

Gabriel Krouk

Scientific Interests

1) Identify Gene regulatory networks involved in Nitrate sensing and signaling.

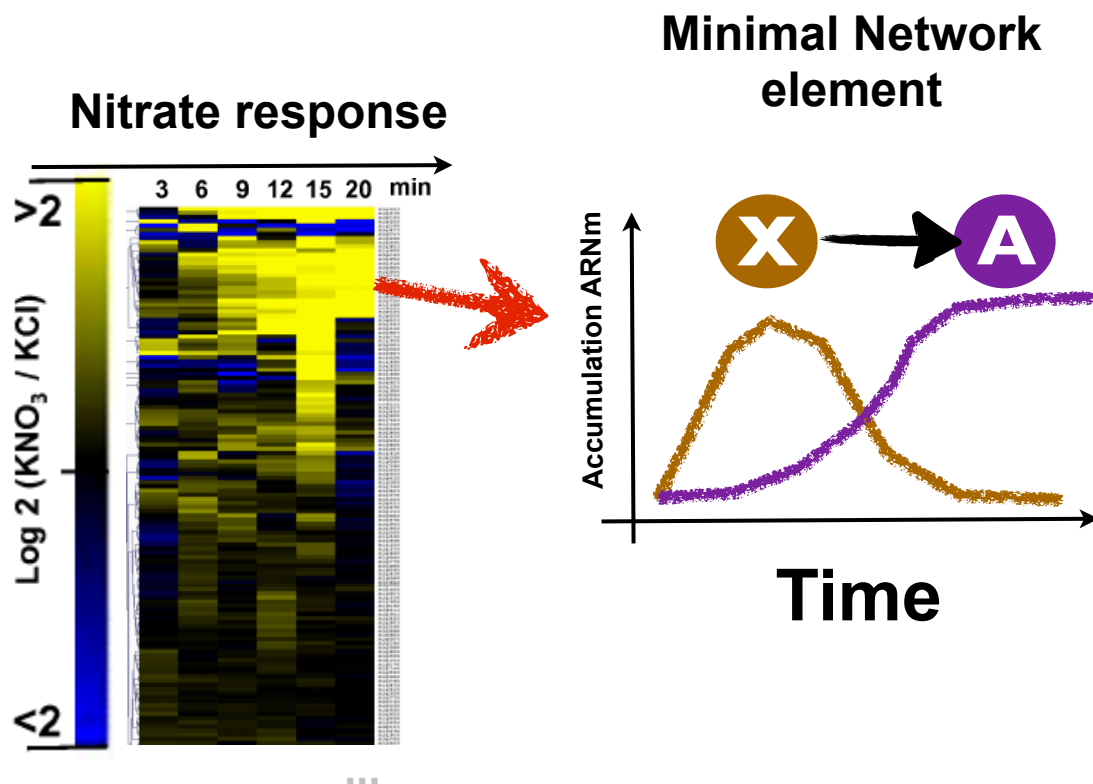
2) Understand nitrogen x hormonal interactions.

Funding

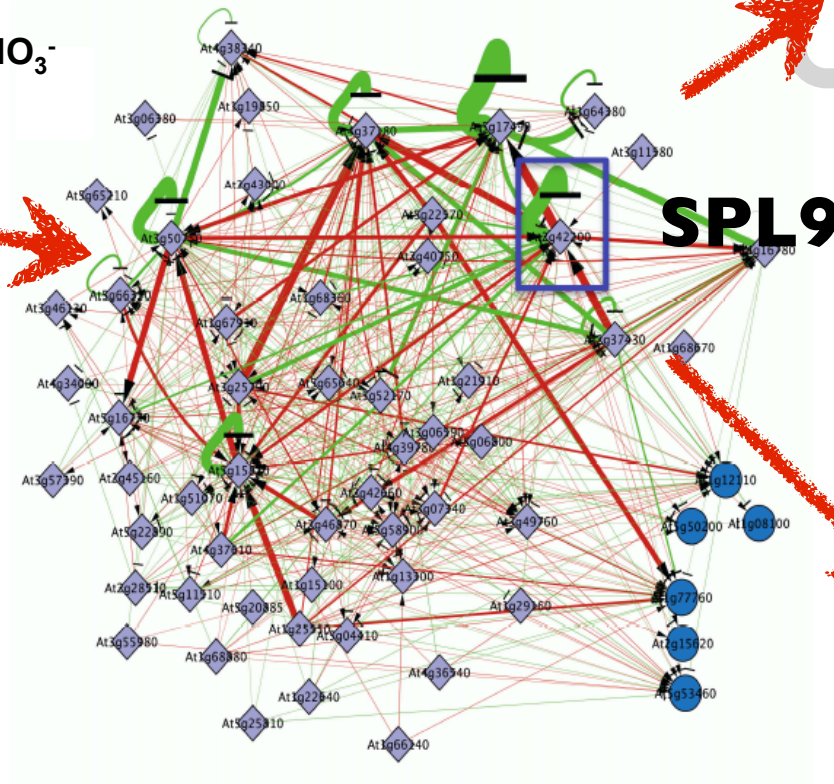
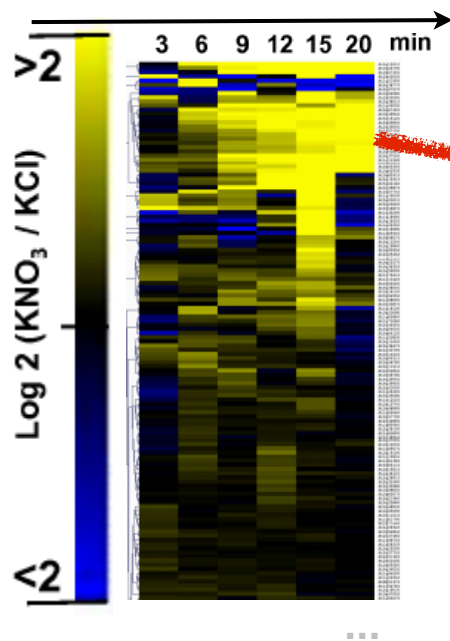
Europe-IOF-FP7 Marie Curie

