

# Identification of transcription regulation associated proteins in plants and stramenopiles

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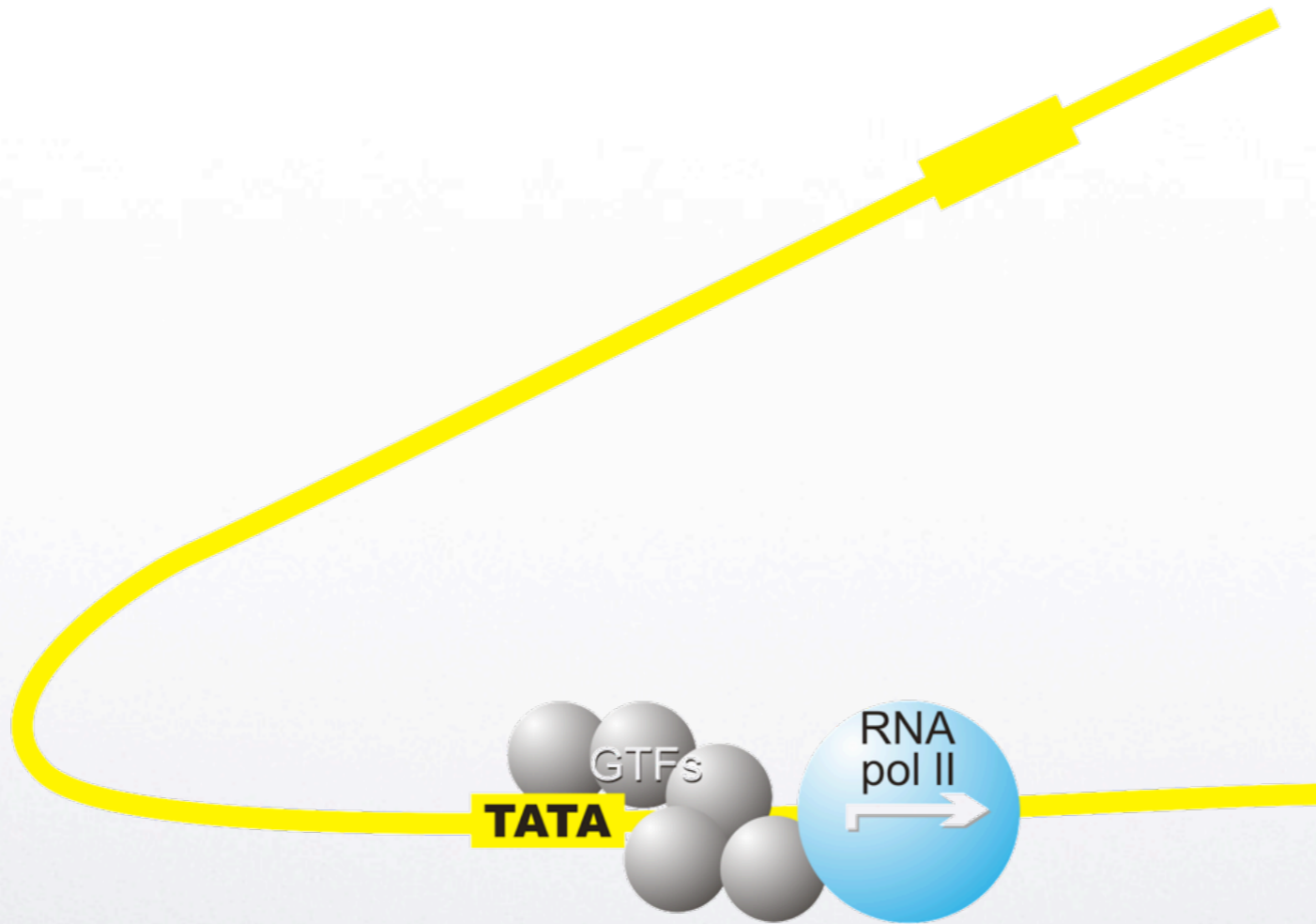
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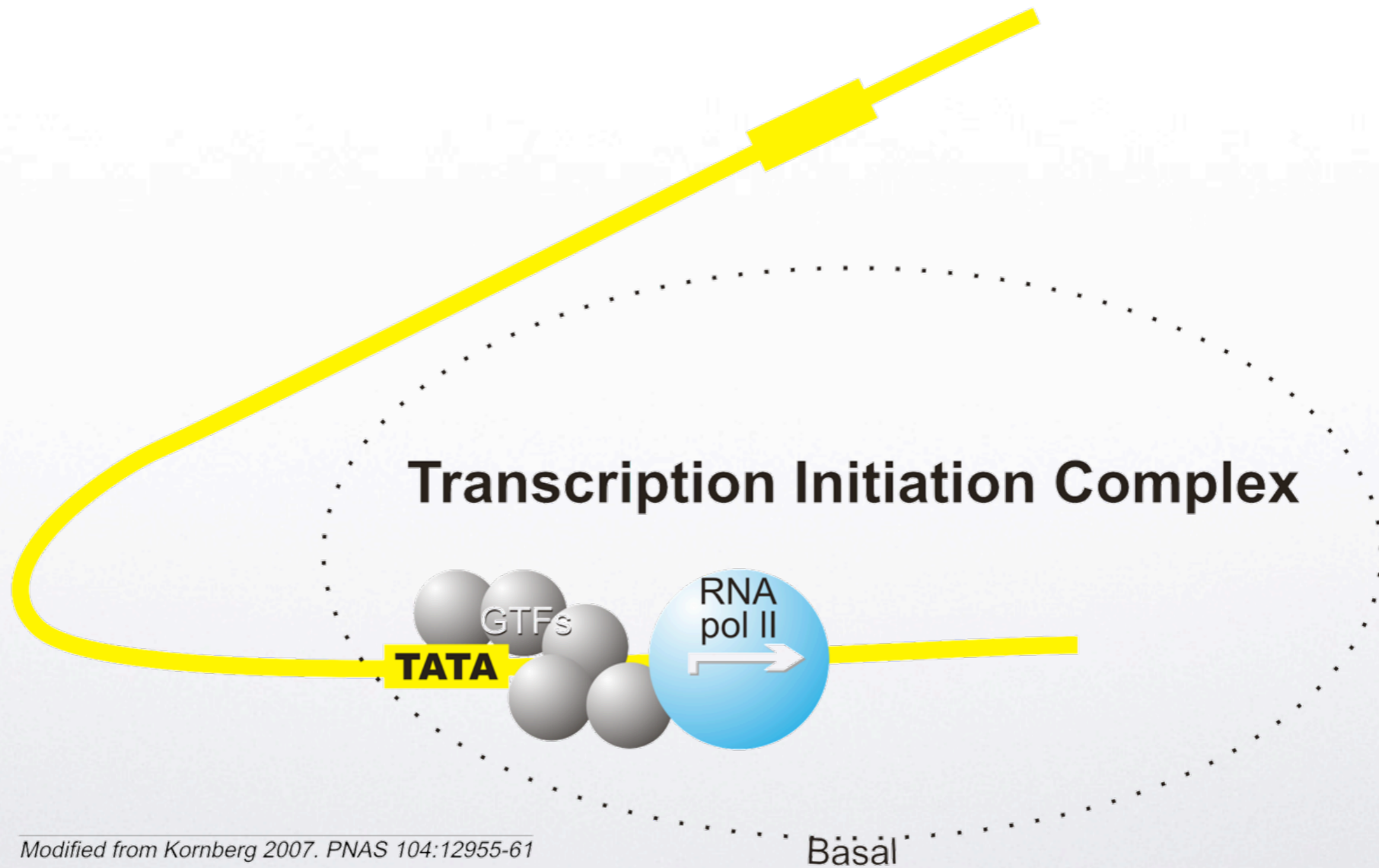
# Eukaryotic transcription



