RNA SYNTHESIS  $r_{transcription} \approx 40 \text{ nucleotides / sec}$  BNID: 111871 (A) rRNA synthesis mRNA synthesis tRNA synthesis  $L_{rRNA\ genes} \approx 4500\ nucleotides$ BNID: 105280 BNID: 104186:106254  $r_{RNAP\,loading} \approx 1 / sec$  $N_{tRNA} \approx \frac{3000}{amino\ acid} \times 20\ amino\ acids$ BNID: 111997  $\frac{1 \text{ mRNA}}{1000 \text{ proteins}} \times 3 \times 10^6 \text{ proteins}$ BNID: 107873  $L_{\text{RNAP footneint}} \approx 40 \text{ nucleotides}$  $\approx 6 \times 10^4 \text{ tRNA}$ ≈3000 mRNA  $L_{\text{between RNAP}} \approx \ L_{\text{RNAP footprint}} + \frac{r_{\text{transcription}}}{r_{\text{RNAP loading}}} \approx 80 \ \text{nucleotides}$  $L_{mRNA} \approx 1000 \text{ nucleotides}$  BNID:100022 L<sub>RNA</sub> ≈ 80 nucleotides BNID:102340  $\frac{L_{\text{rRNA genes}}}{L_{\text{hotween RNAP}}} \times N_{\text{rRNA genes}} \approx 400 \text{ RNAP}$  $N_{\text{rnap}} \approx N_{\text{rnap}}^{\text{(frna)}} + N_{\text{rnap}}^{\text{(mrna)}} + N_{\text{rnap}}^{\text{(frna)}} \approx 500 \text{ RNAP}$ (B) (C) 10<sup>4</sup> 105 RNA Polymerases per cell 0 0 0 ع<sup>70</sup> (RpoD) per cell 10<sup>4</sup> 8 800 800 CO CO 0  $10^{3}$ estimated value estimated value Li et al. 2014 Li et al. 2014 Peebo et al. 2015 Peebo et al. 2015 Schmidt et al. 2016 Schmidt et al. 2016 Valgepea et al. 2013 Valgepea et al. 2013

 $10^{2}$ 

0.00

0.25

0.50

0.75

growth rate [hr-1]

1.50

1.75

1.50

1.75

 $10^{2}$ 

0.00

0.25

0.50

0.75

growth rate [hr-1]