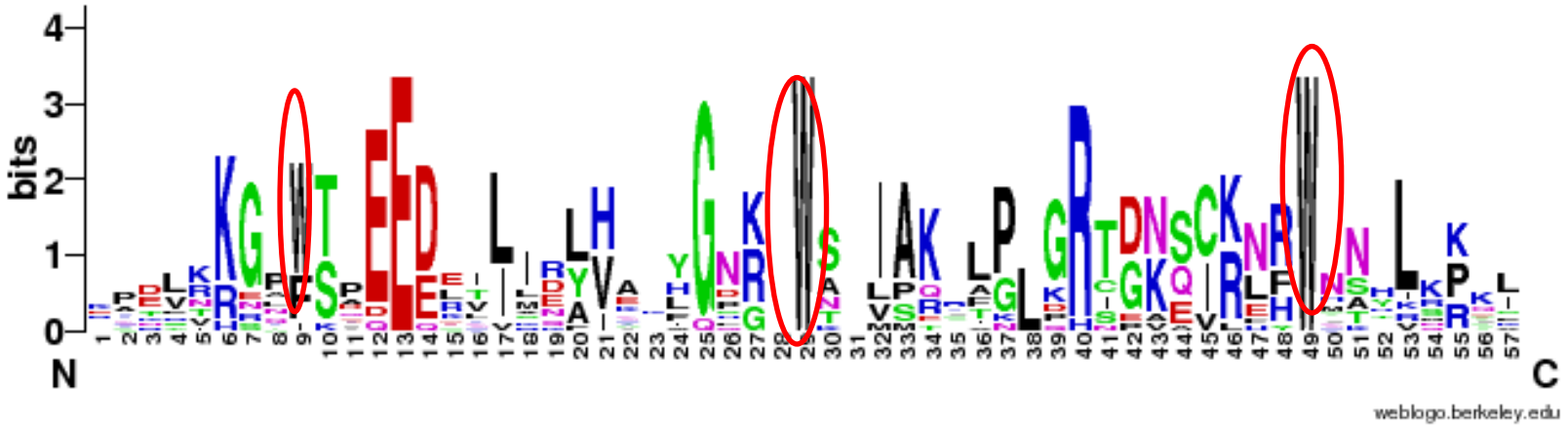
MYB98 VS. c-Myb



(By Uniprot)

