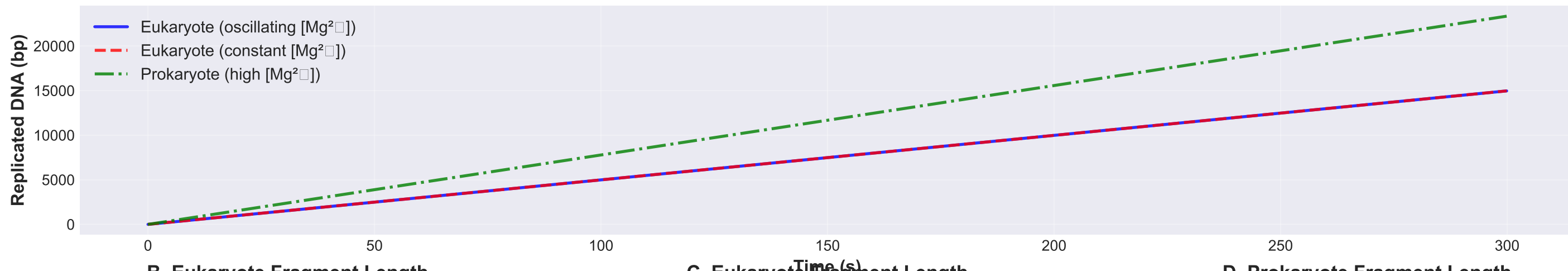
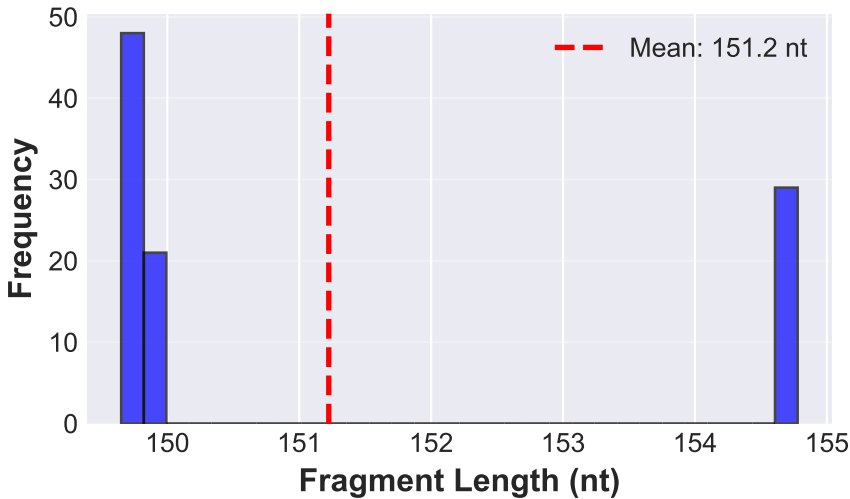