Modified from Kornberg 2007. PNAS 104:12955-61



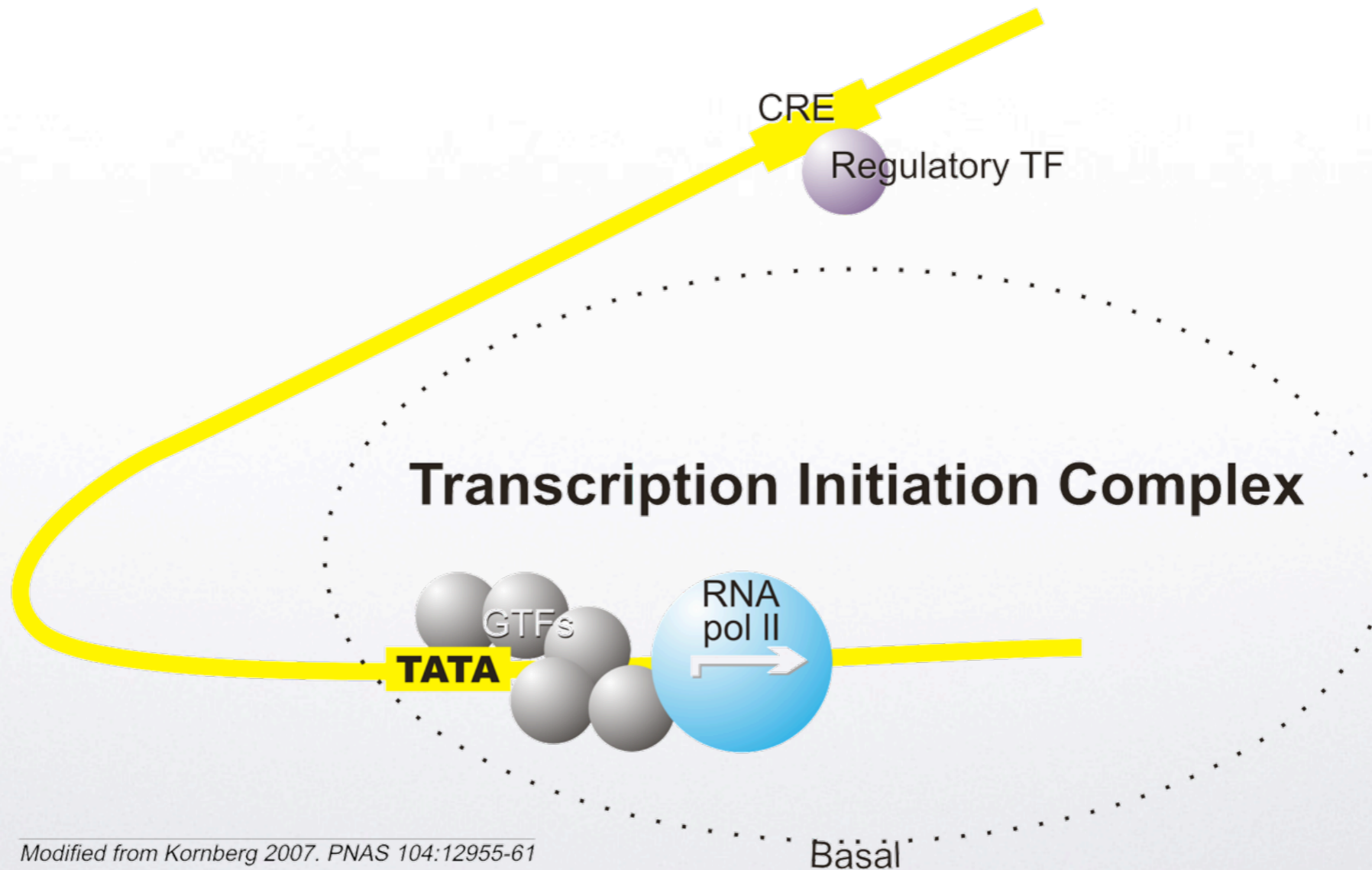
# Eukaryotic transcription



Modified from Kornberg 2007. PNAS 104:12955-61

Basal

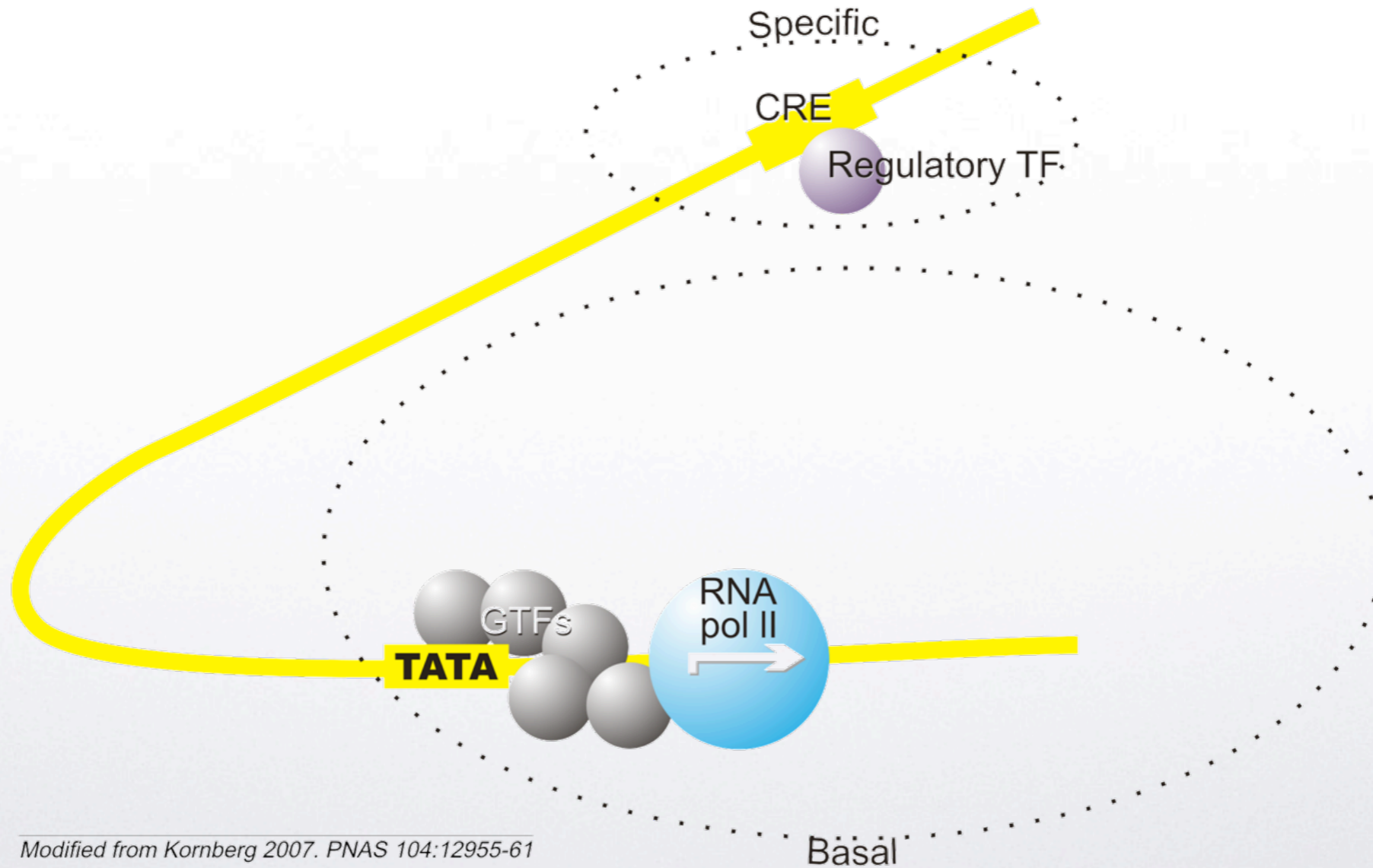
# Eukaryotic transcription



Modified from Kornberg 2007. PNAS 104:12955-61

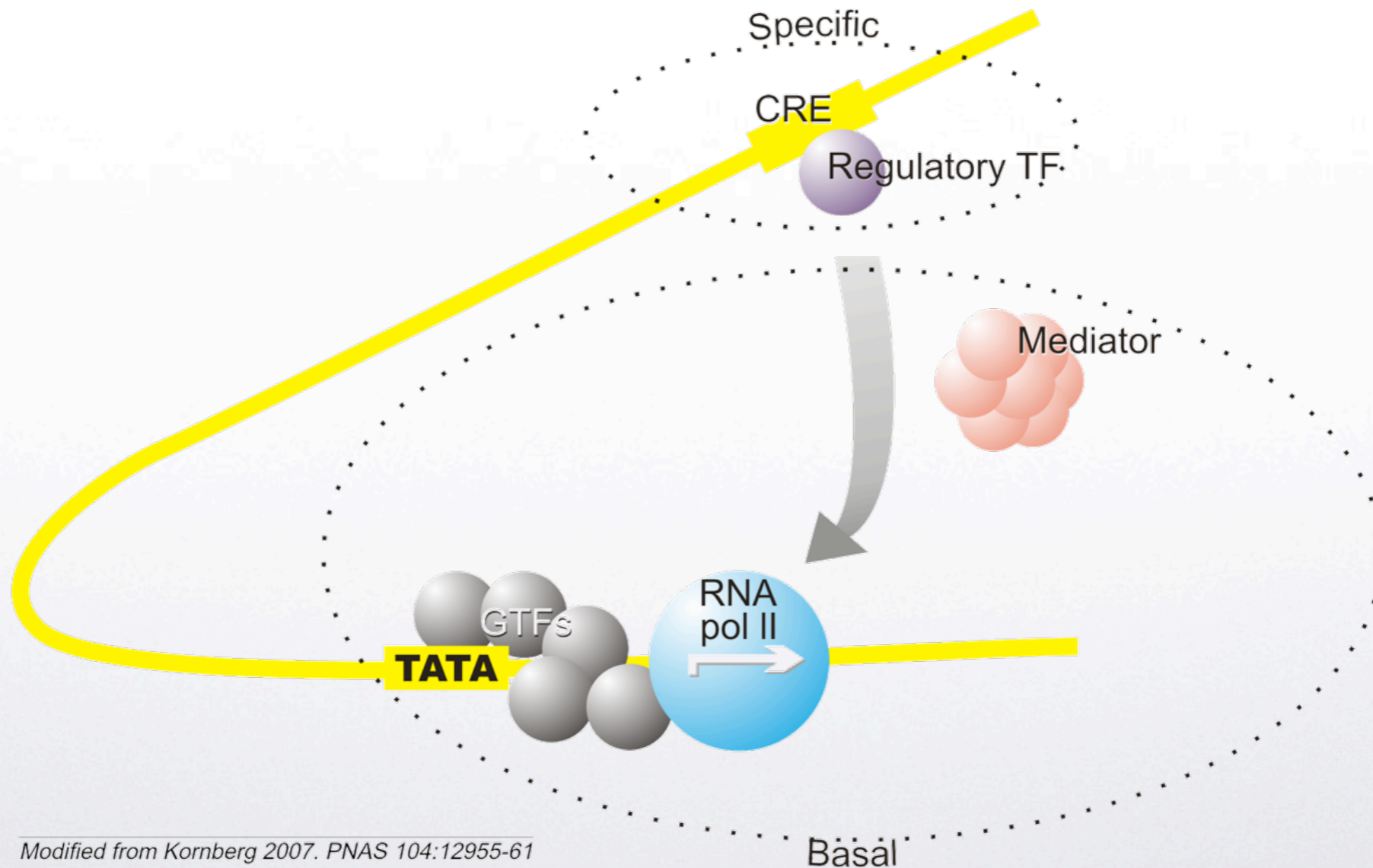


# Eukaryotic transcription



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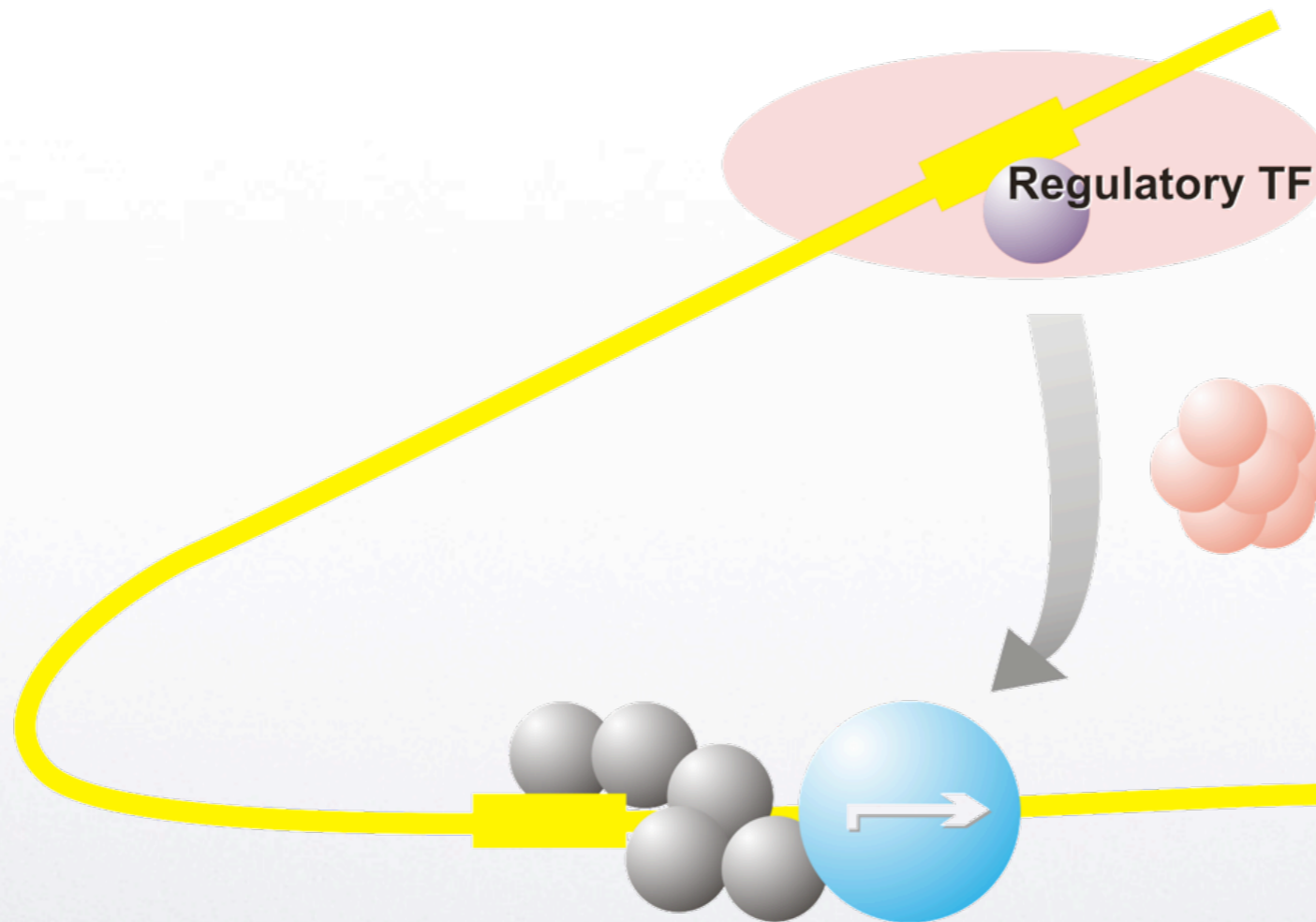
