

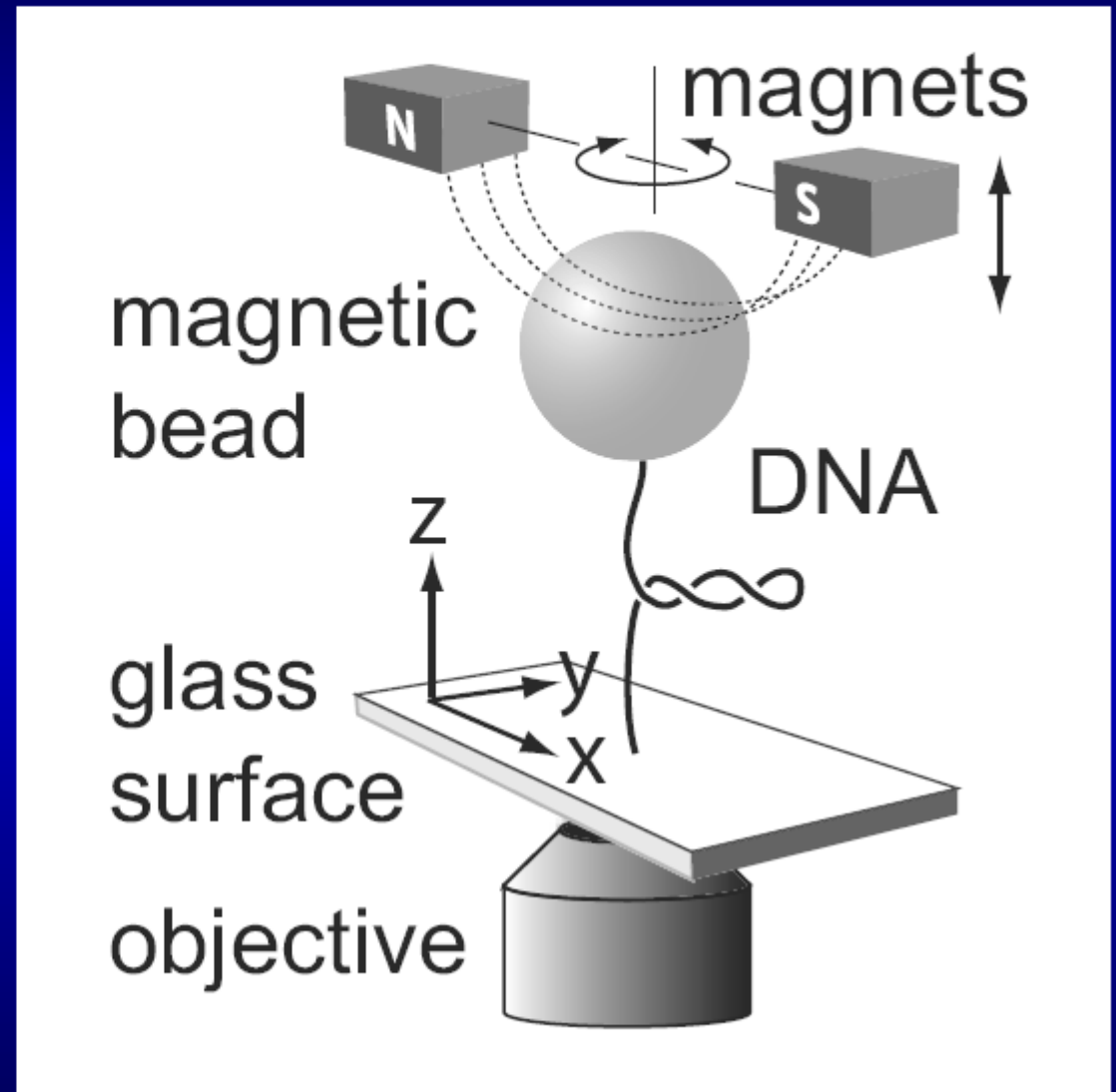
Mechanically controlled DNA extrusion from a palindromic sequence by single molecule micromanipulation.

