

6S RNA: interaction & differential expression analysis

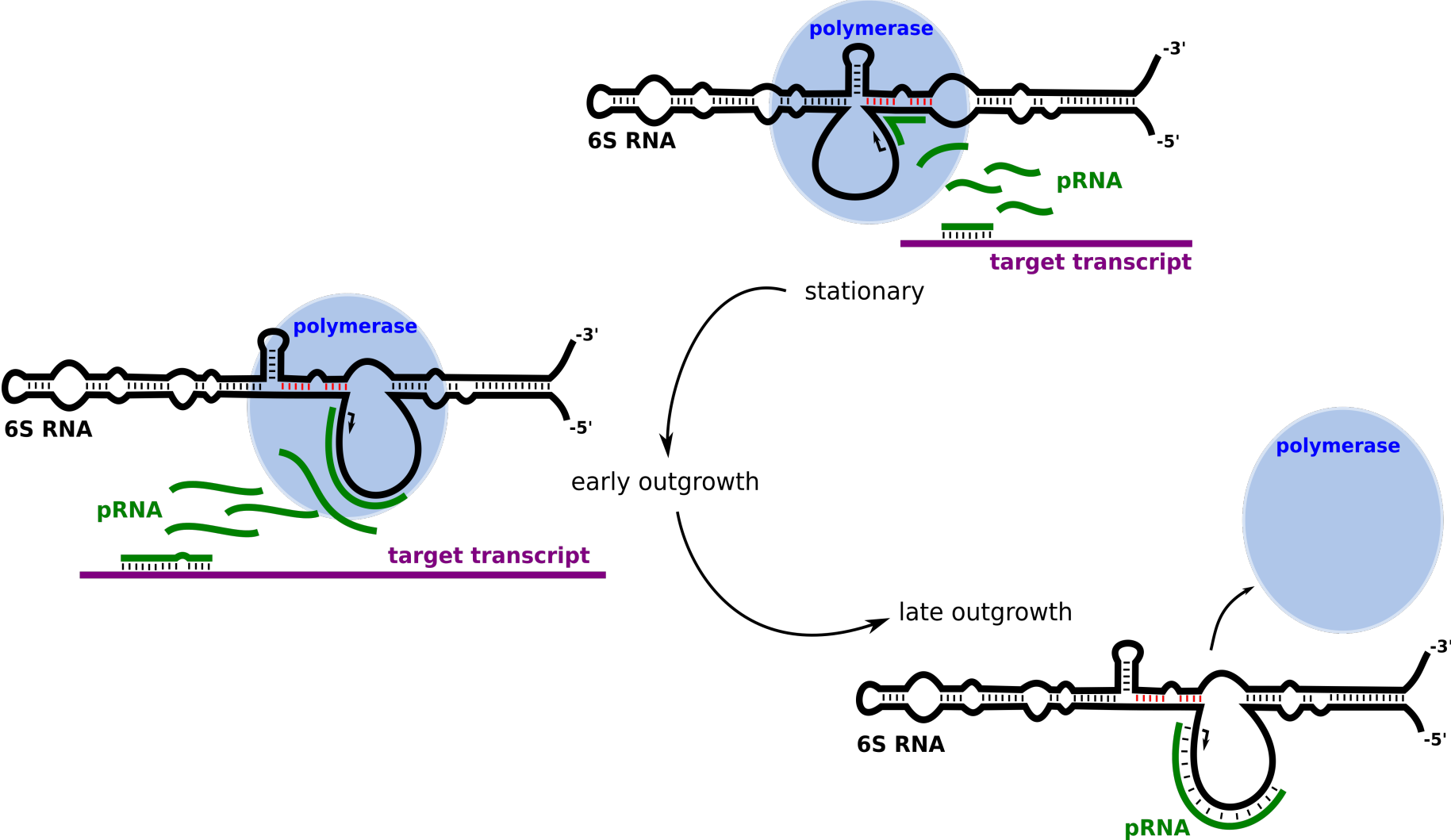