# Eukaryotic transcription



Modified from Kornberg 2007. PNAS 104:12955-61



# Eukaryotic transcription



Modified from Kornberg 2007. PNAS 104:12955-61



# Why studying TAPs?

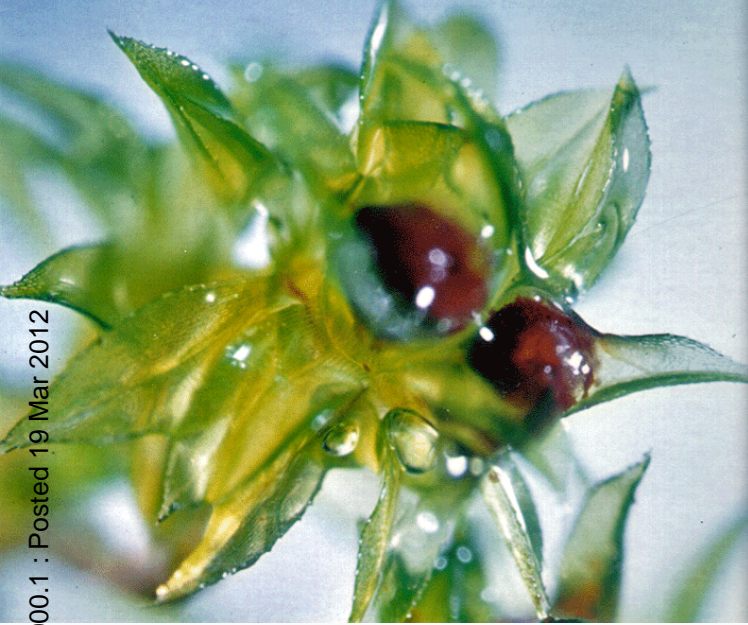
Involved in the generation of new forms

Preferentially retained after whole genome duplications

We can control organisms if we can control gene regulatory networks!