Alexandre Dawid, Fabien Guillemot, Camille Brème, Vincent Croquette, François Heslot
Physical Review Letter 2006 May 12;96(18):188102

Twisting a palindromic DNA molecule
($F = \text{constant}$)

A simple measure of the helical pitch

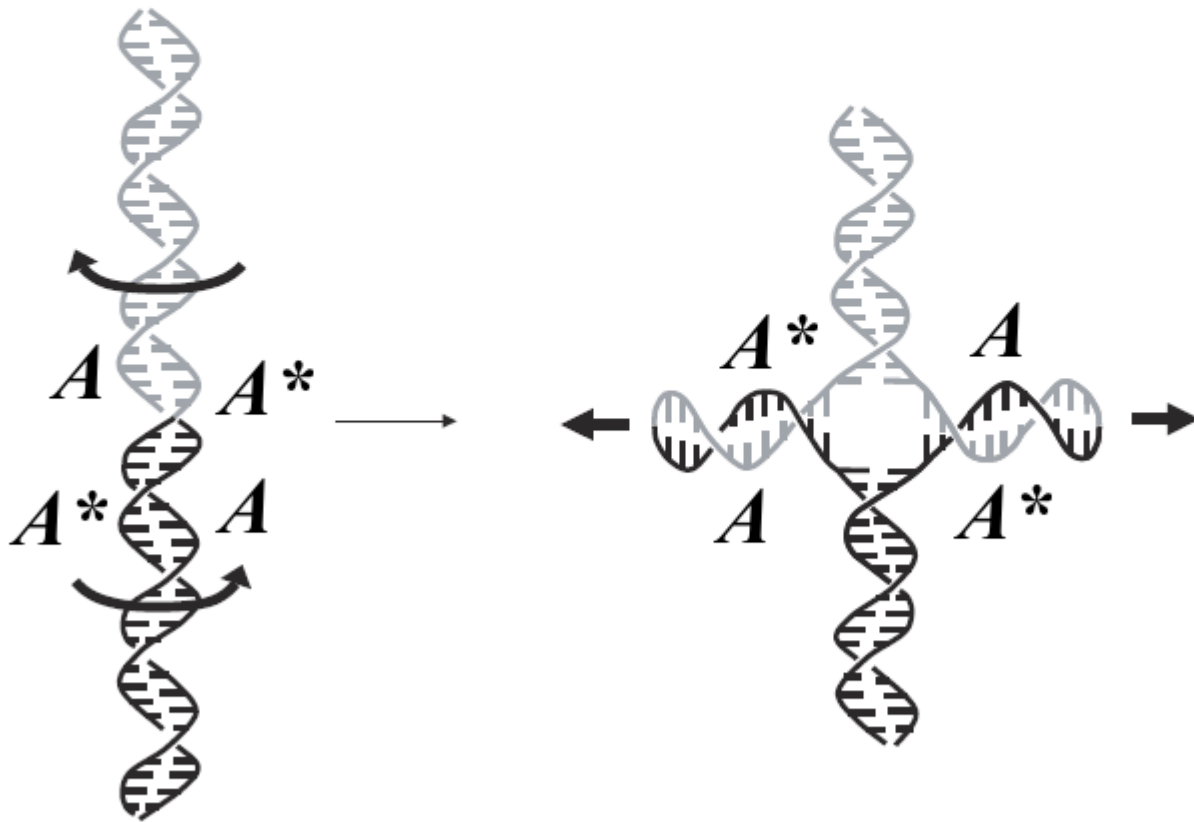
Results



Twisting a single DNA molecule having a palindromic sequence: experiment.