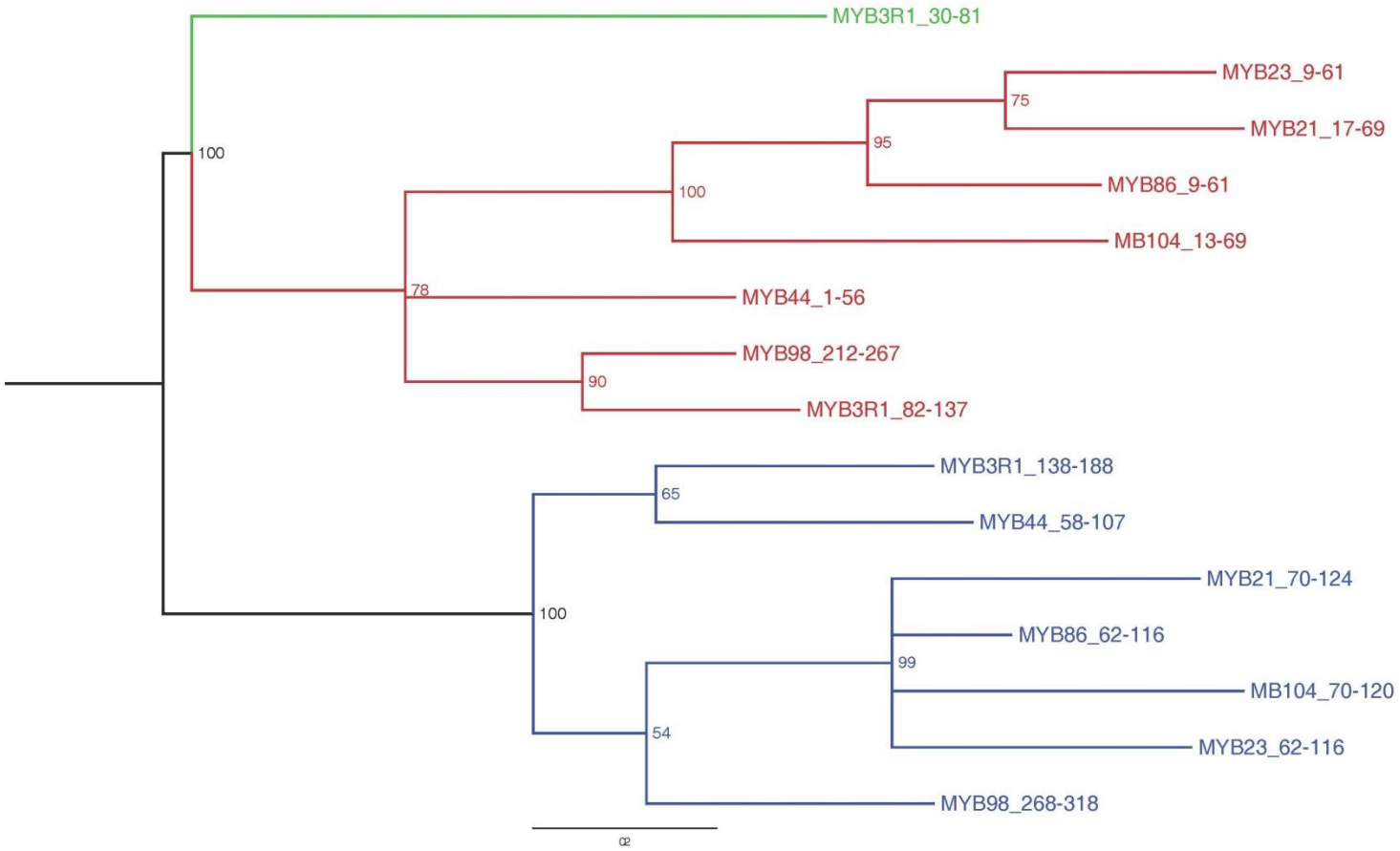
- The Myb domain is a DNA binding motif found in 1999 in the vetebrate protooncogene *c-Myb*;
- The Myb domain in c-Myb consistes of three imperfect tandem Myb repeates referred to as R1,R2 and R3;
- The Myb repeats form a hehix-turen-helix structure;
- Most plant MYB proteins contain only the R2 and R3 Myb repeats.

About the myc-repeat domain(1)



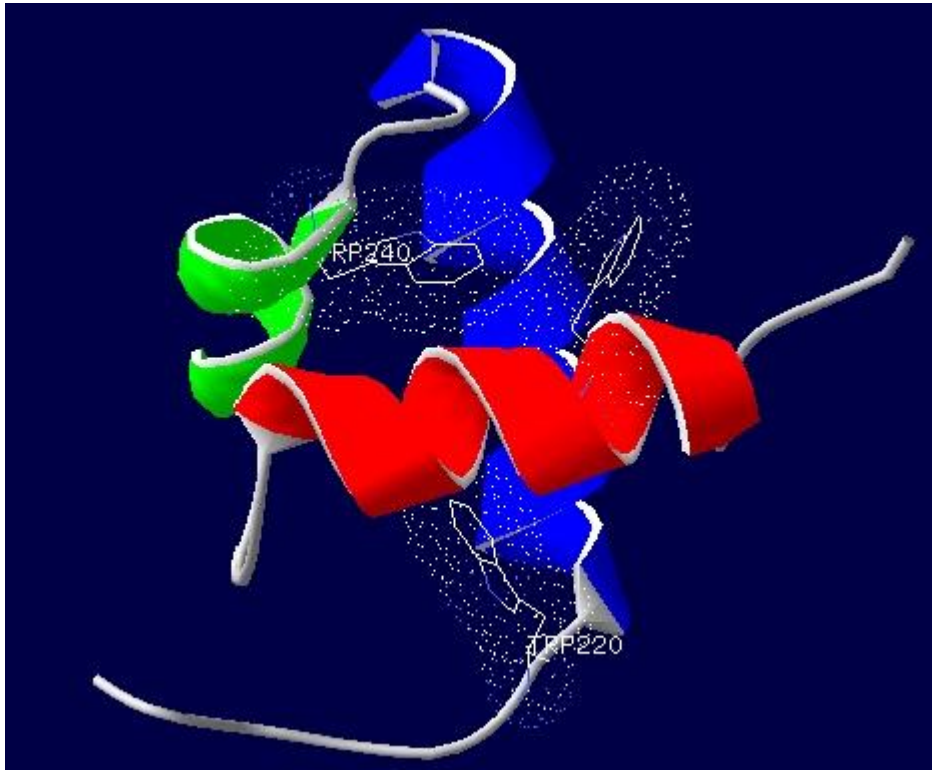
From the result ,we also can see that three trp residues are conserved.