*Physcomitrella patens*



# Plants



*Populus trichocarpa*



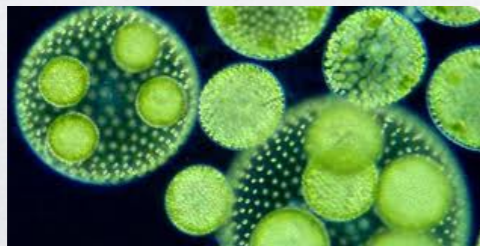
*Selaginella moellendorffii*



*Chlamydomonas reinhardtii*



*Cyanidioschyzon merolae*



*Volvox carterii*



*Carica papaya*



*Arabidopsis thaliana*



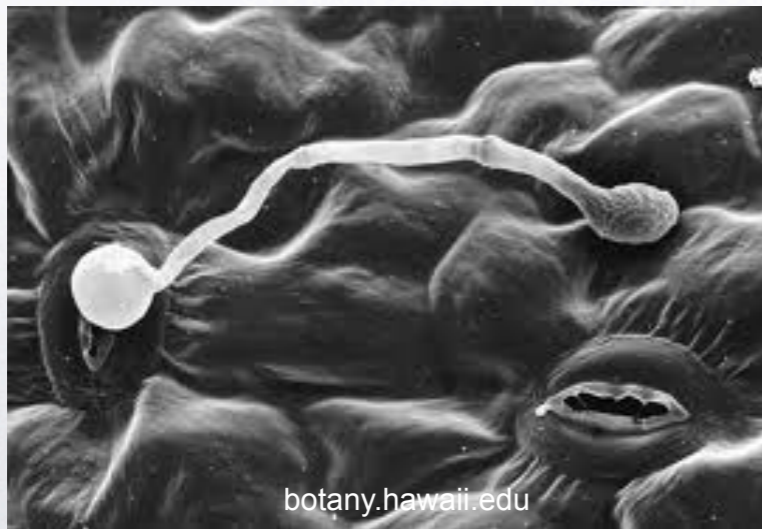
# Stramenopiles



Golden Algae



Diatoms



*Phytophthora*



*Saprolegnia*



# Exploiting conserved domains for identification

DNA  
Binding  
Domain

**DBD**

**SSD**

Signal  
Sensing  
Domain

Transactivation  
Domain

**TAD**

Nature Precedings : doi:10.1038/npre.2012.7000.1 : Posted 19 Mar 2012



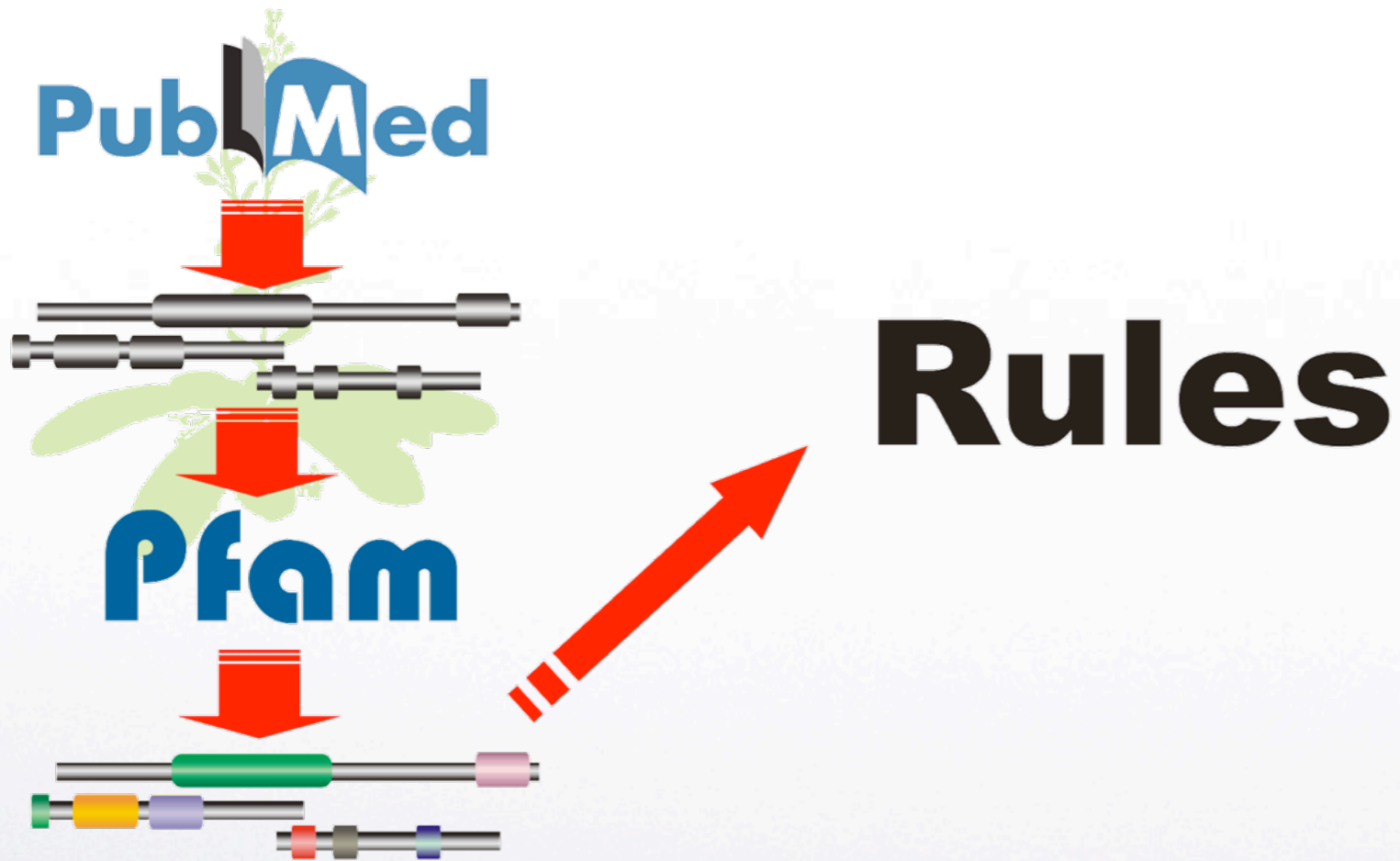