Principle

Mechanics



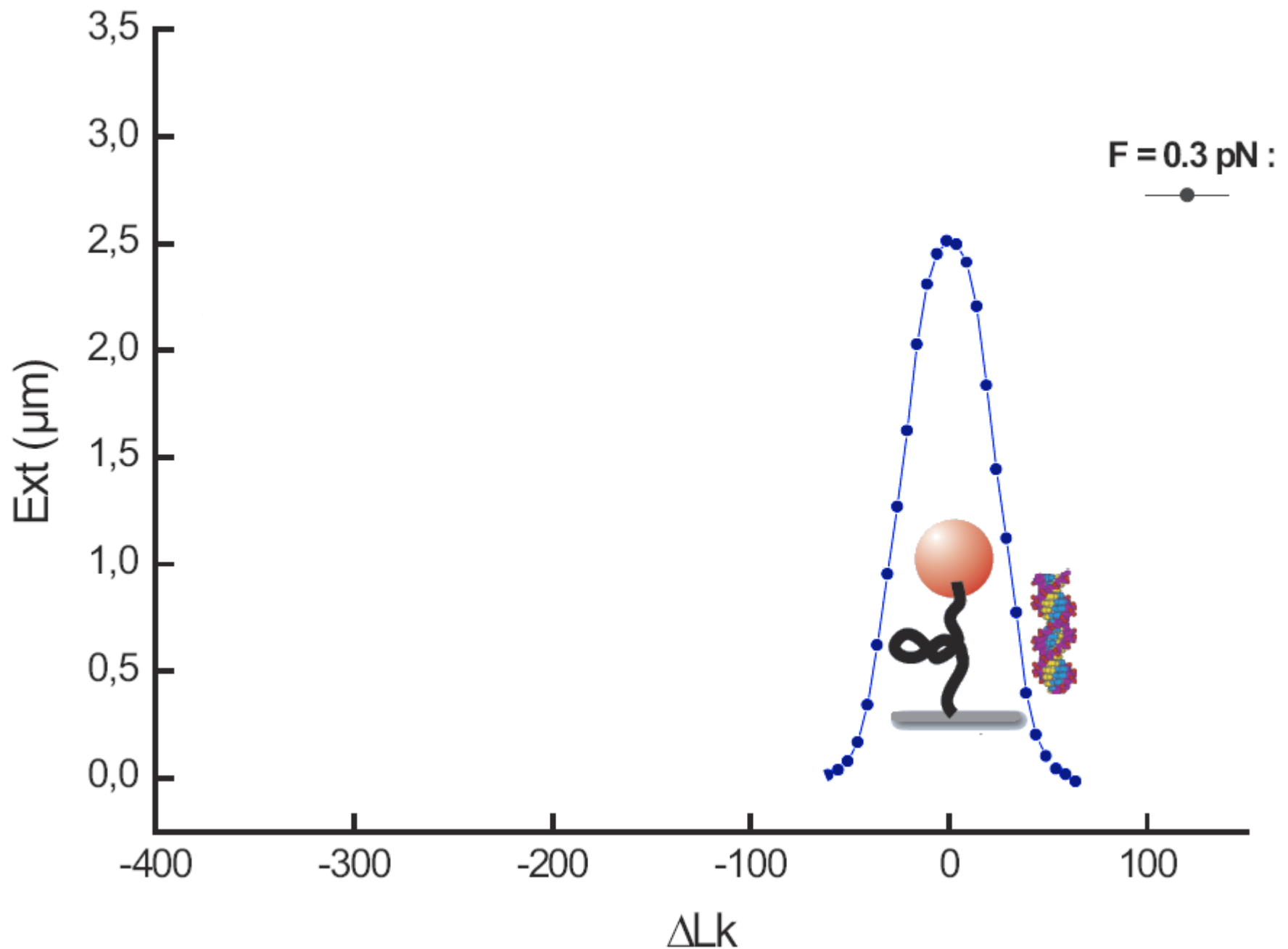
Twisting a single DNA molecule having a palindromic sequence: experiment;