ANR-NitroNet

CNRS-PEPS-Bio-Math-info Andre Mas (UMII)



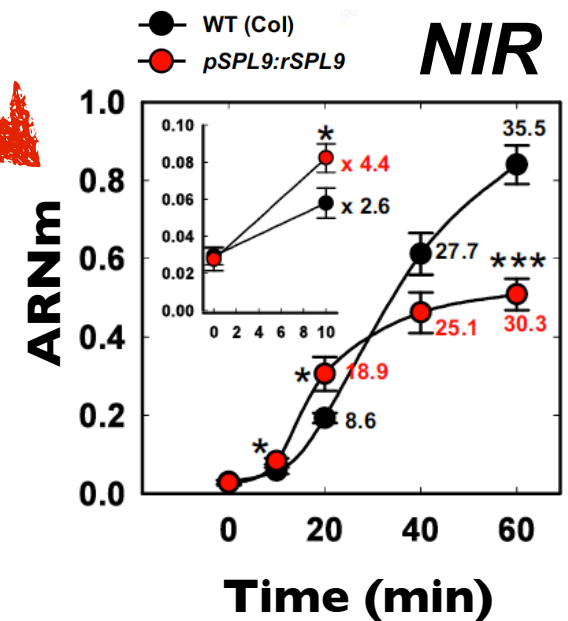
Cinétique réponse NO_3^-

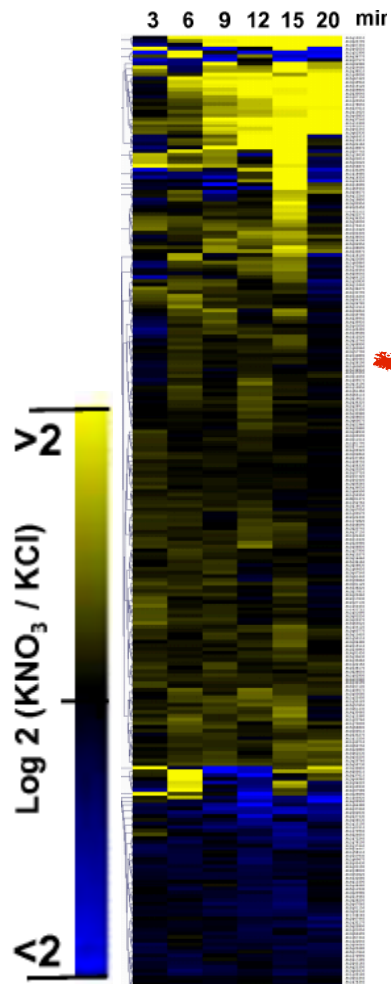


Modèle

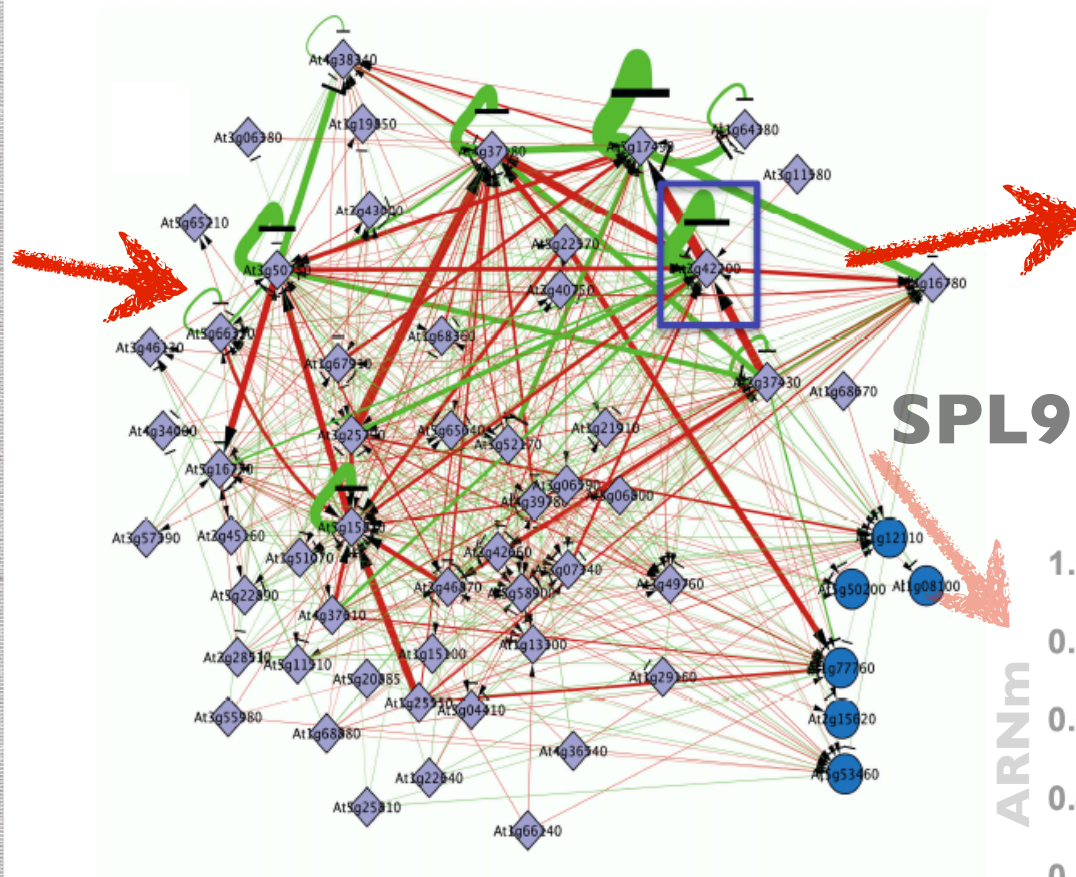
Validation *in silico*:
Le modèle prédit
l'expression des gènes.