# Classification system



Nature Precedings : doi:10.1038/npre.2012.7000.1 : Posted 19 Mar 2012



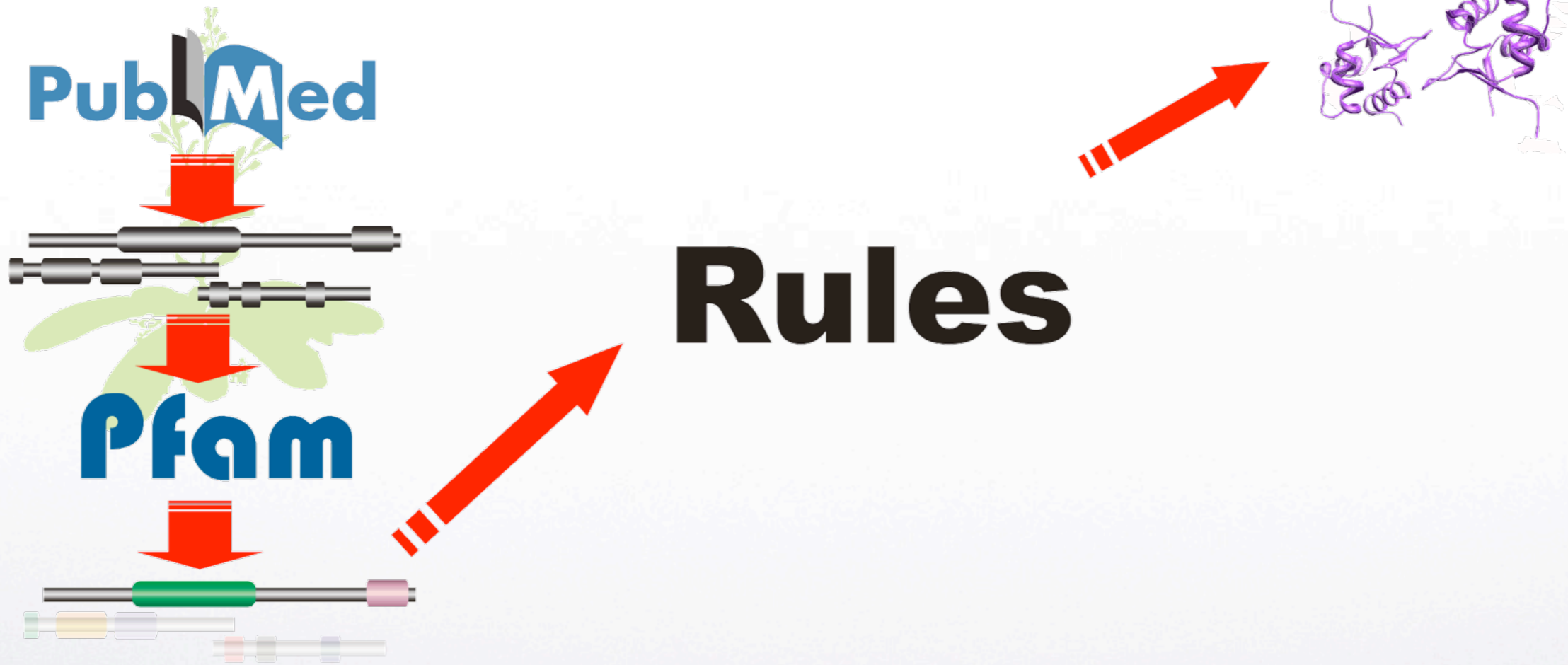
# Classification system



Nature Precedings : doi:10.1038/npre.2012.7000.1 : Posted 19 Mar 2012

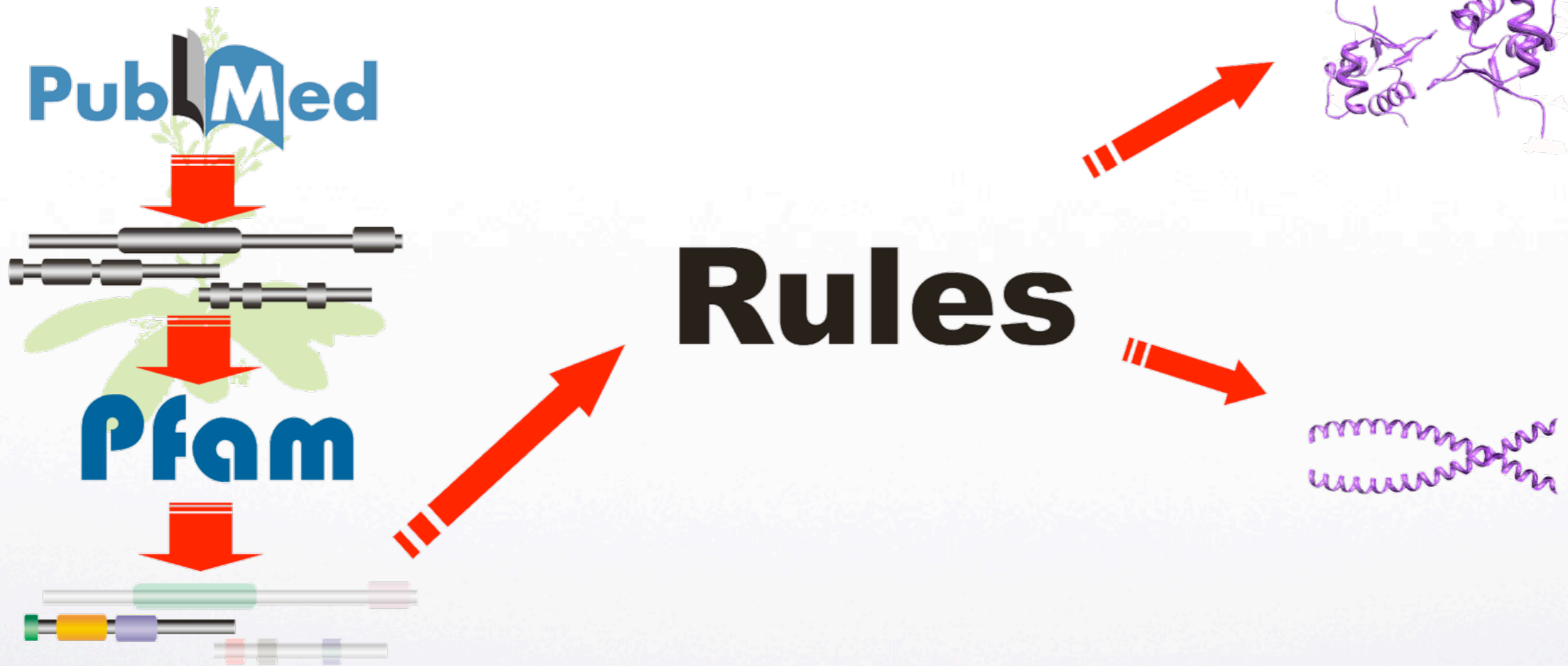


# Classification system



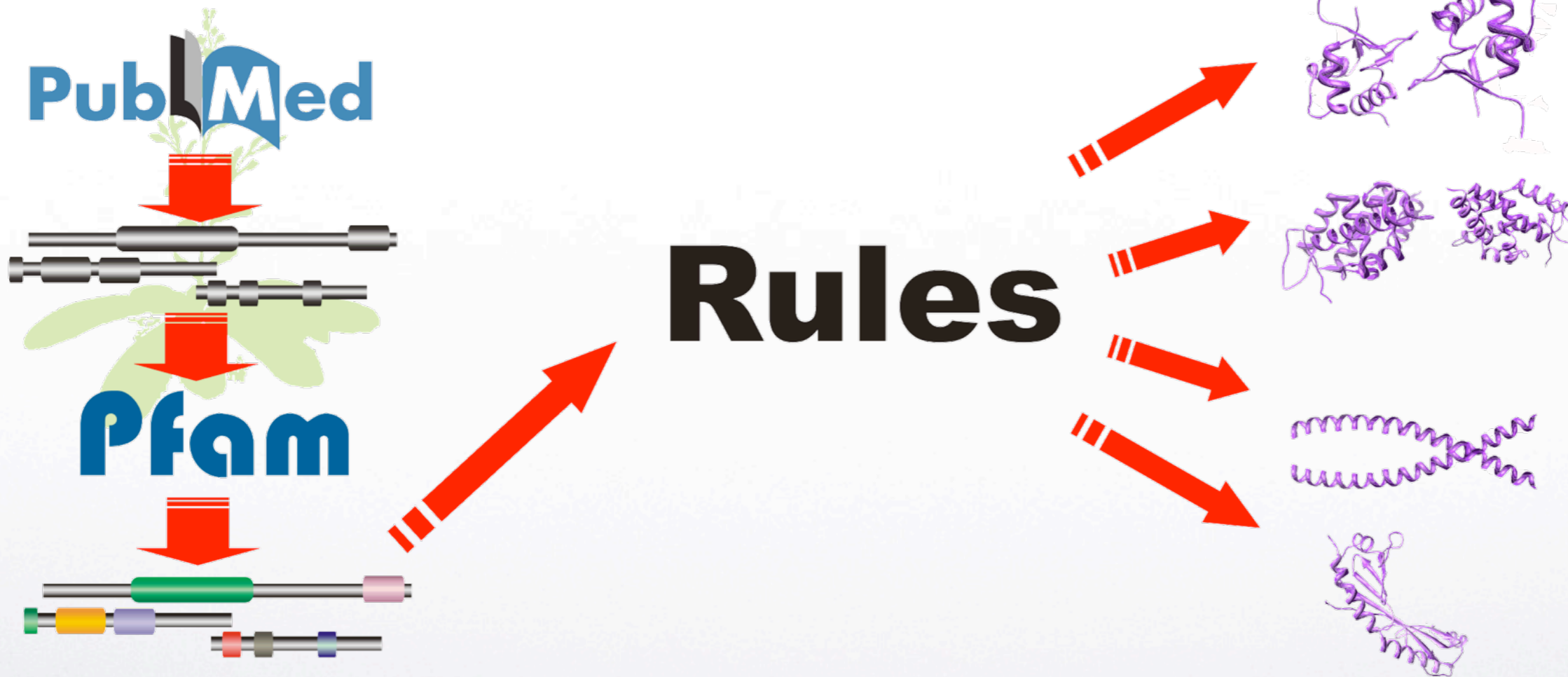


# Classification system





# Classification system



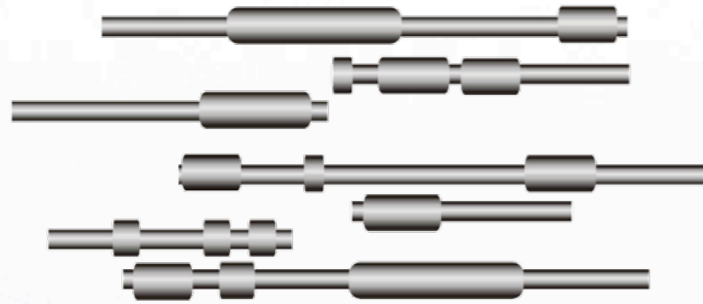


# Classification system

## Rules



# Classification system



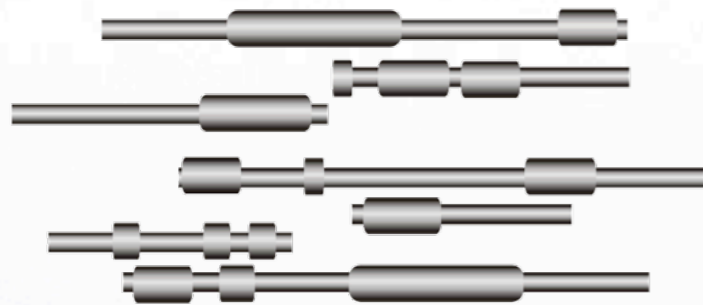
Predicted proteome

## Rules



# Classification system

## Rules



Predicted proteome

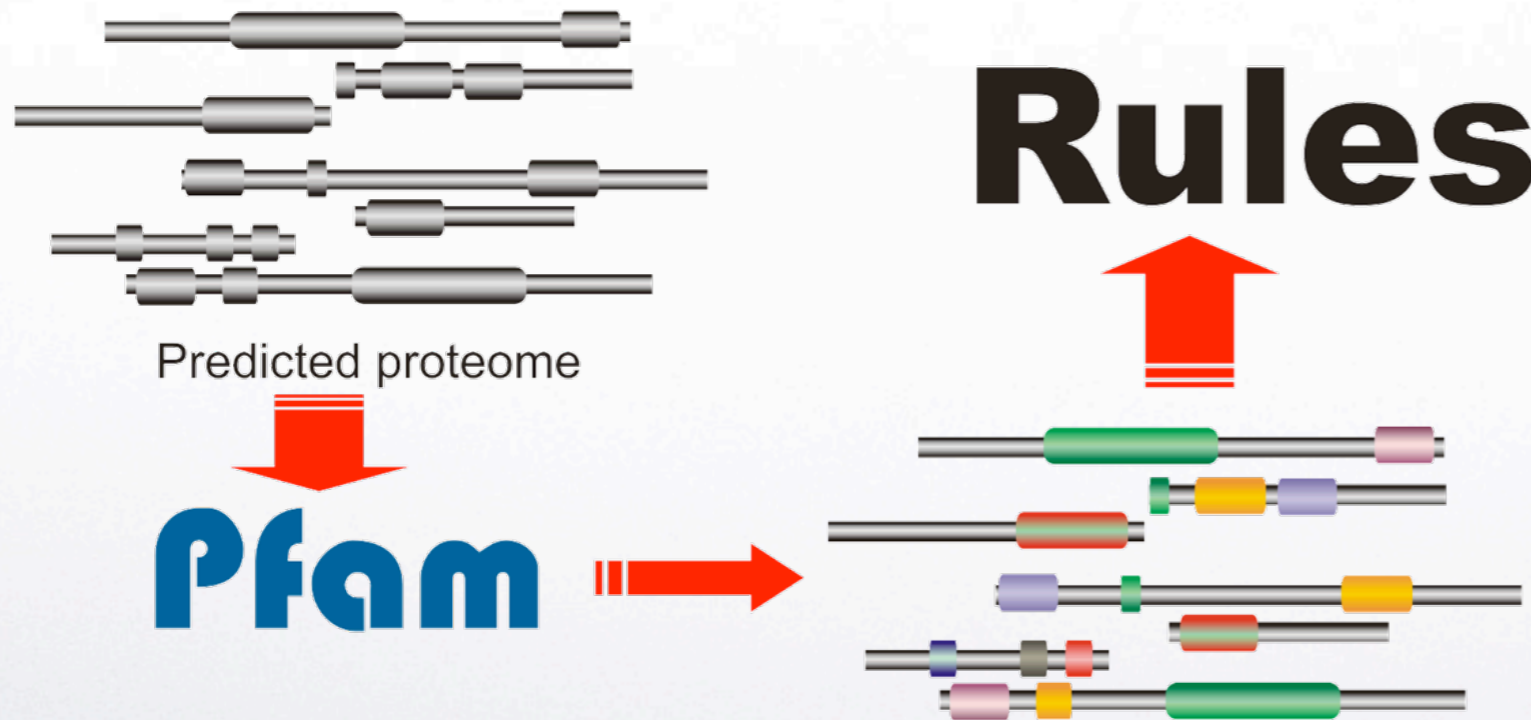