F = 0.3 pN

F = 1.3 pN

F = 1.3 pN, torsion increasing

F = 1.3 pN, torsion decreasing



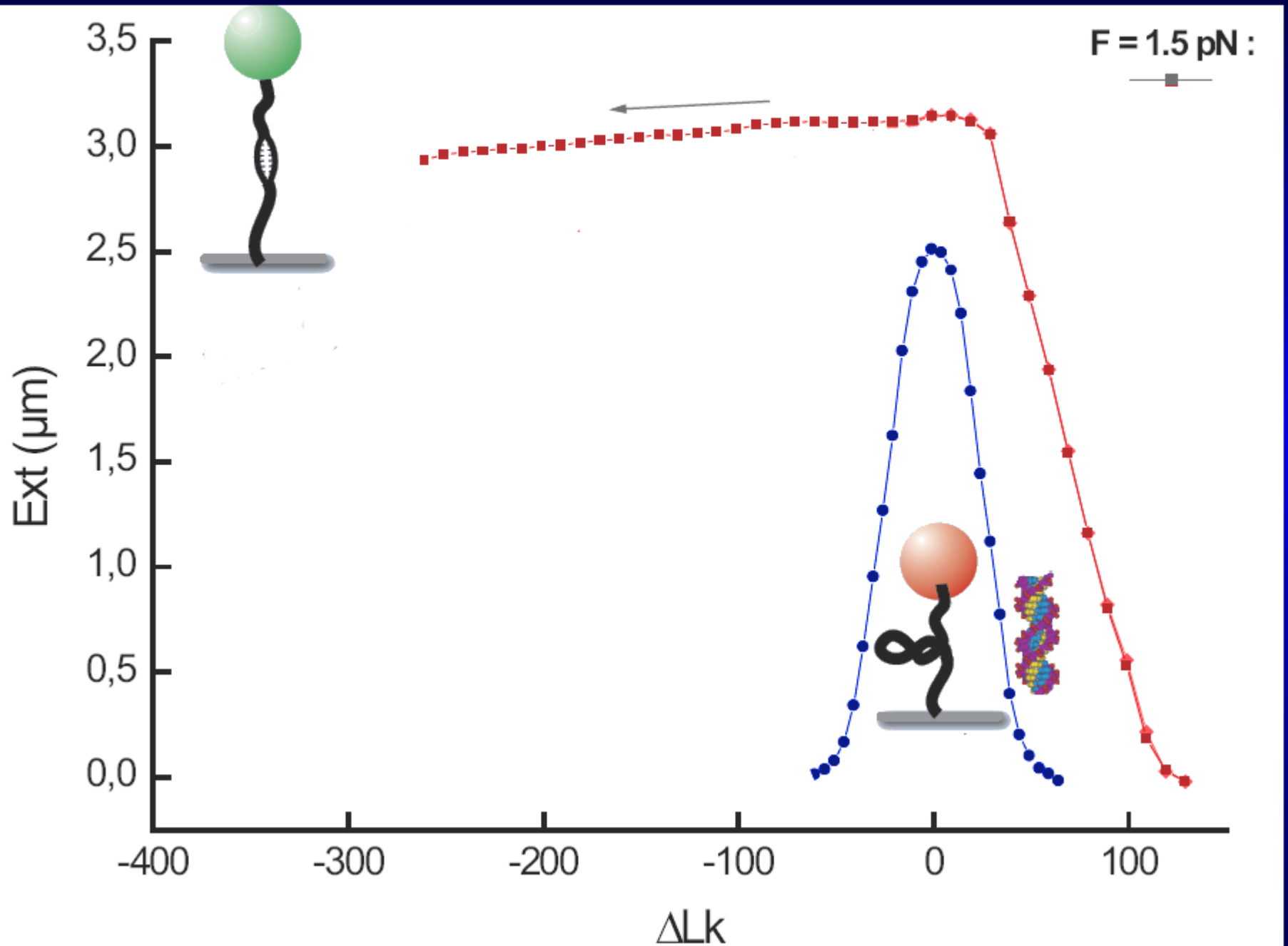