Clemens Thölken @ Bled 2016

Philipps

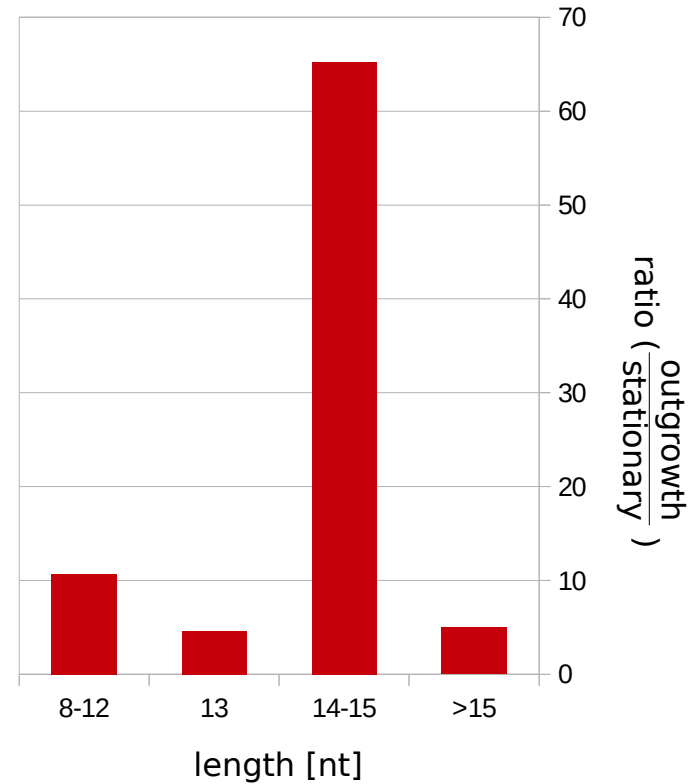
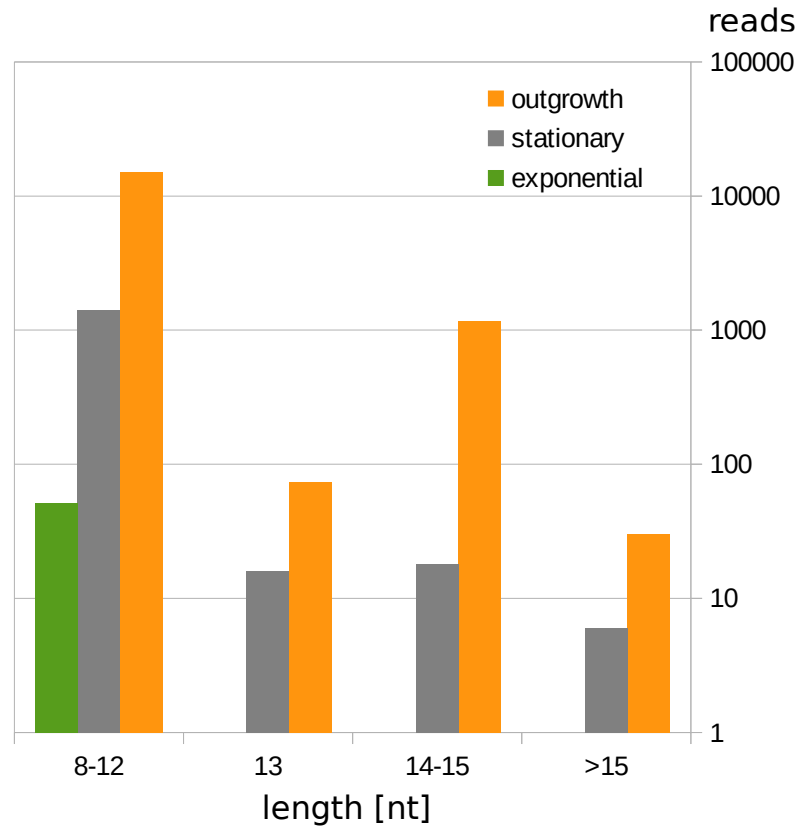