Experimental Validation



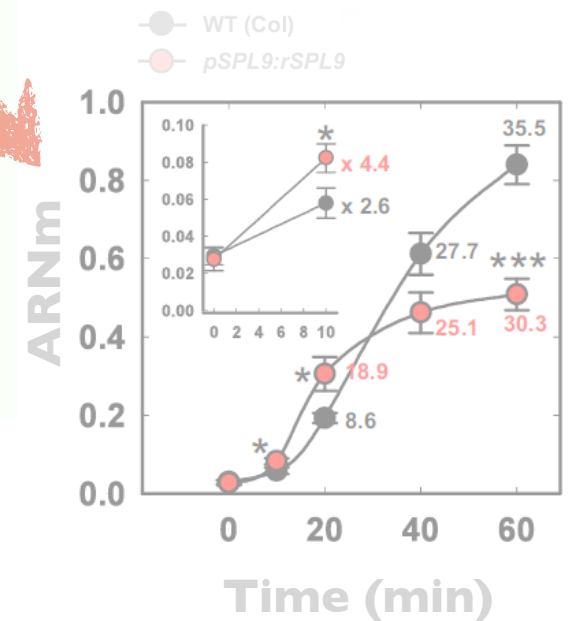


Apprentissage: Modèle prédictif



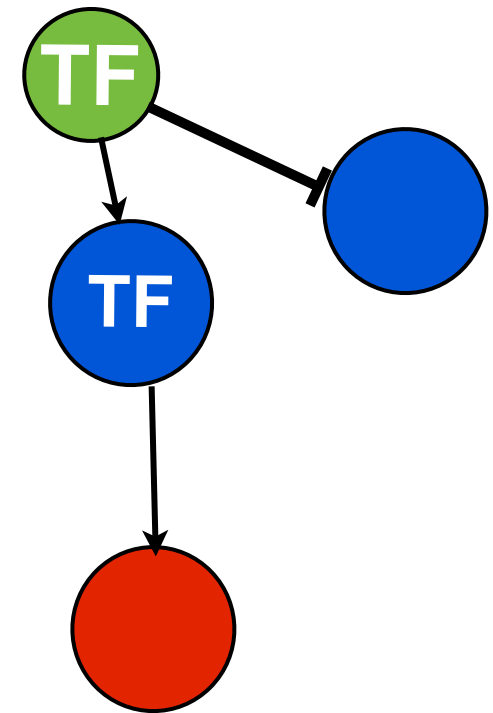
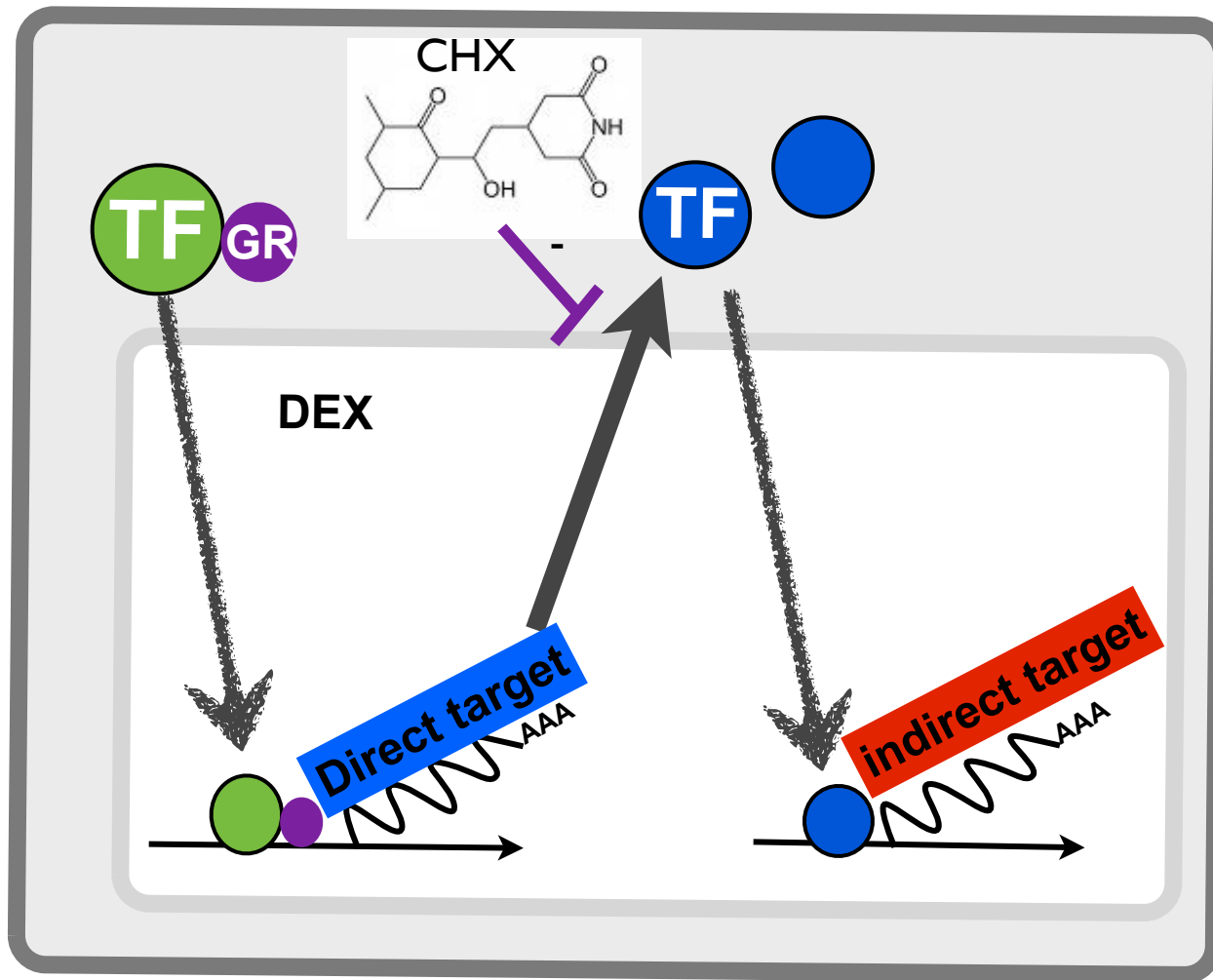
**Autres
FT CANDIDATS**

