RNA SYNTHESIS ≈ 40 nucleotides / sec BNID: 111871 (A) rRNA synthesis mRNA synthesis tRNA synthesis  $L_{\text{rRNA genes}} \approx 4500 \text{ nucleotides}$ BNID: 104186;106254 BNID: 108093 BNID: 108611  $N_{mRNA} \approx \frac{1 \text{ mRNA}}{1000 \text{ proteins}} \times 3 \times 10^6 \text{ proteins}$  $N_{abbb} \approx 4 \times 10^5 \text{ tRNA / cell}$  $r_{\text{RNAP loading}} \approx 1 \text{ / sec}$ BNID: 111997 ≈3000 mRNA (at steady state) BNID: 107873  $L_{RNAP footprint} \approx 40 \text{ nucleotides}$ BNID:102340  $\rho_{\text{RNAP}} \approx \underline{\hspace{1cm} 1 \hspace{1cm} RNAP}$  $r_{degradation} \approx 1 \text{ mRNA} / 300 \text{ s}$  BNID:111927 1 RNAP  $L_{tRNA} \approx 80 \text{ nucleotides / tRNA}$ 80 nucleotides  $L_{mRNA} \approx 1000 \text{ nucleotides}$  BNID:100022  $N_{RNAP}^{(mRNA)} \approx \frac{N_{mRNA} \times r_{degradation} \times L_{mRNA}}{r} \approx 250 \text{ RNAP}$  $N_{RNAP} \approx N_{RNAP}^{\text{(riflNA)}} + N_{RNAP}^{\text{(riflNA)}} + N_{RNAP}^{\text{(riflNA)}} \approx 1000 \text{ RNAP}$ (B) (C) 105  $10^{4}$ RNA Polymerases per cell 0 70 (RpoD) per cell  $10^{4}$ 0 replication fork scaling replication fork scaling 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  $10^{2}$  $10^{2}$ 0.00 0.25 0.50 1.00 1.25 0.00 0.25 1.00 1.25 0.75 1.50 1.75 2.00 0.50 1.50 1.75

growth rate [hr<sup>-1</sup>]

growth rate [hr-1]