Universität
Marburg

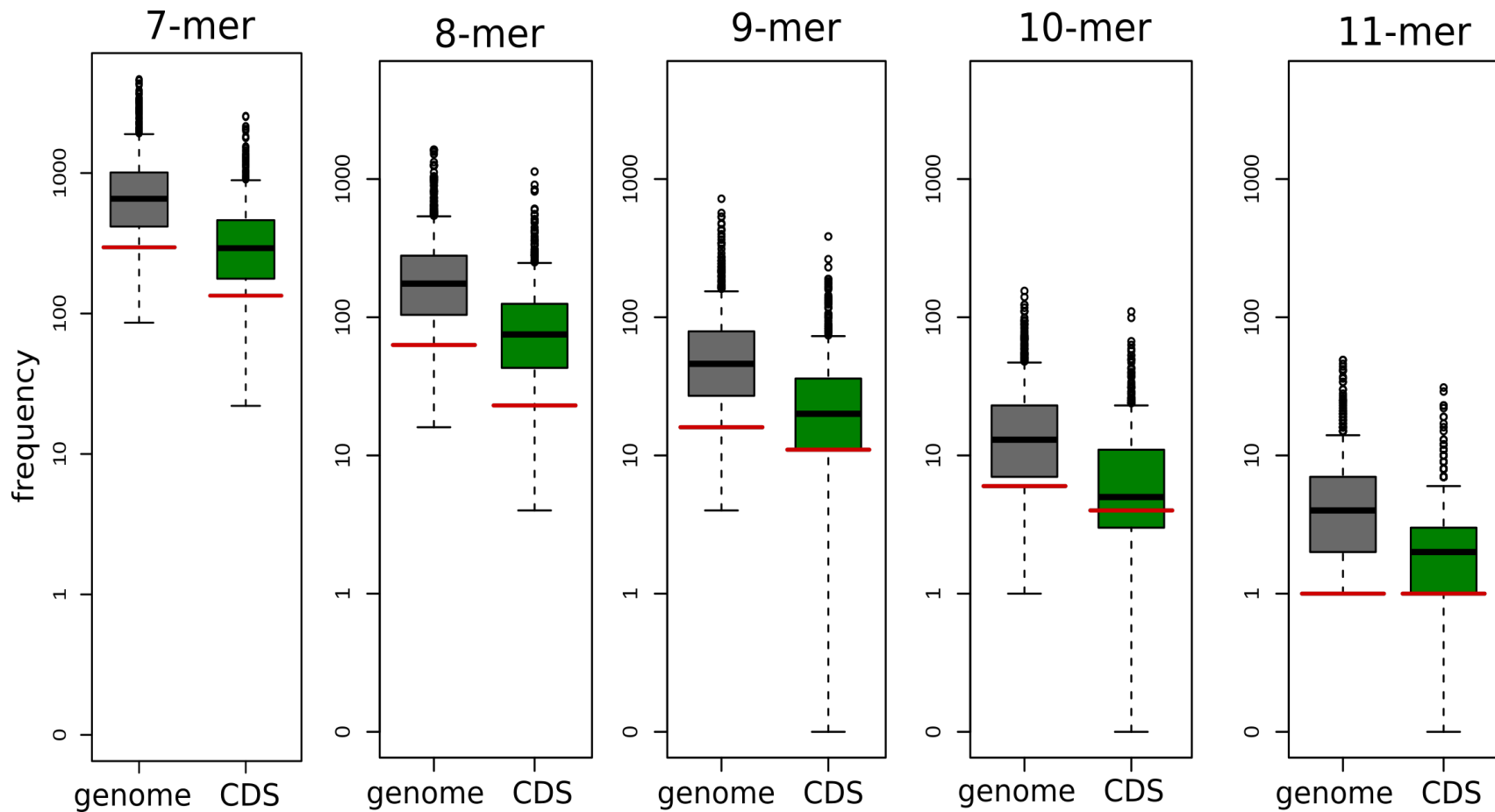
6S RNA in *B. subtilis*



6S pRNA expression per growth phase



pRNA sequence underrepresentation



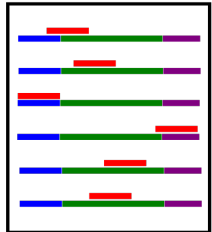
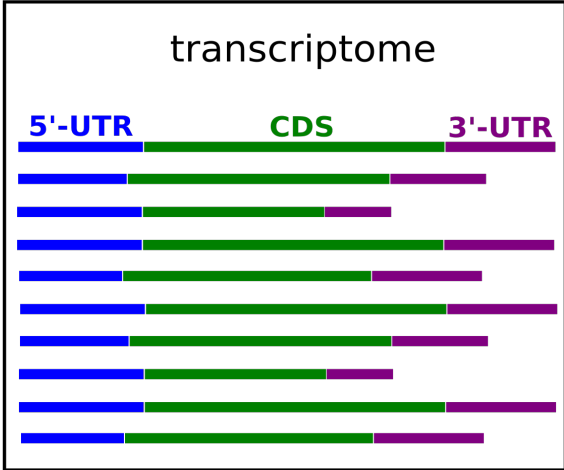
Prediction of pRNA:mRNA interaction