SPL9



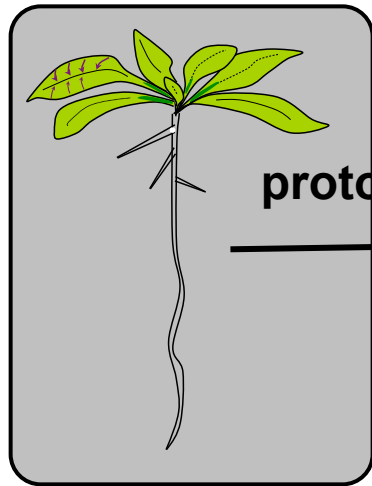
Quickly finding TF--> TARGET relationships

Bargmann et al. (2013) Molecular Plant

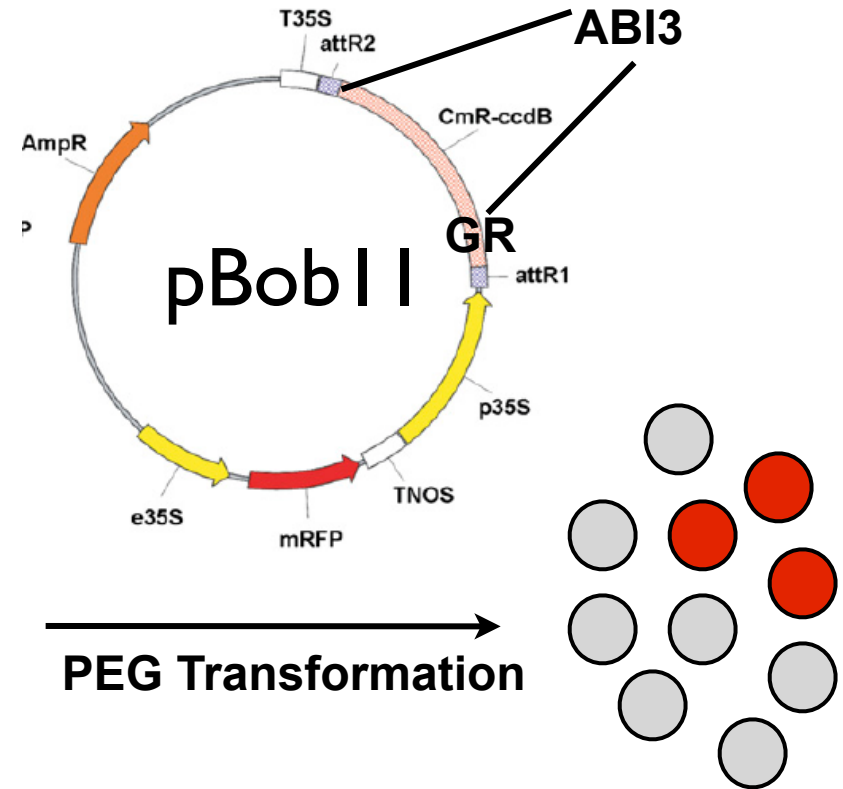
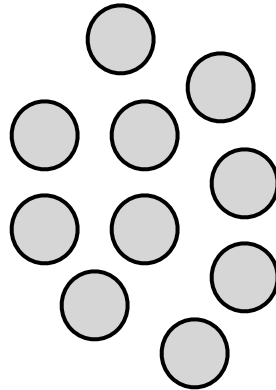


Experimentally: ~ 2 weeks

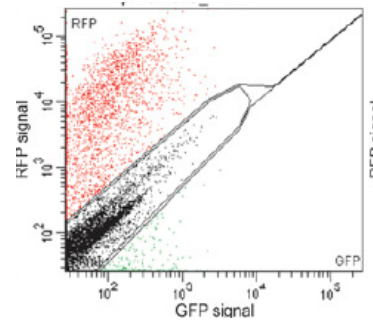
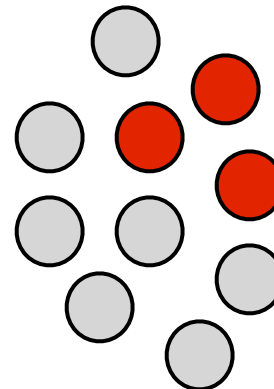
2 week old plants
(roots)