**Pfam**

Nature Precedings : doi:10.1038/npre.2012.7000.1 : Posted 19 Mar 2012

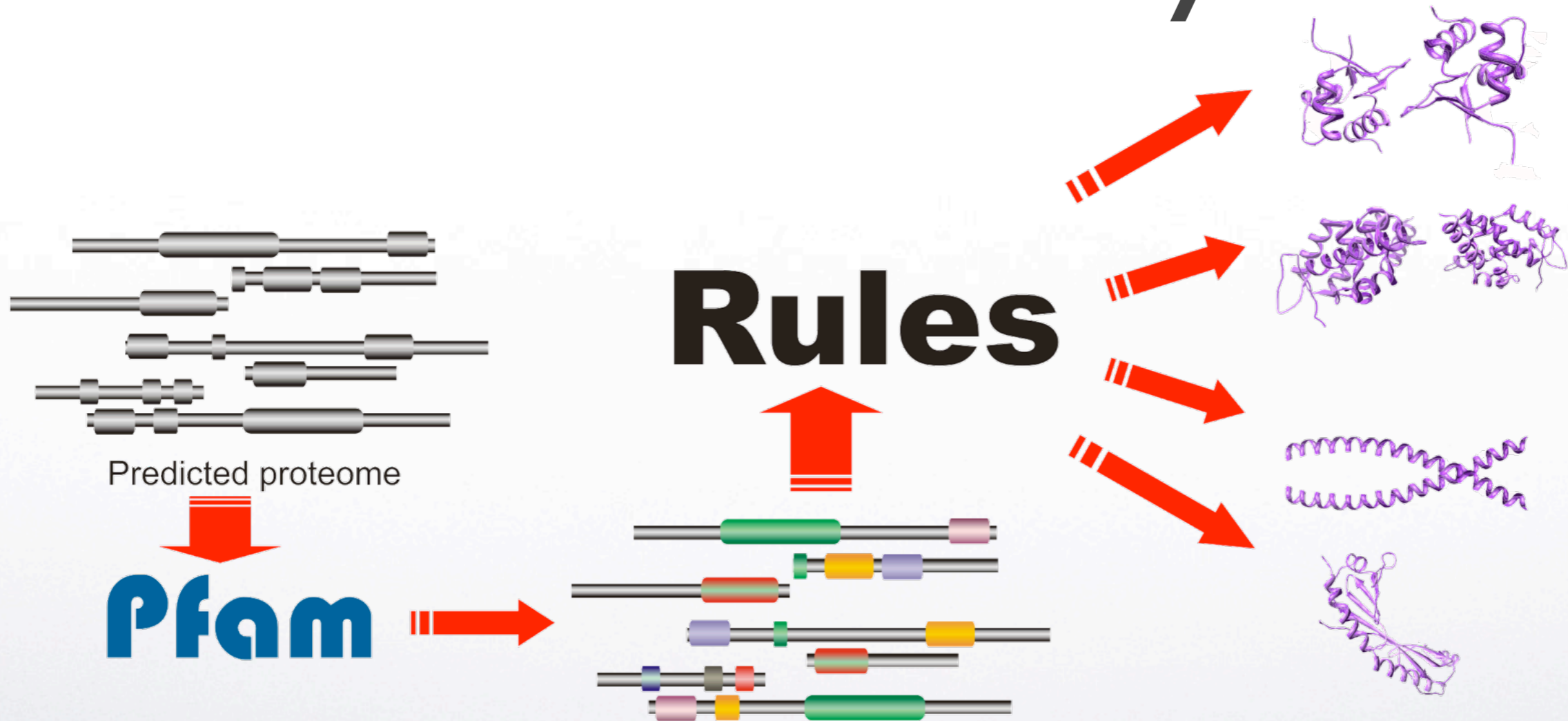


# Classification system





# Classification system





# Classification rules



Transcription factor family



Other transcriptional regulator



PFAM domain

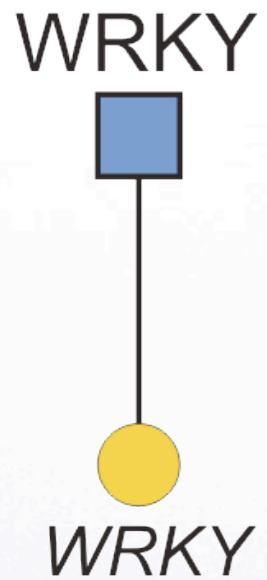


In house domain

*Modified from Riaño-Pachón et al. 2007. BMC Bioinformatics 8:42*



# Classification rules



Transcription factor family



Other transcriptional regulator



PFAM domain

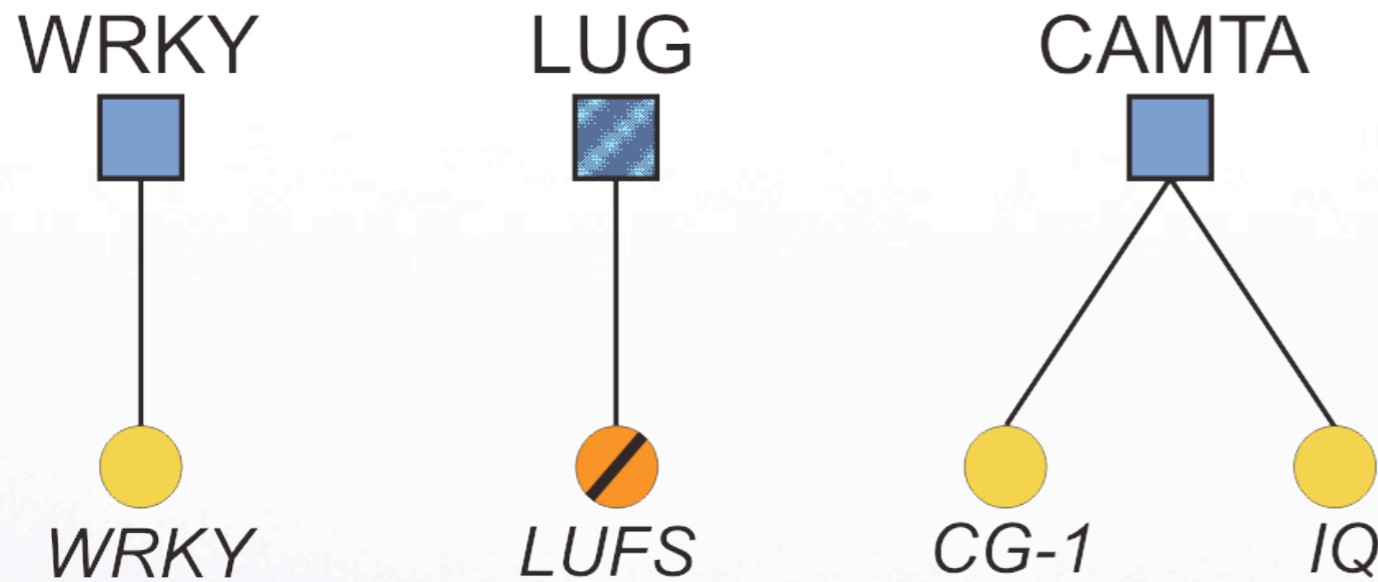


In house domain

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# Classification rules



Transcription factor family



Other transcriptional regulator