Sequence complementarity

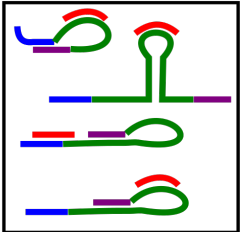
Structural accessibility

RNAbob

**RNAup /
IntaRNA**



candidate lists



Putative interaction targets

Gene	Structure	Sequence	Role
srfAA	outgrowth		surfactin
infB		outgrowth	translation initiation factor IF-2
ppsB	outgrowth	stationary	plipastatin synthase subunit B
aspS	outgrowth		aspartate--tRNA ligase
ddl	outgrowth	stationary	D-alanine--D-alanine ligase
rsmB	both		ribosomal RNA small subunit methyltransferase B
vpr		both	minor extracellular protease vpr
pcrA	outgrowth	stationary	ATP-dependent DNA helicase PcrA
sigH		both	RNA polymerase sigma-H factor
holB	stationary		DNA polymerase III subunit delta'
nadD	outgrowth	stationary	nicotinate-nucleotide adenylyltransferase
glpG	both		rhomboid protease GluP
ybbD	outgrowth	stationary	lipoprotein
yhdW	outgrowth	both	lycerophosphoryl diester phosphodiesterase

Diversity of known pRNA sequences

E.coli 6S pRNA

AUCGGCUCAGGGGACUG

B.subtilis 6S-1 pRNA

GUUCGGUCAAAACUAGG

B.subtilis 6S-2 pRNA

AAAGGUUAAAACUUAAU

R.sphaeroides 6S pRNA

AUCGGCCACUGGAAAAG

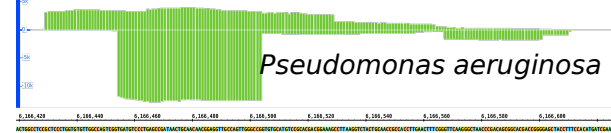
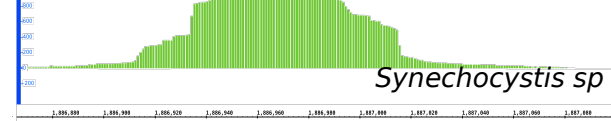
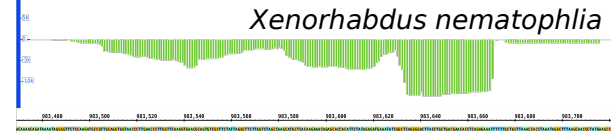
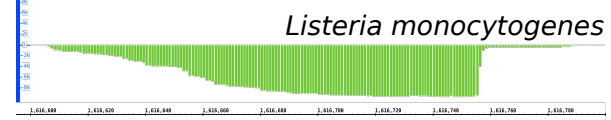
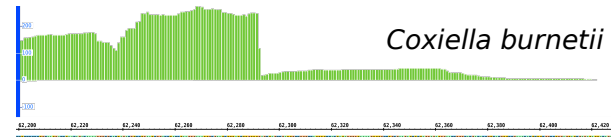
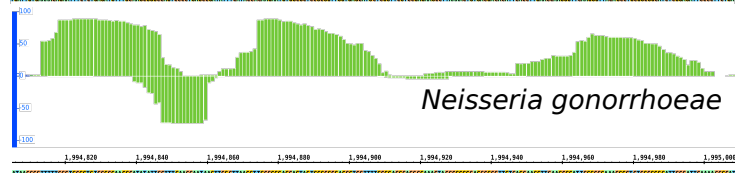