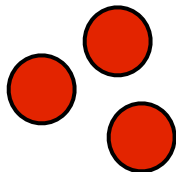
protoplasting



Various treatments
(+/- DEX; +/- CHX)



FACS

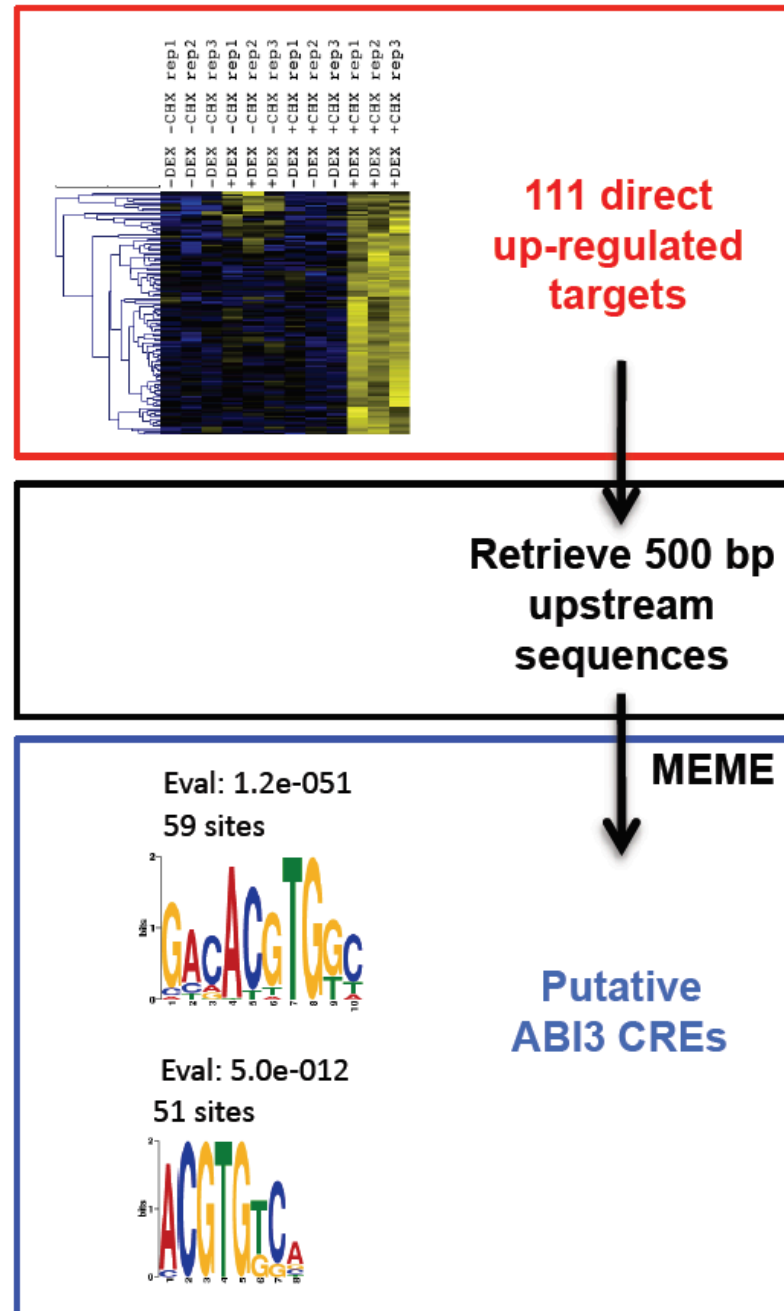


RNA / QPCR/ Transcriptomics

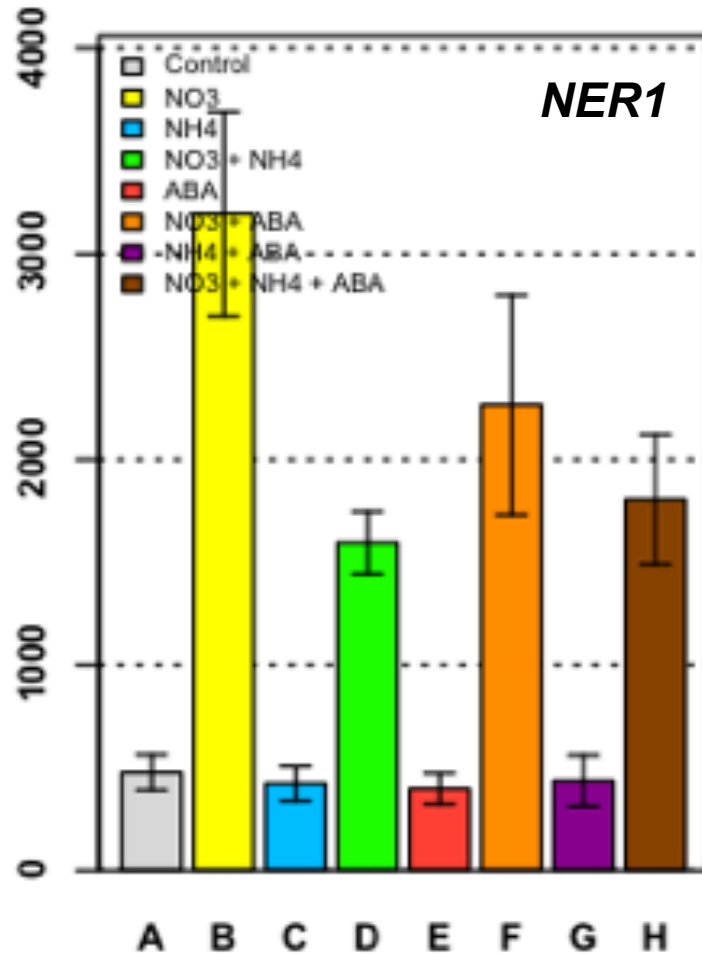
... as a mean to predicts a TF physiological function?

