Multienzyme chemiluminescent foldable biosensor for on-site detection of acetylcholinesterase inhibitors

Laura Montali[1◆], Maria Maddalena Calabretta[1◆], Antonia Lopreside[1], Marcello D'Elia[2], Massimo Guardigli*[1], Elisa Michelini*[1,3,4]

[1]Department of Chemistry "Giacomo Ciamician", University of Bologna, Via Selmi 2, 40126 Bologna, Italy

[2]Gabinetto Regionale di Polizia Scientifica per l'Emilia-Romagna, Via Volto Santo 3, 40123, Bologna, Italy

[3]INBB, Istituto Nazionale di Biostrutture e Biosistemi, 00136 Rome, Italy

[4]Health Sciences and Technologies-Interdepartmental Center for Industrial Research (HST-ICIR), University of Bologna, via Tolara di Sopra 41/E 40064, Ozzano dell'Emilia, Bologna, Italy

◆ These authors contributed equally.

Supplementary Materials

Table S1: Recovery of chlorpyrifos methyl in white cabbage juice (n = 3). *n.d.*: not detectable

Added (mM)	Found (mM)	Recovery (%)	RDS (%)
0.00	*n.d.*	*n.d.*	*n.d*
0.60	0.59±0.04	95	1
3.00	2.72±0.03	99	3
10.00	9.73±0.05	92	6

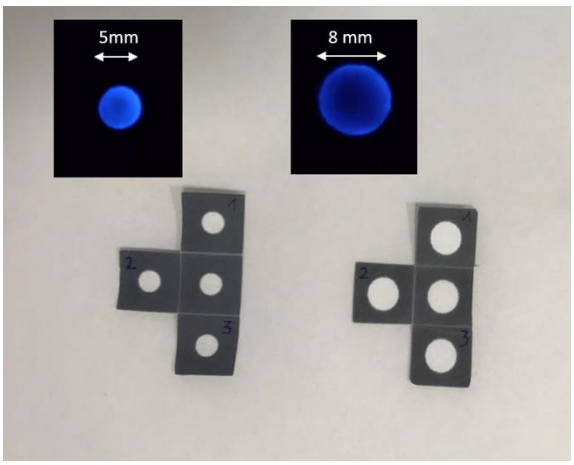

Fig. S1: Paper-based biosensors designed with 5-mm (left) and 8-mm (right) diamater wells and CL signals obtained with paper-based biosensors with adequate enzymes loading (AChE, ChOx and HRP) in 5-mm and 8-mm diameter wells. In optimized experimental conditions CL signals were obtained with OnePlus6 smartphone (30 s, ISO 800) after 10 minutes of substrate reaction.

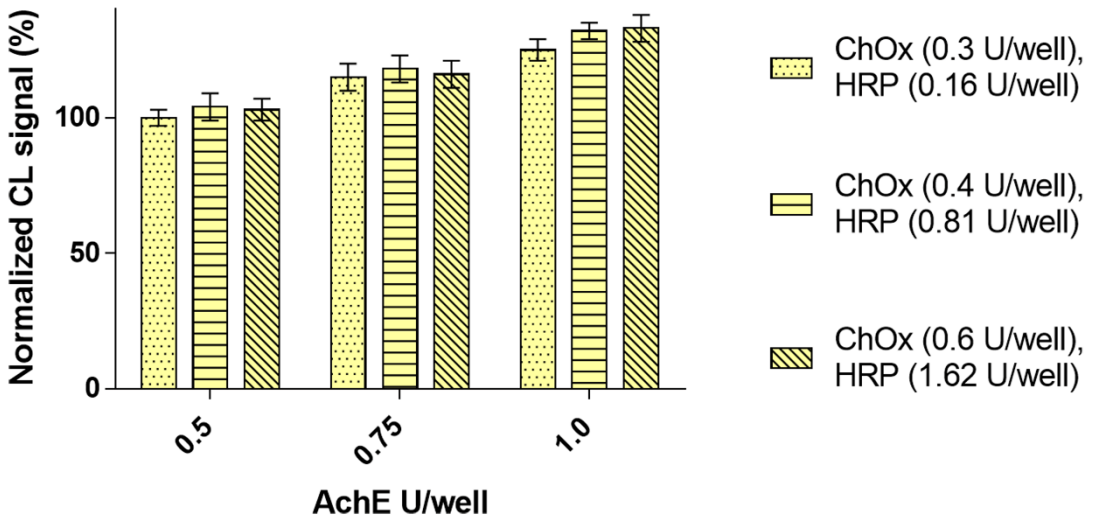

Fig. S2: Optimization of the paper-based biosensors with different enzyme loadings: AchE (0.5, 0.75 and 1.0 U/well) with different concentrations of ChOx and HRP (0.3 and 0.16 U/well, 0.4 and 0.81 U/well and 0.6 and 1.62 U/well, respectively). CL signals were measured with the OnePlus6 smartphone (30 s, ISO 800) 10 minutes after the complete folding of the biosensor. Results are normalized to the signal obtained in the optimal experimental conditions (AchE 0.5 U/well, ChOx 0.3 U/well, HRP 0.16 U/well)