PFAM domain

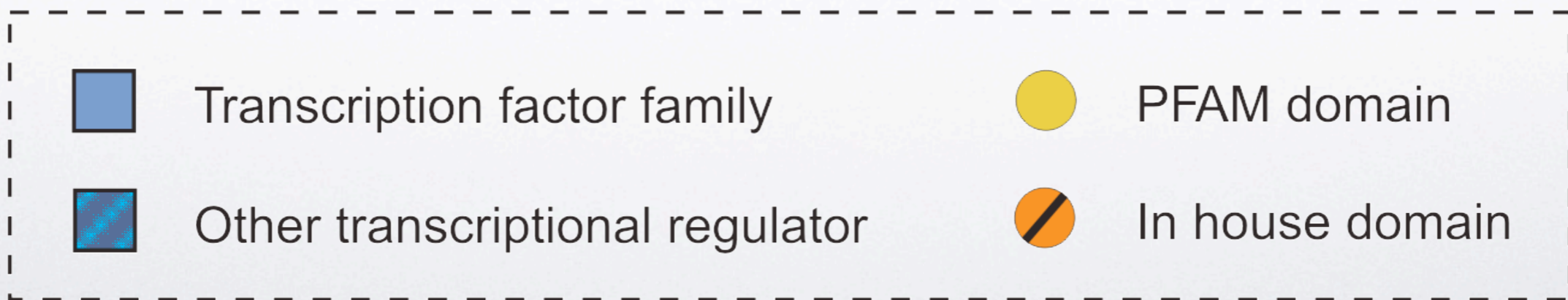
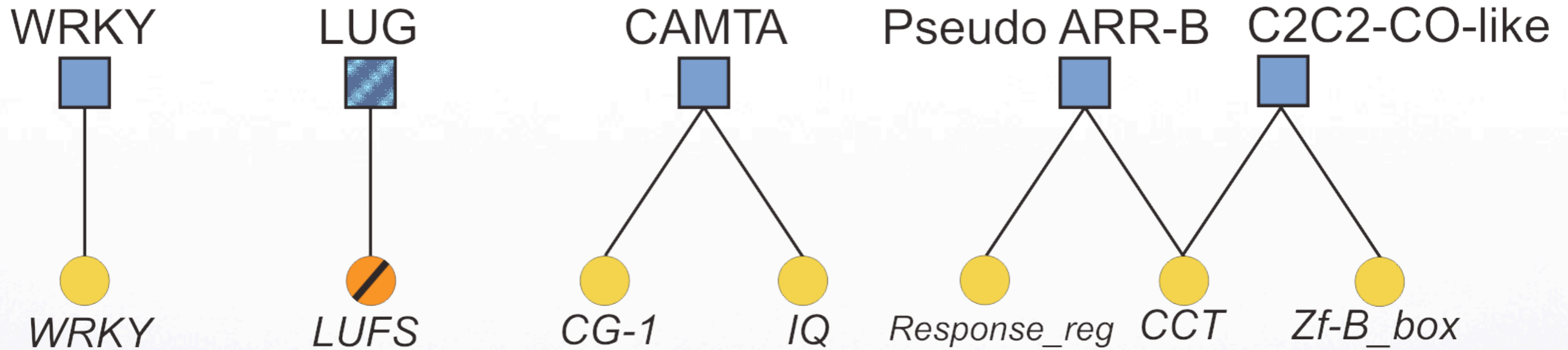


In house domain

*Modified from Riaño-Pachón et al. 2007. BMC Bioinformatics 8:42*



# Classification rules

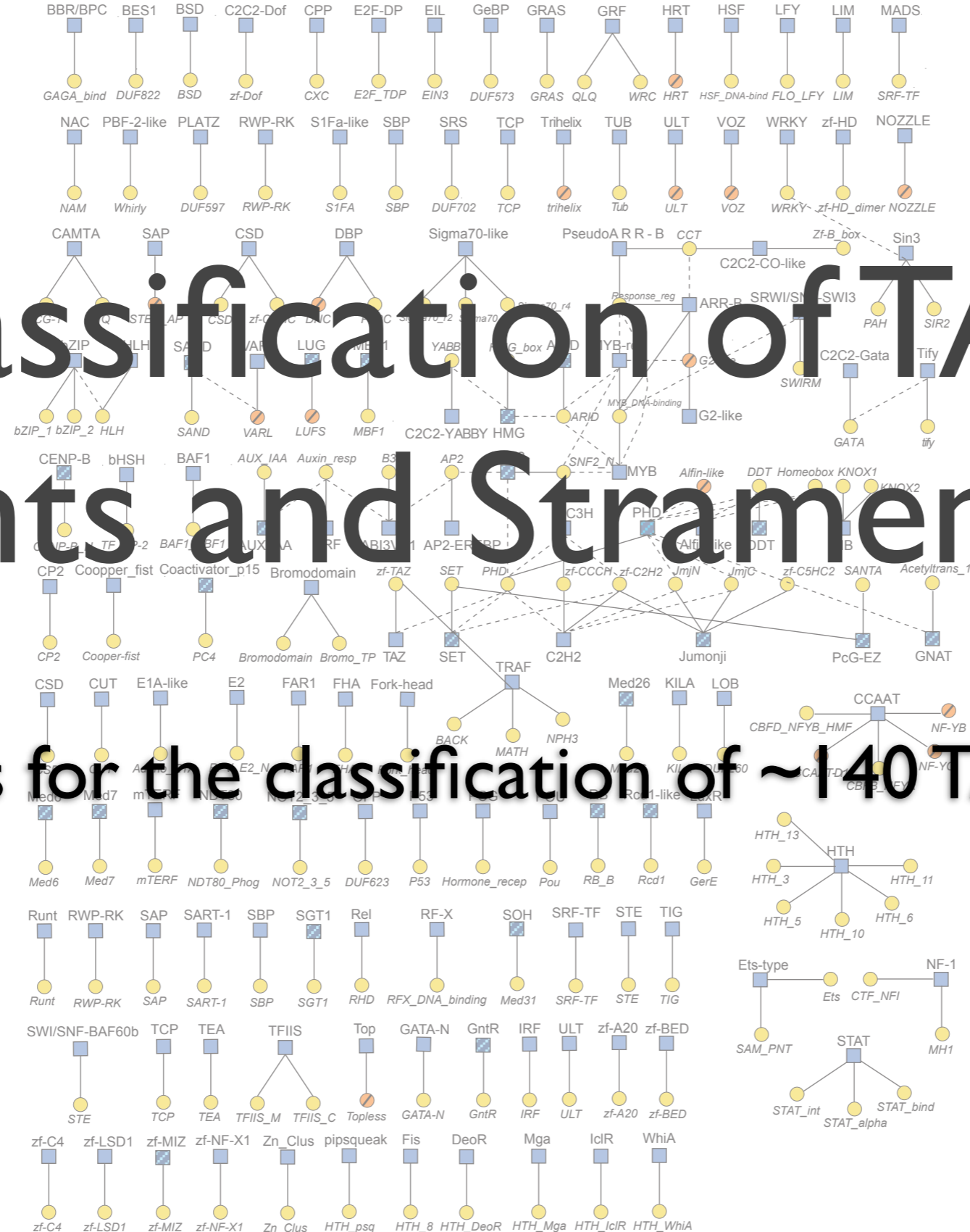


Modified from Riaño-Pachón et al. 2007. BMC Bioinformatics 8:42



# Classification of TAPs in Plants and Stramenopiles

Rules for the classification of ~140 TAP families



Supplementary figure 6  
A bipartite graph that describes the rules for identification and classification of TFs and TRs

- Transcription Factor Family
- ▣ Other Transcriptional Regulator
- PFAM Domain
- ◐ In house Domain
- Required Domain
- - - Forbidden Domain