	Term	Observed Frequency	Expected Frequency	p-value
	ABI3 reg genes (1095)			
GO:0009737	response to abscisic acid stimul	2.90%	0.90%	2.17E-07
GO:0009415	response to water	2.10%	0.60%	1.28E-06
GO:0006082	organic acid metabolic process	4.90%	2.50%	1.43E-05
GO:0009414	response to water deprivation	1.80%	0.50%	1.65E-05
GO:0019752	carboxylic acid metabolic proces	4.80%	2.50%	2.64E-05
GO:0009628	response to abiotic stimulus	6%	3.60%	0.000145
	ABI3 direct up-regulated targets (299)			
GO:0009737	response to abscisic acid stimul	4.40%	0.90%	7.88E-06
GO:0009415	response to water	3.40%	0.60%	1.33E-05
GO:0003006	reproductive developmental pro	6.80%	2.20%	1.75E-05
GO:0048608	reproductive structure developm	6.80%	2.20%	1.75E-05
GO:0022414	reproductive process	7.50%	2.70%	2.02E-05
GO:0048316	seed development	5.50%	1.60%	2.27E-05
GO:0000003	reproduction	7.50%	2.70%	3.08E-05
GO:0009725	response to hormone stimulus	7.20%	2.70%	6.40E-05
GO:0010295	(+)-abscisic acid 8'-hydroxylase	1%	0%	7.77E-05
GO:0009719	response to endogenous stimul	7.50%	3.10%	0.00015
GO:0009687	abscisic acid metabolic process	1.40%	0.10%	0.000152
GO:0043288	apocarotenoid metabolic process	1.40%	0.10%	0.000152
GO:0050896	response to stimulus	18.10%	10.90%	0.000172
GO:0009414	response to water deprivation	2.70%	0.50%	0.000254
GO:0009628	response to abiotic stimulus	8.20%	3.60%	0.000255
GO:0009723	response to ethylene stimulus	2.70%	0.60%	0.000388
GO:0010162	seed dormancy	1%	0%	0.000465
GO:0022611	dormancy process	1%	0%	0.000465
GO:0042221	response to chemical stimulus	9.90%	5.00%	0.000474
GO:0010431	seed maturation	1%	0%	0.000599
GO:0048623	seed germination on parent plan	0.70%	0.00%	0.00103
GO:0048838	release of seed from dormancy	0.70%	0.00%	0.00103
GO:0006950	response to stress	11.30%	6.40%	0.00125
GO:0019915	sequestering of lipid	1%	0%	0.00137
GO:0048856	anatomical structure developme	7.50%	3.70%	0.00147

... as a mean to predicts a TF CRE action?