Okazaki Fragment Length: Charge-Dependent Replication Dynamics

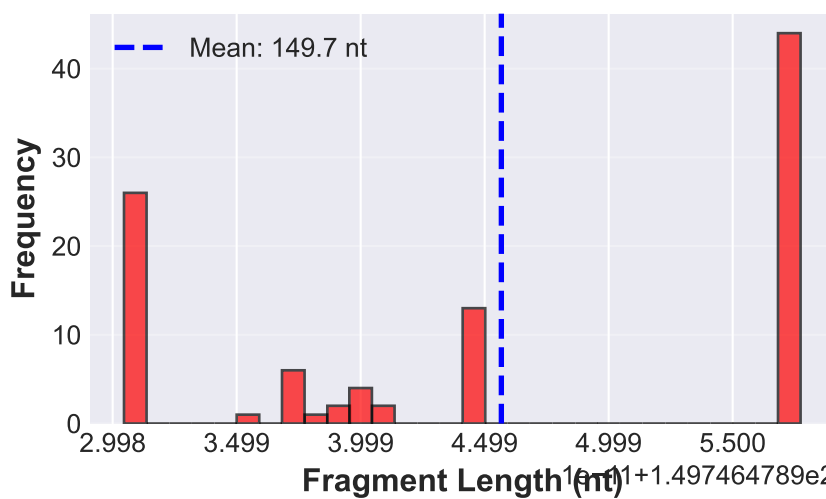
A. DNA Replication Progression



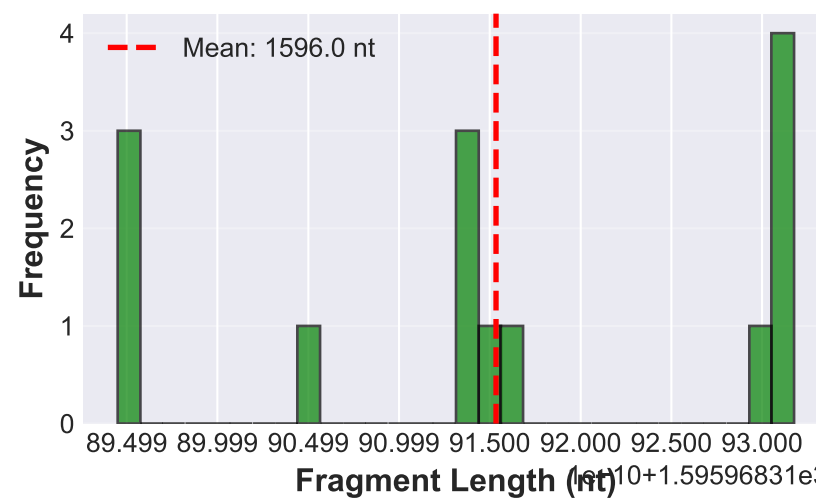
B. Eukaryote Fragment Length (Oscillating  $[Mg^{2+}]$ )



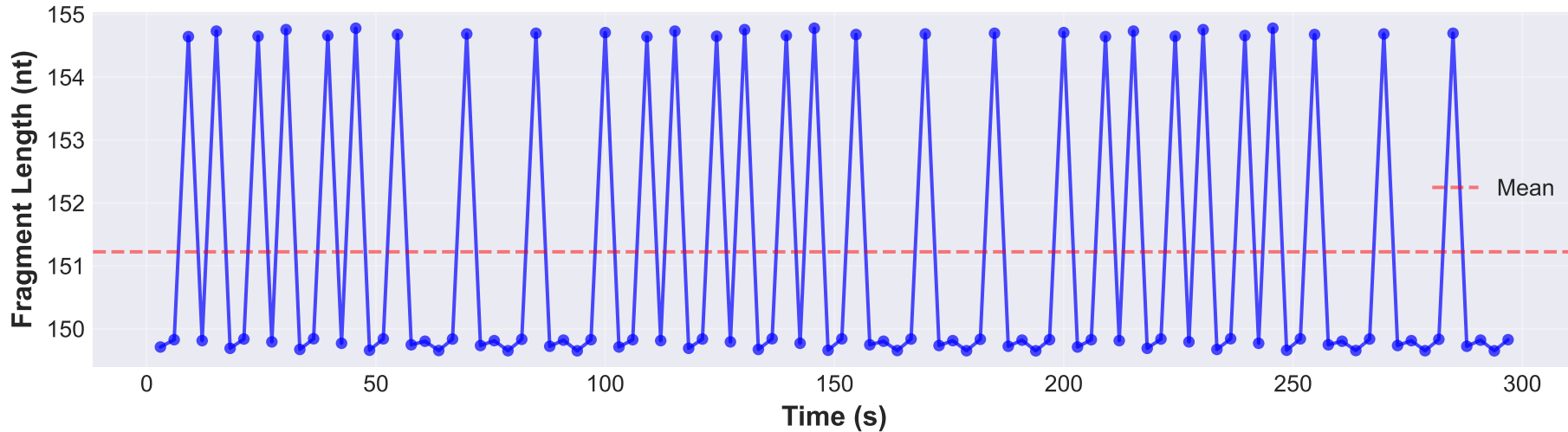
C. Eukaryote Fragment Length (Constant  $[Mg^{2+}]$ )



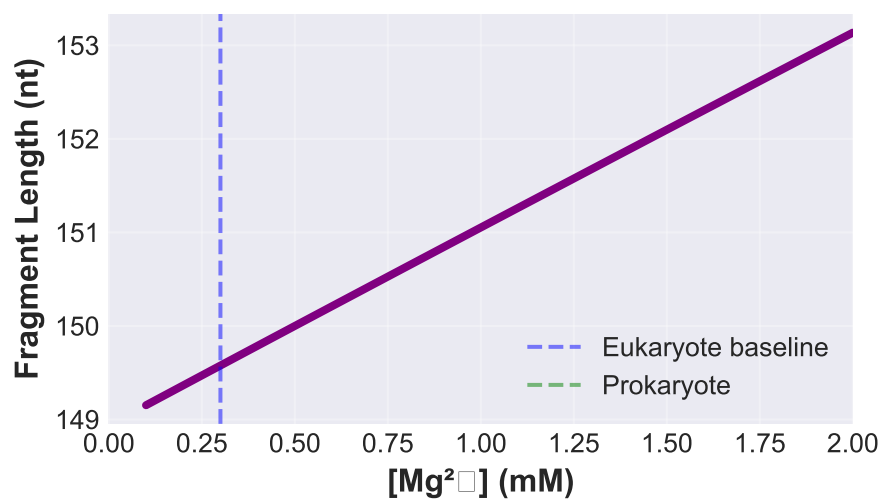
D. Prokaryote Fragment Length (High  $[Mg^{2+}]$ )



