Electronic Supplementary Material (ESI) for Analyst.

Label-Free Enzyme Therapeutic Effectiveness Quantification with Optimized Silicon Transistors

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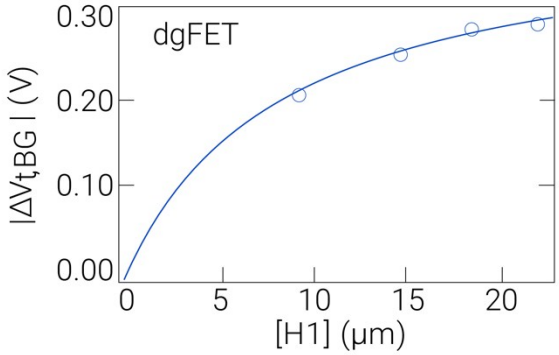

Figure S1: Steady-state measurements of Cdk5 activity using dual-gated field-effect transistors (dgFETs).[1] The change in the solution pH was used as a reporter to detect and quantify enzyme-mediated phosphorylation of the protein histone H1. The change in the back-gate threshold ($V_{T,BG}$) as a function of histone H1 concentration ([H1]) showed a monotonic increase. A simple model was used to estimate the activity coefficient, k_a=(9.1±0.9) μM.[2]

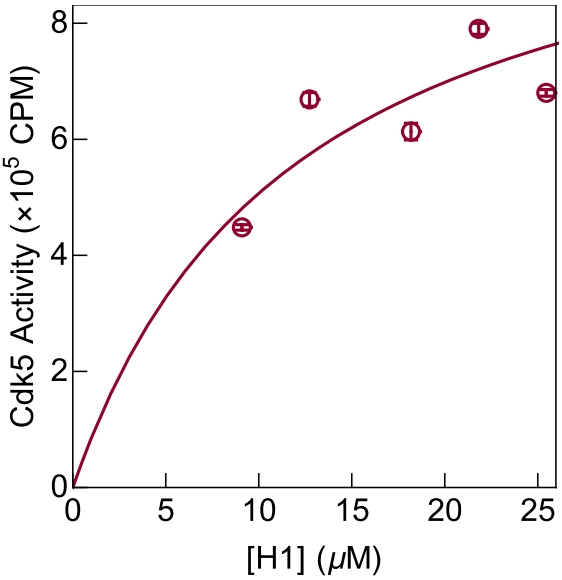

Figure S2: The activity of Cdk5/p25 was determined using a radioactively labeled adenosine triphosphate (γ-^{32}P-ATP) assay as a function of the concentration of the protein histone ([H1]).[3] A simple model was used to determine the activity coefficient, k_a=(12.1±2.3) μM.[2] Adapted with permission from Ref. 2. The error bars represent the standard deviation in Cdk5 activity.

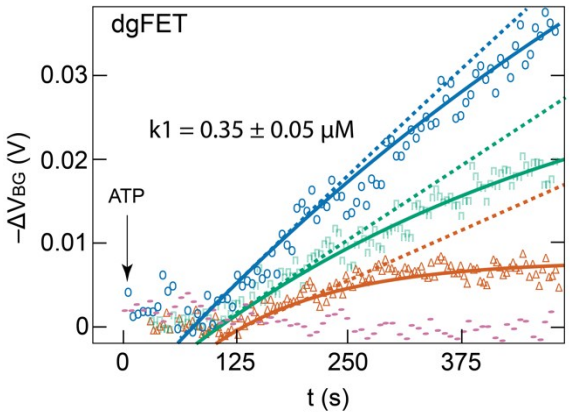

Figure S3: Time-series measurements of enzyme catalyzed phosphorylation of histone H1 were measured with a dual-gated field-effect transistor (dgFET). The histone concentrations ([H1]) were 9.1 µM (*orange*), 12.7 µM (*green*), 18.2 µM (*blue*) and a control sample with no histone (*pink*). The solid lines depict a first order kinetics model that describes the time course of phosphorylation, while the dashed lines represent an estimate of the reaction velocity during the first 100 s after a change in the signal was detected.

References

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