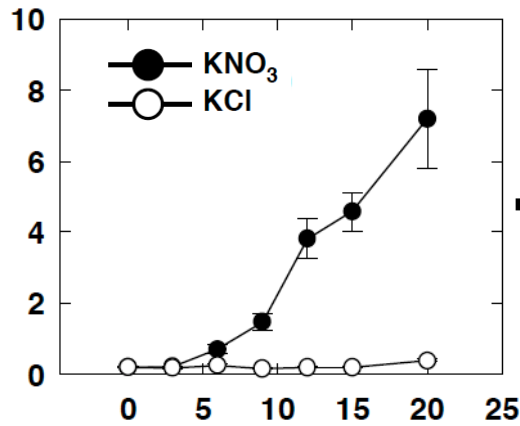


"TARGET" some Nitrate Early Regulated TF



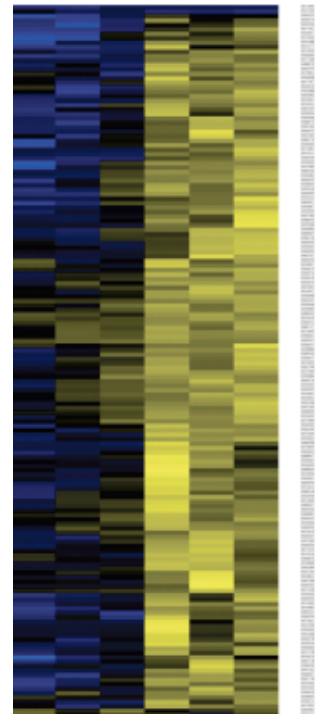
relative mRNA level

NER1



Potential NER1 direct targets

**35S:GR:NER1
in protoplasts
(TARGET results)**



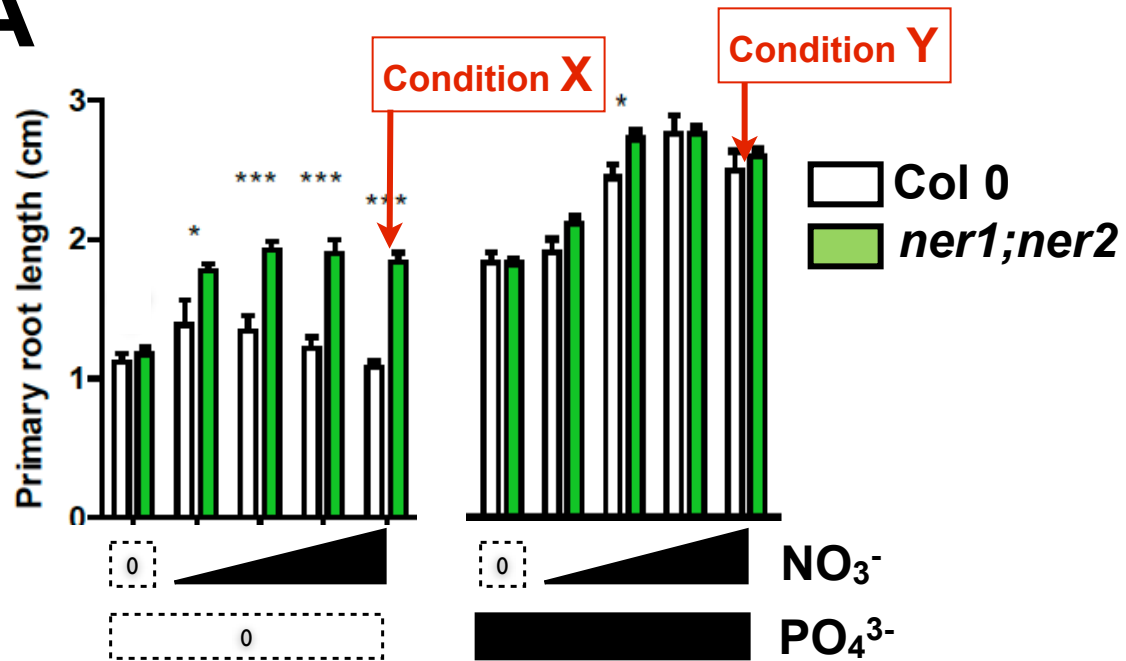
1 2 3 1 2 3
- +
+ CHX

Replicate
DEX

**Over-represented
Functional Categories
in the NER1 putative
direct targets
(GO Annotation)**

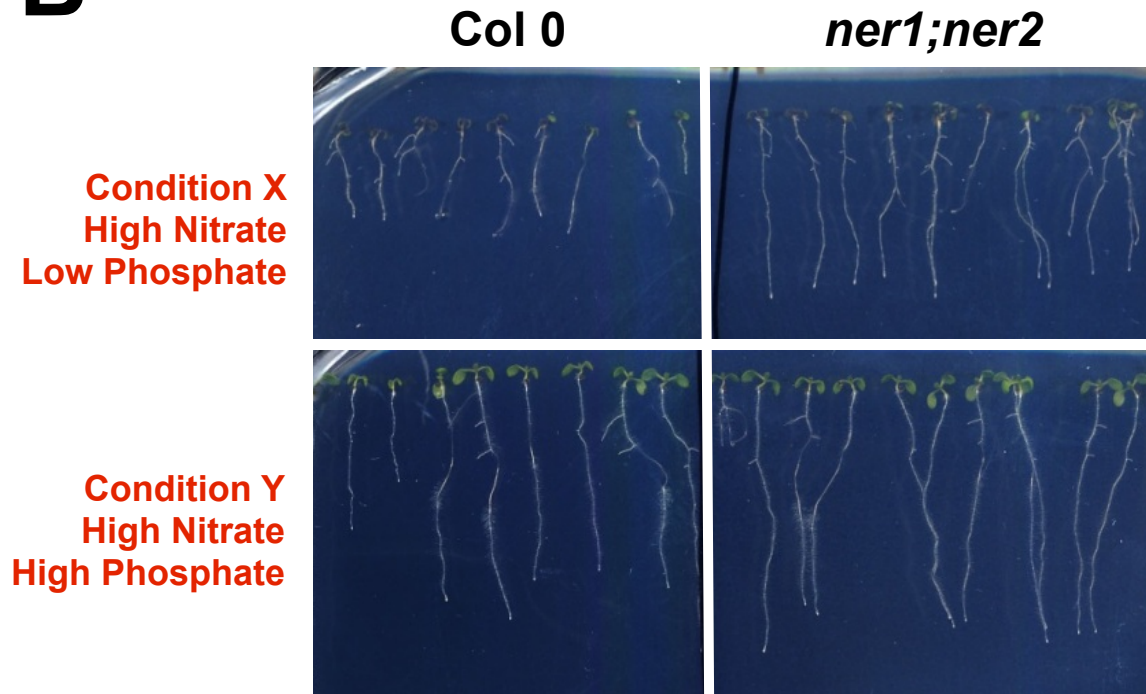
Term	p-value
phosphate transport	8.14E-06
anion transport	0.000851
sugar transport	0.00136
C-compound and carbohydrate transport	0.00284
meristematic tissue	0.00638