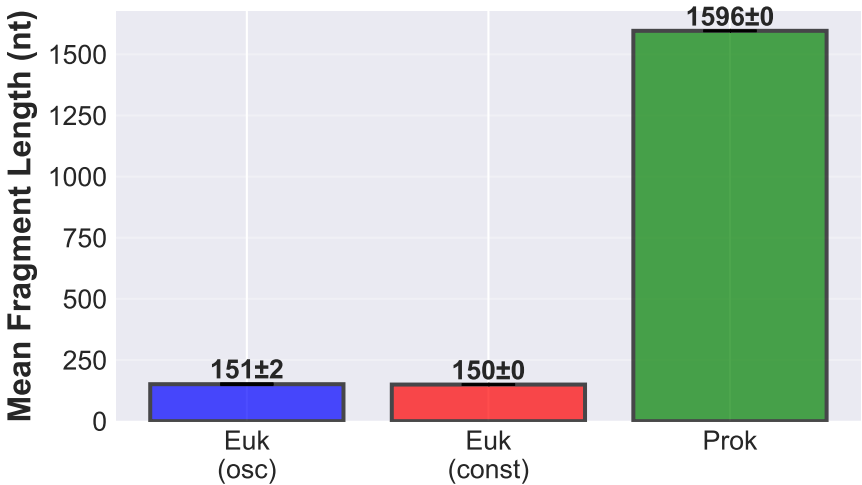
E. Okazaki Fragment Length Oscillations Over Time



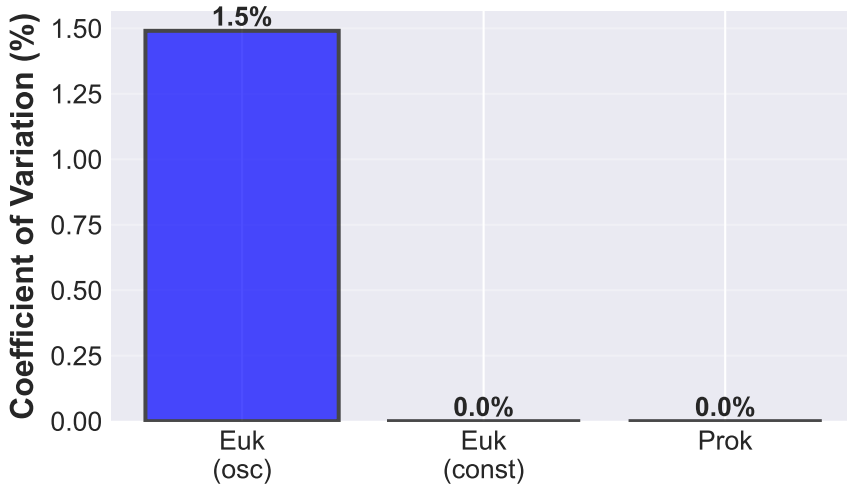
F. Fragment Length vs  $[Mg^{2+}]$



G. Fragment Length Comparison



H. Fragment Length Variability



OKAZAKI FRAGMENT STATISTICS

Eukaryote (Oscillating):

- Mean: 151.2 nt
- Std: 2.3 nt
- Range: 149.7-154.8 nt
- CV: 1.5%

Eukaryote (Constant):

- Mean: 149.7 nt
- Std: 0.0 nt
- Range: 149.7-149.7 nt
- CV: 0.0%

Prokaryote:

- Mean: 1596.0 nt
- Std: 0.0 nt
- Range: 1596.0-1596.0 nt
- CV: 0.0%

Ratios:

- Prok/Euk: 10.6×
- Predicted: ~10× (literature)

Oscillation Effect:

- Amplitude: 2.6 nt
- Period: ~5 s (ATP cycle)