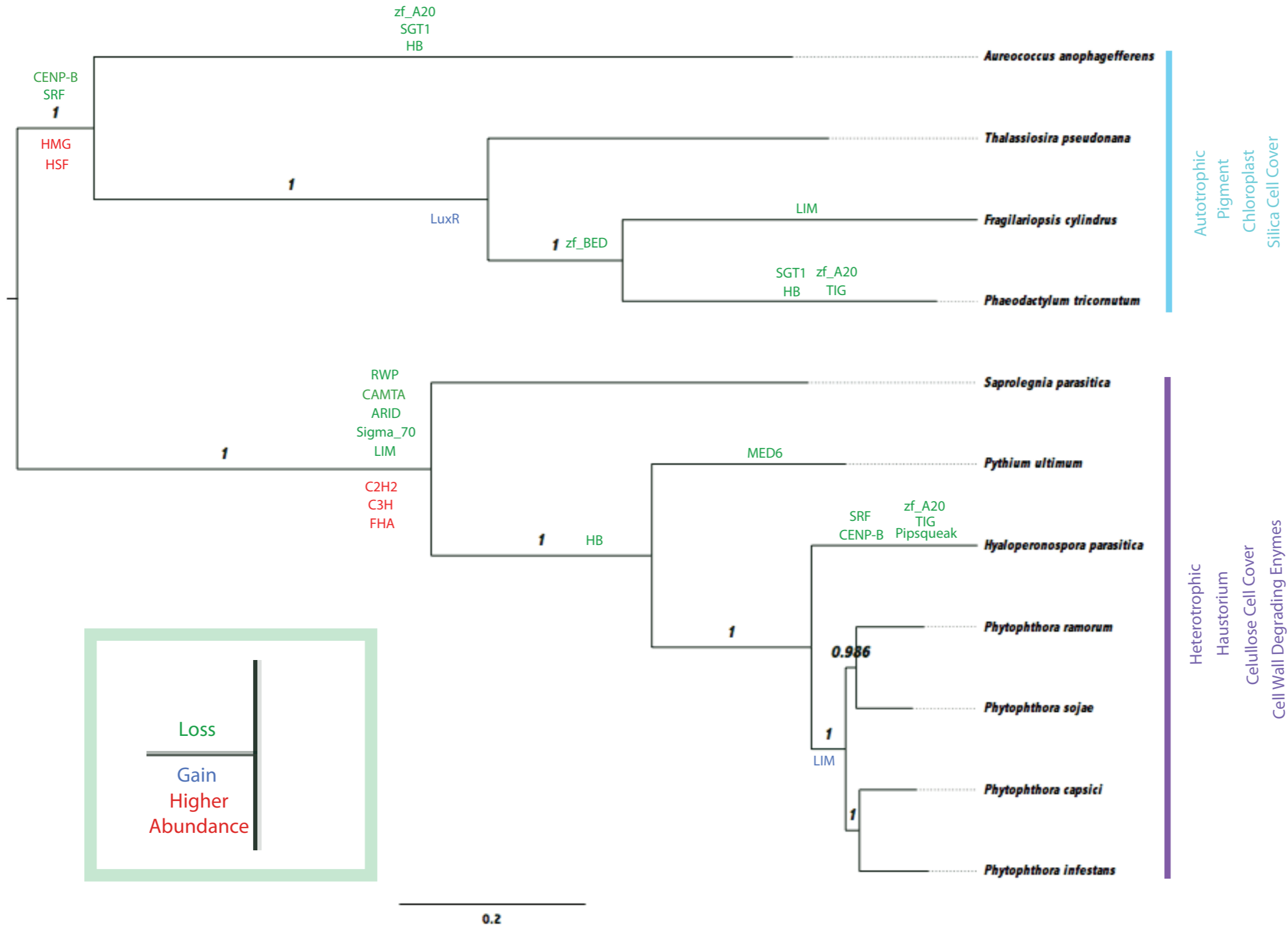
Nature Precedings : doi:10.1038/npre.2012.7000.1 : Posted 19 Mar 2012



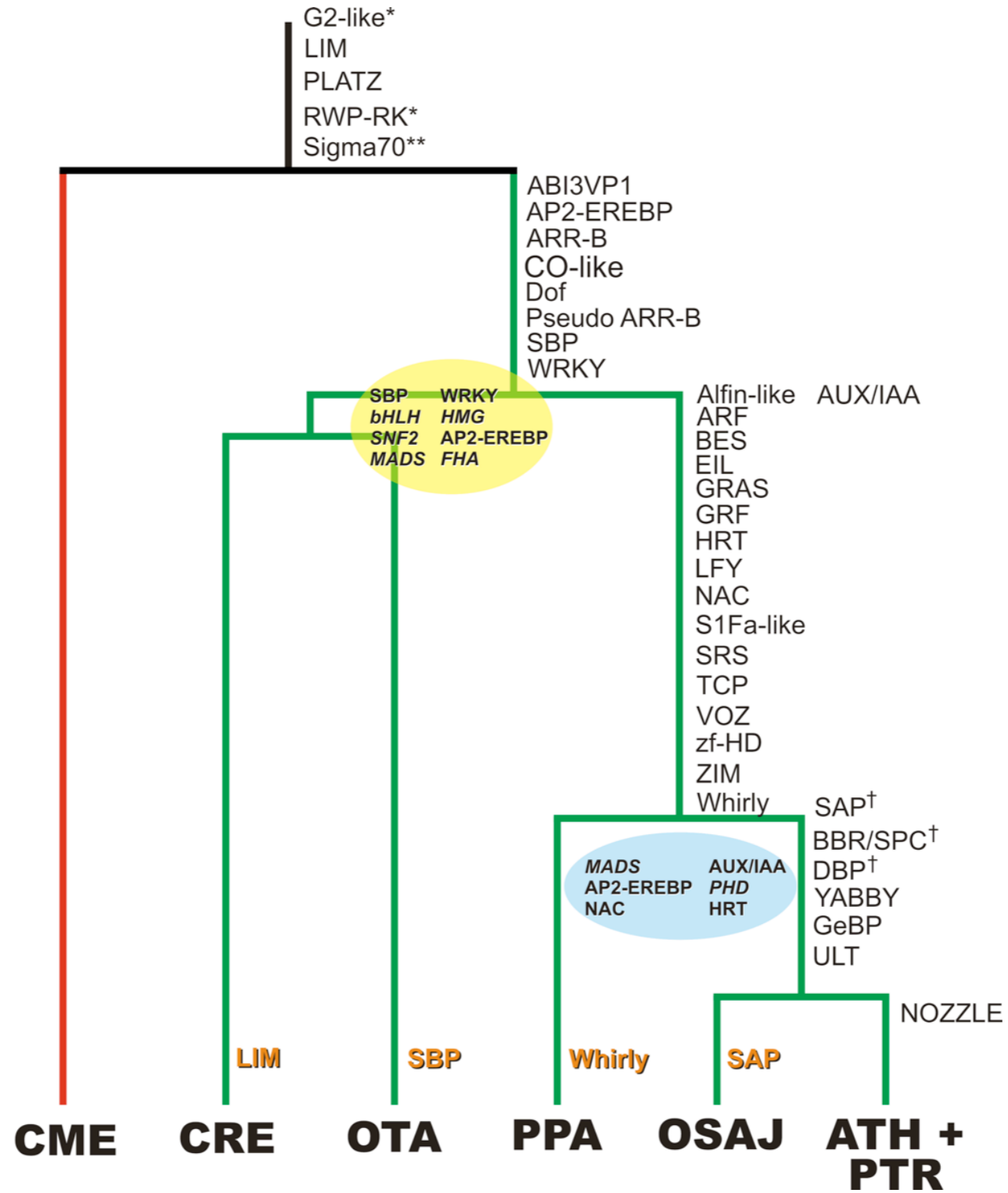
# Tales of gain and losses in Stramenopiles



Nature Precedings : doi:10.1038/npre.2012.7000.1 : Posted 19 Mar 2012







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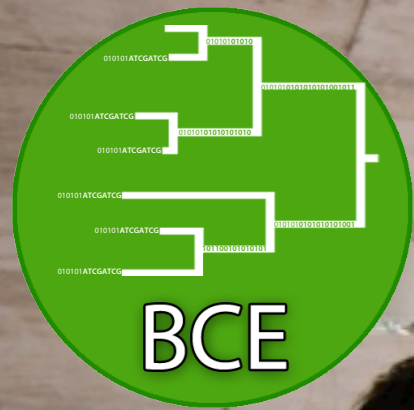


We have developed a tool for the automatic, rapid, and reliable identification and classification of ~ 140 families of transcription regulation associated proteins.

The relative importance of TF families has changed along the evolutionary history of plants and stramenopiles.

Significant size differences between families correlate with great moments in evolution.





# Acknowledgements



Coffee and coffee-rust genomics  
Poster: **P45**



Metagenomics

Nature Precedings : doi:10.1038/npre.2012.70007.1 Posted 19 Mar 2012



Coral genomics and evolution

Regulatory regions in Plants  
Poster: **P42**

Oomycete evolution

Bacterial and human evolution  
Poster: **P44**

Oomycete evolution

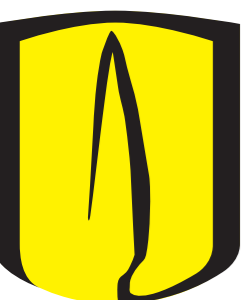
Stramenopile TAPs  
Poster: **P16**

TAPs  
TAPs  
TAPs  
TAPs  
Omics  
Omics  
Omics

Structural bioinformatics and Cancer

Positions available for master thesis

<http://bce.uniandes.edu.co/>



Universidad de los Andes



Max Planck Institute of Molecular Plant Physiology



Bundesministerium für Bildung und Forschung



**Thank you for your  
attention!**

**Questions?**