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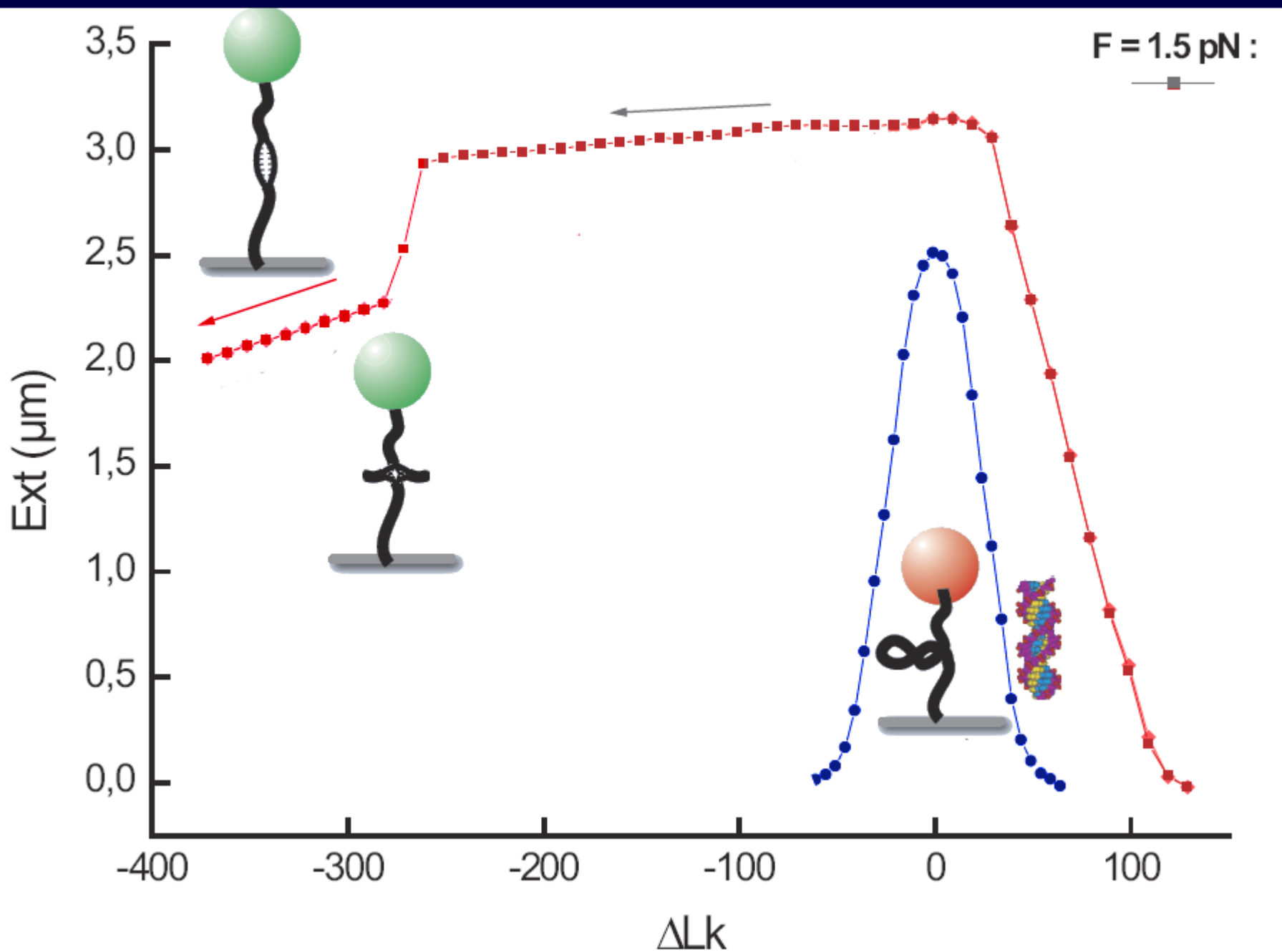
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