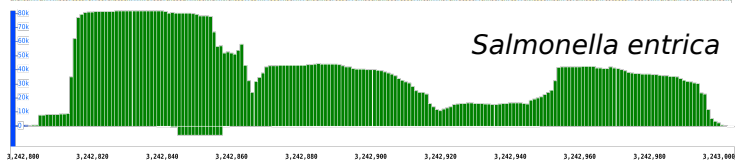
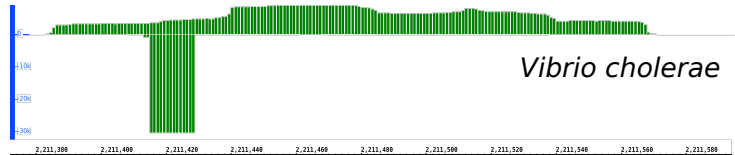
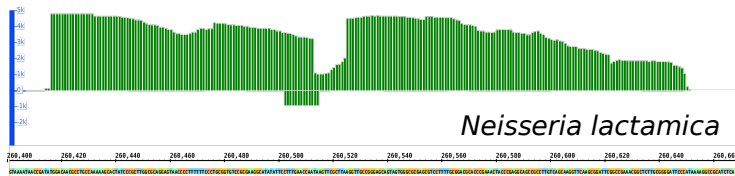
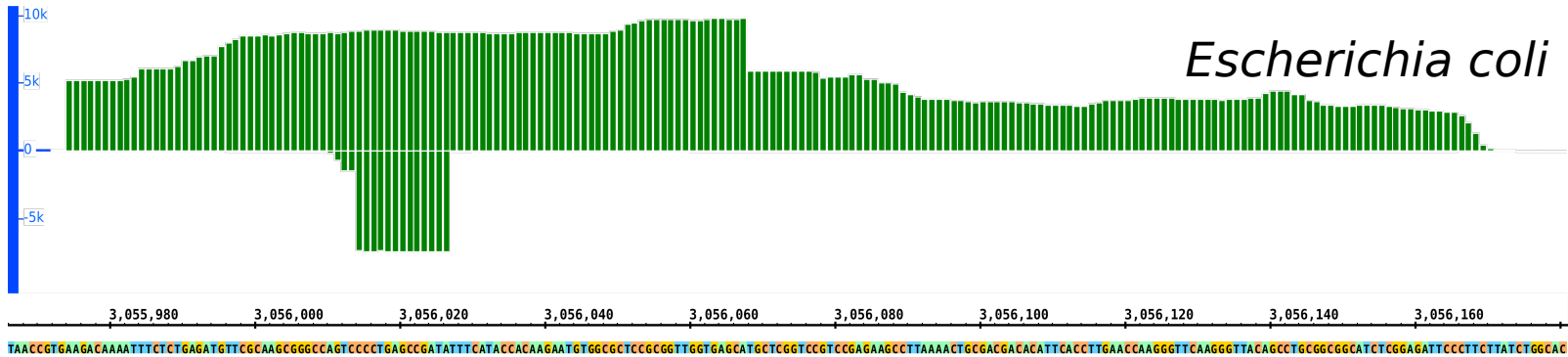
A.aeolicus 6S pRNA

GUAGGCCCCAUUGACAA

H.pylori 6S pRNA

AACGAACUUGCCAUCAA

Detection of pRNA transcription



Conservation of interaction targets

Gene	Role
artR	ABC transporter ATP-binding protein
ykuF	short-chain dehydrogenase
yraN	LysR family transcriptional regulator
ykpA	ABC transporter ATP-binding protein
pcrA	ATP-dependent DNA helicase PcrA
bceR	sensory transduction protein BceR, two-component response regulator, osmolarity response
bmrA	multidrug resistance ABC transporter ATP-binding permease protein BmrA
ykuU	thioredoxin, alkyl hydroperoxide reductase, bacterioferritin comigratory protein
yqhB	transmembrane transporter domain-containing protein
ykrV	transaminase MtnE

Outlook

- Confirmation of predicted interactions
 - Experiments by growth phase:
 - stationary
 - outgrowth
 - sporulation
 - validate with 6S-KO strains in *B.subtilis*
 - point mutations in pRNA sequence
 - RT qPCR

Acknowledgement



Thanks to:

Marburg

- Philipp Hoch
- Maria Schmidt
- Roland K. Hartmann
- Marcus Lechner
- Zhao Jing

Moscow

- Olga Burenina
- Elena Kubareva

... and thank **you** for your attention!

Putative interaction targets: IntaRNA