A



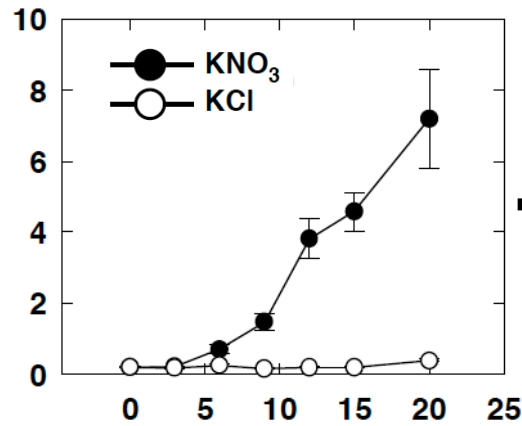
Anna Medici

B



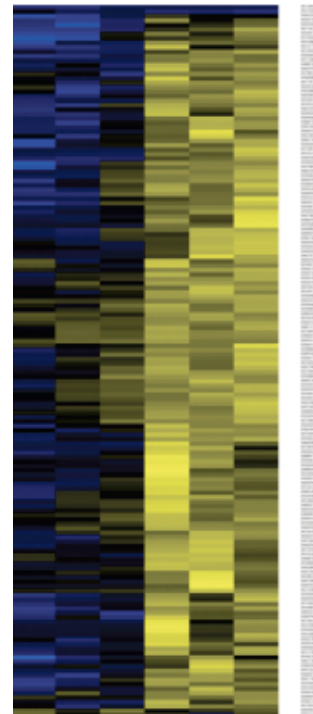
relative mRNA level

NER1



Potential NER1 direct targets

**35S:GR:NER1
in protoplasts
(TARGET results)**



1 2 3 1 2 3
- +
+ CHX

Replicate
DEX

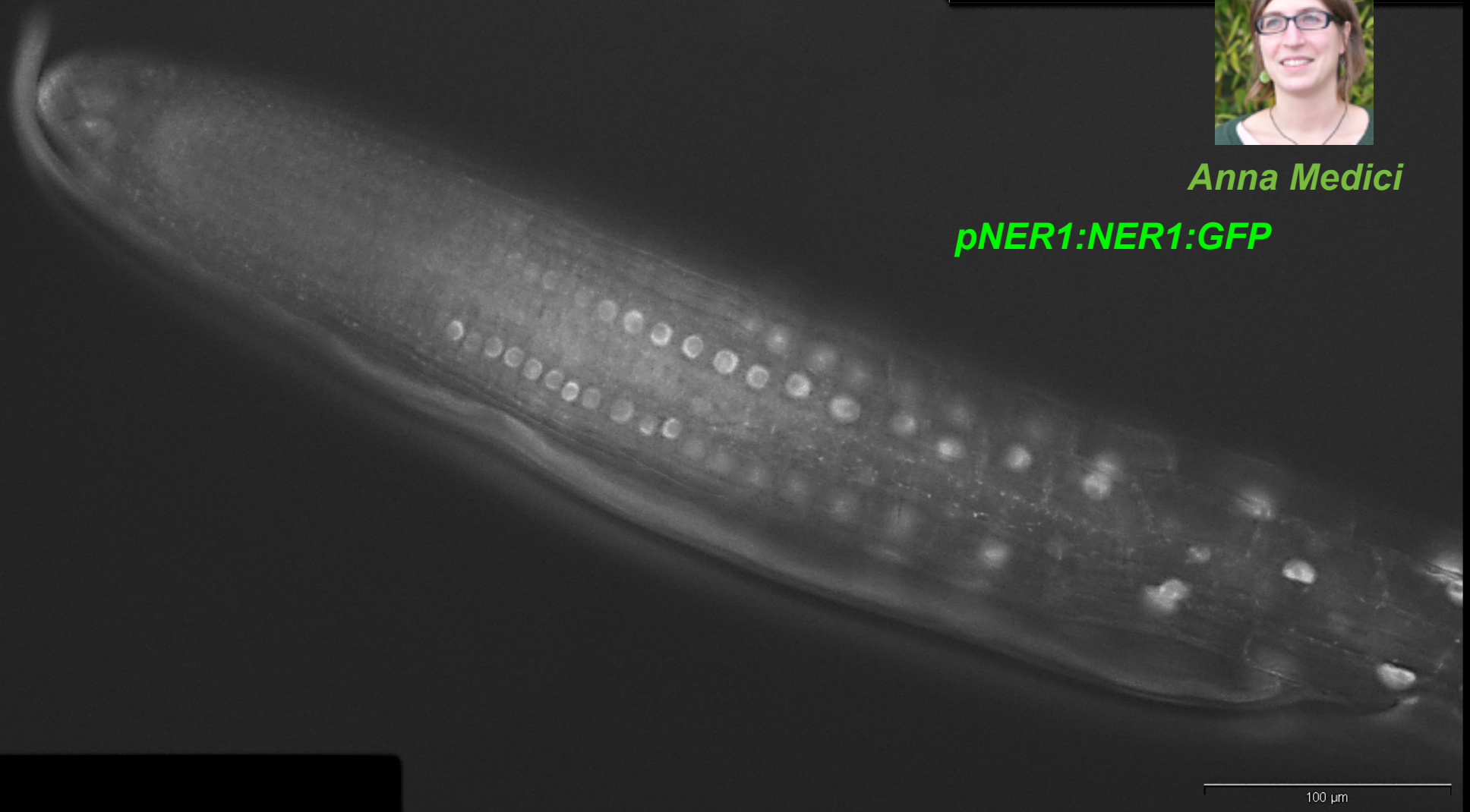
**Over-represented
Functional Categories
in the NER1 putative
direct targets
(GO Annotation)**

Term	p-value
phosphate transport	8.14E-06
anion transport	0.000851
sugar transport	0.00136
C-compound and carbohydrate transport	0.00284
meristematic tissue	0.00638



Anna Medici

pNER1:NER1:GFP



*pNER1:NER1:GFP Chromatin IP seq
against GFP --> in planta to validate
TARGET results*