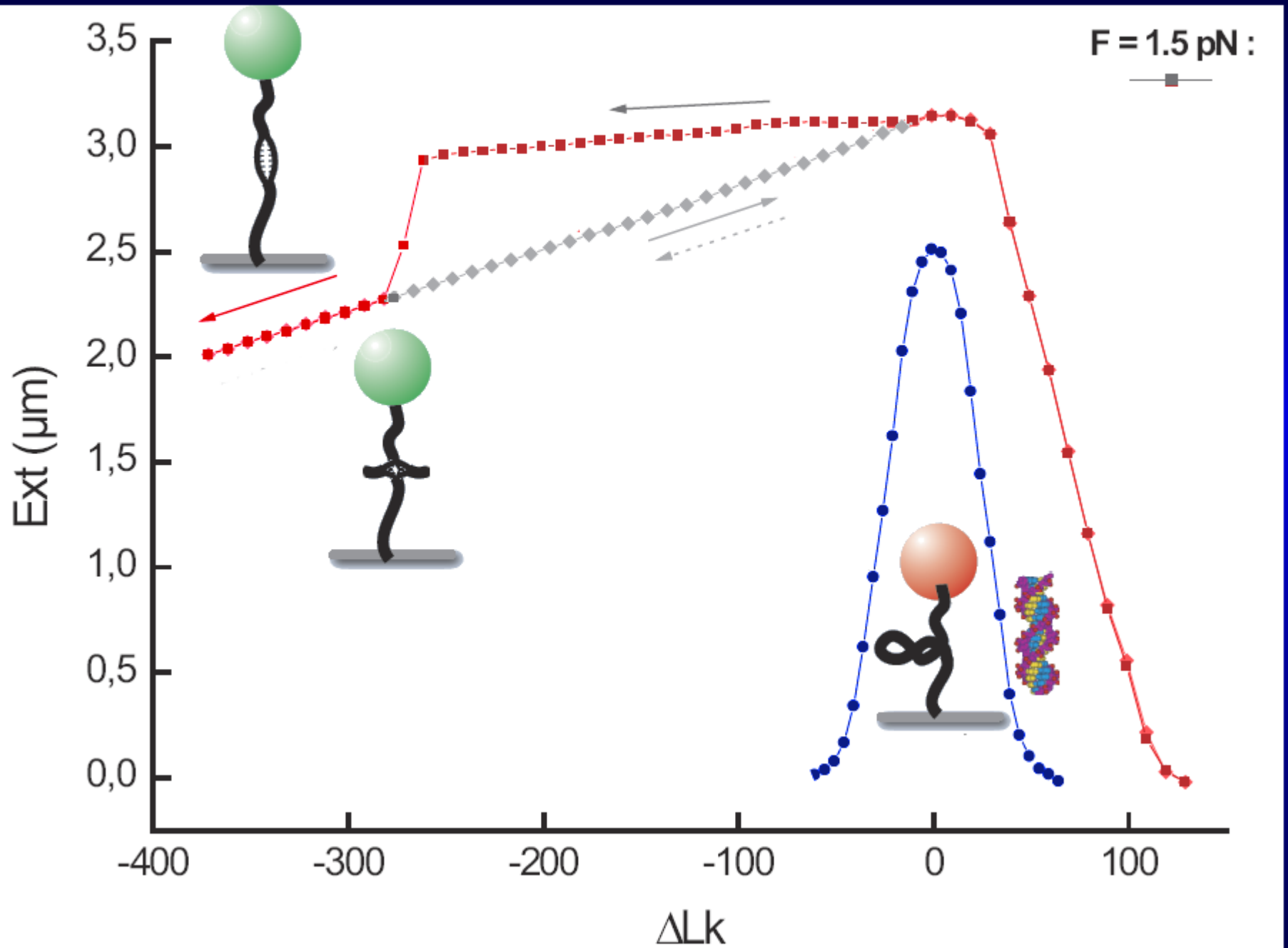
Twisting a single DNA molecule having a palindromic sequence: experiment;