About the myc-repeat domain(2)



While R1 forms a clade with R2,R2 and R3 separate with each other clearly.

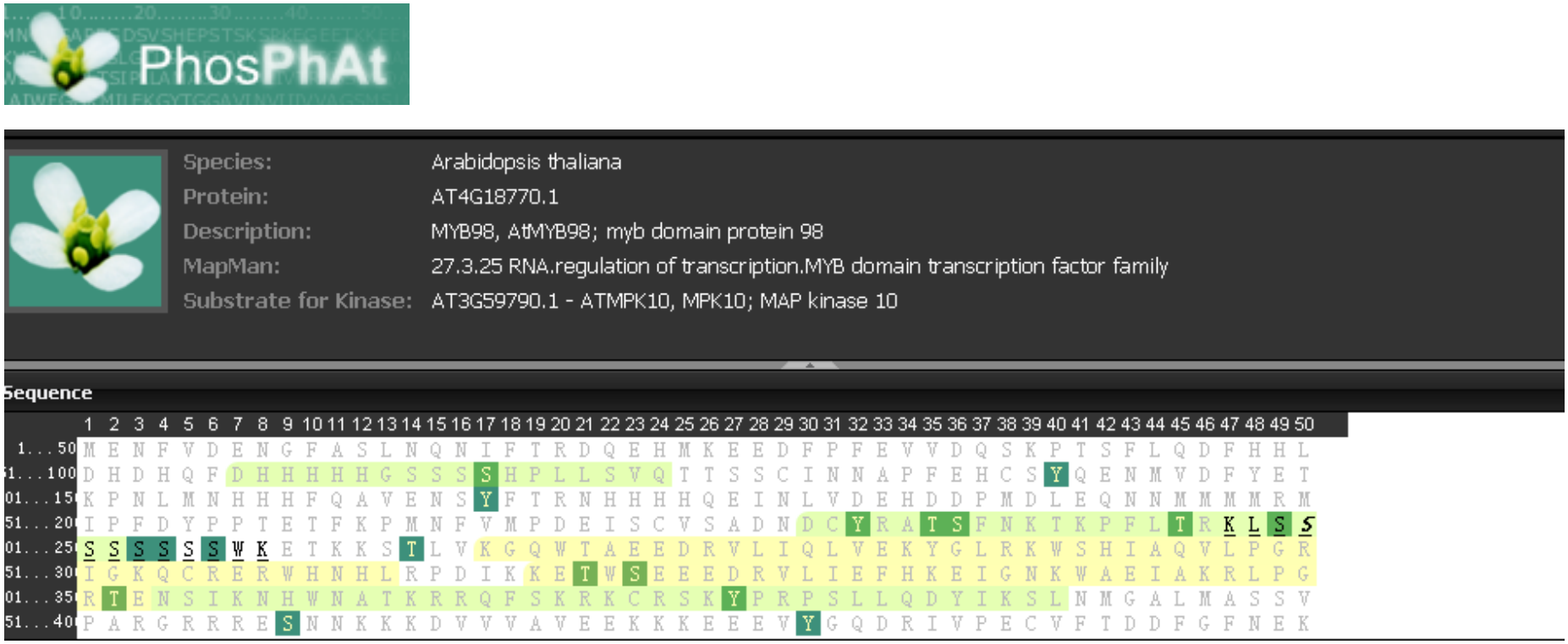
Swiss model—homology modeling



- The figure shows the structure of a single HTH Myb-type repeat,three conserved TRP residues form its hydrophobic core.
- The third helix is found to be a recognition helix.

(Ogata, K et al.1992,1994)

Phosphorylation site prediction



(From PhosPhAt)

There are many predicted serine/threonine and tyrosine sites in the MYB98 sequence.

Future work

- Try to figure out genes regulated by MYB98;
- Through dominant negative and dominant active approaches to find out the function of myb 98;
- protein-protein interaction;