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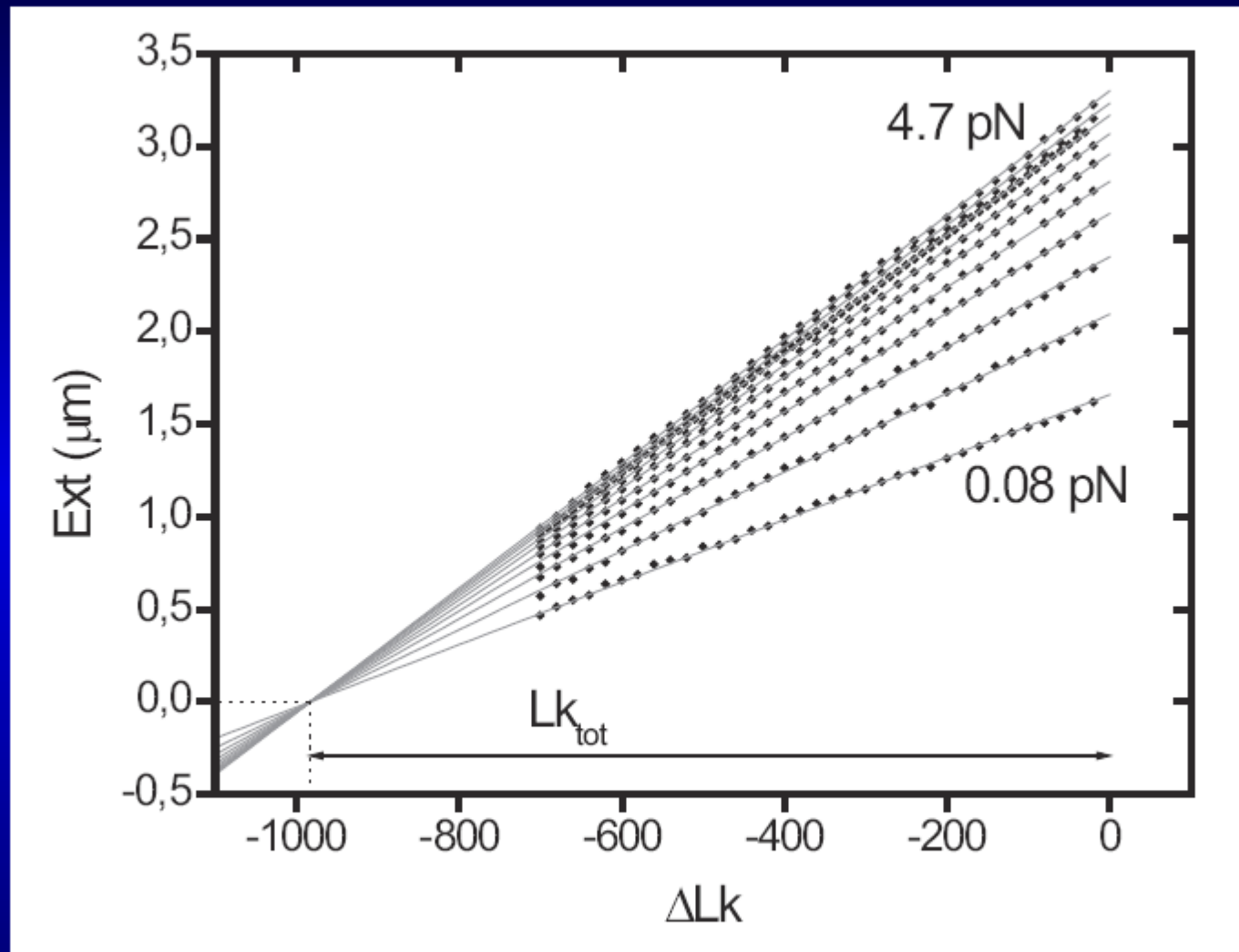
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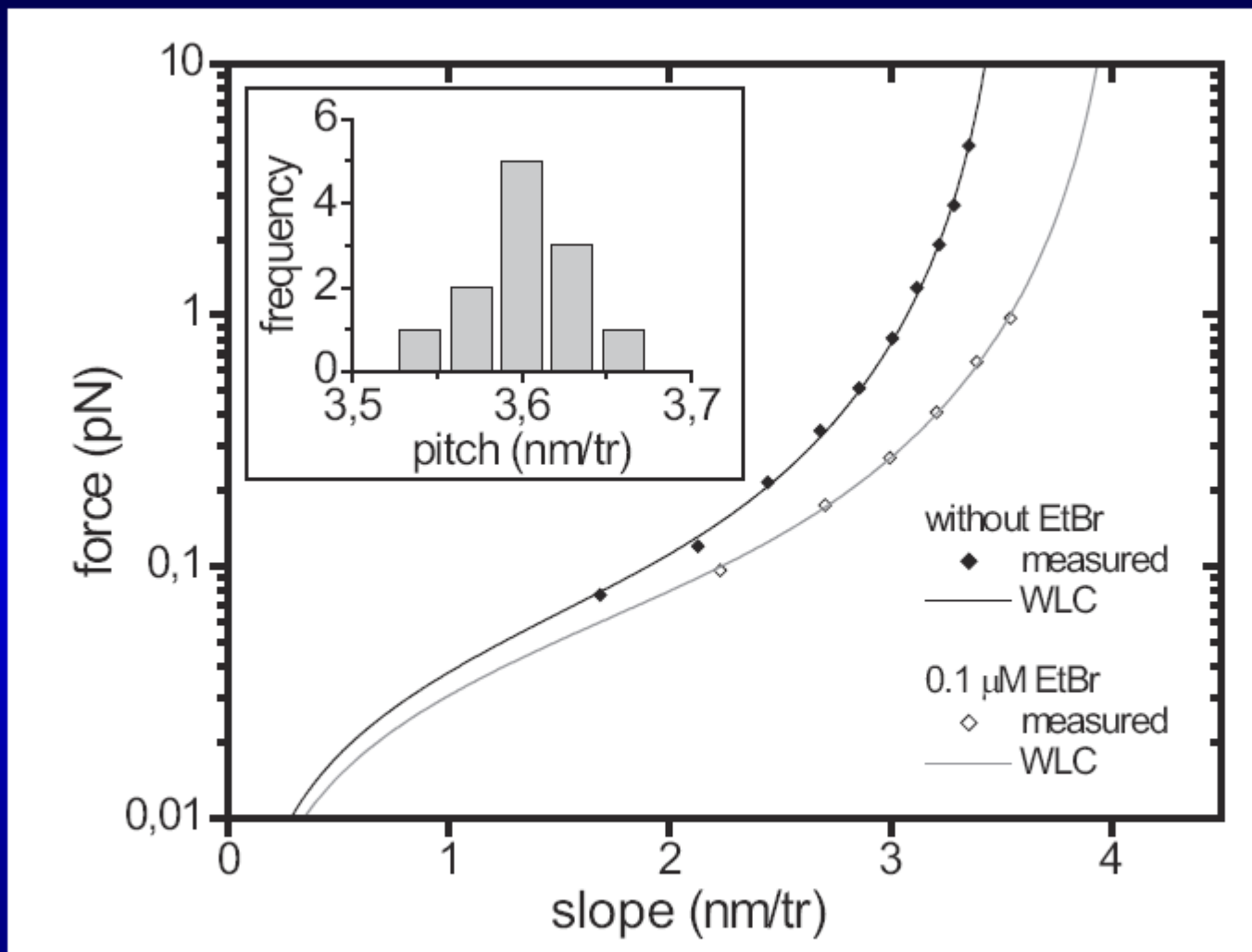
F = 1.3 pN, torsion decreasing



Slope dependence versus force applied



Slope versus force = Worm Like Chain model



DNA pitch and persistence length

Helical pitch of DNA (p) and persistence length (L_P)

condition	p (nm) ($\pm SD$)	L_P (nm) ($\pm SD$)	number of molecules
standard ^a (pH 8, 37°C)	3.61 ± 0.03	50 ± 2	12
standard + 0.2 M KGlu ^b	3.59 ± 0.03	42 ± 2	3
standard but pH 7	3.59 ± 0.05	45 ± 3	6
standard but 27°C	3.64 ± 0.06	46 ± 3	2
standard + 0.1 μ M EtBr ^b	4.12 ± 0.05	52 ± 5	3

^a25 mM Tris-Acetate pH 8, 0.5 mM EDTA, 0.1% BSA, 0.01% NaN₃, 37°C

^bKGlu : potassium glutamate, EtBr : ethidium bromide