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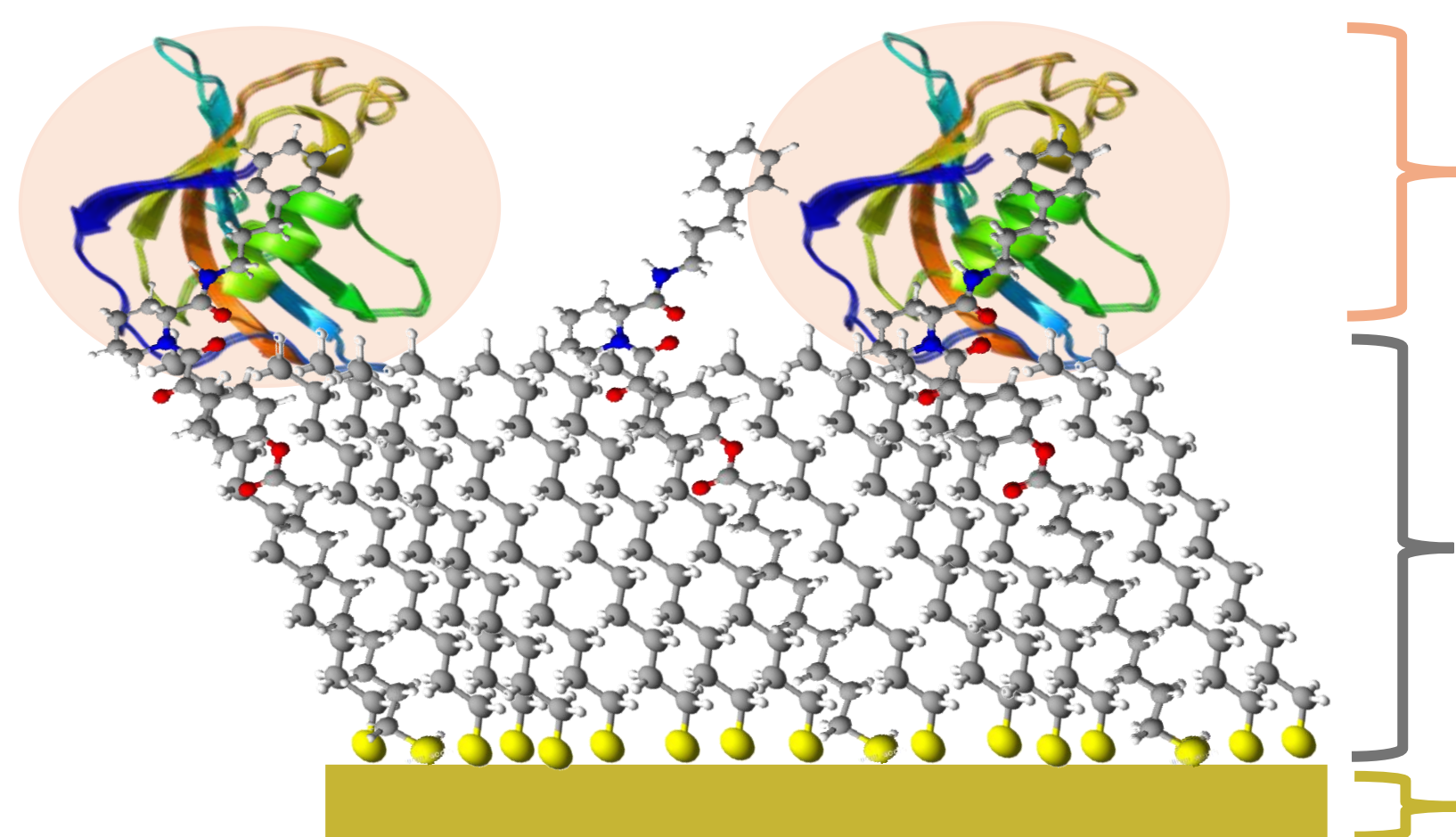
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PROJECT

The aim of the research activity is the design, the assembly and the development of a device for rapid and efficient determination of the concentration of the FKBP12 protein in biological fluids (CSF and blood). FKBP12 is a peptidyl-prolyl cis-trans isomerase with a well-established role in cancer, neurodegenerative processes and post-surgical anti-rejection response.¹

PROPOSED PLATFORM

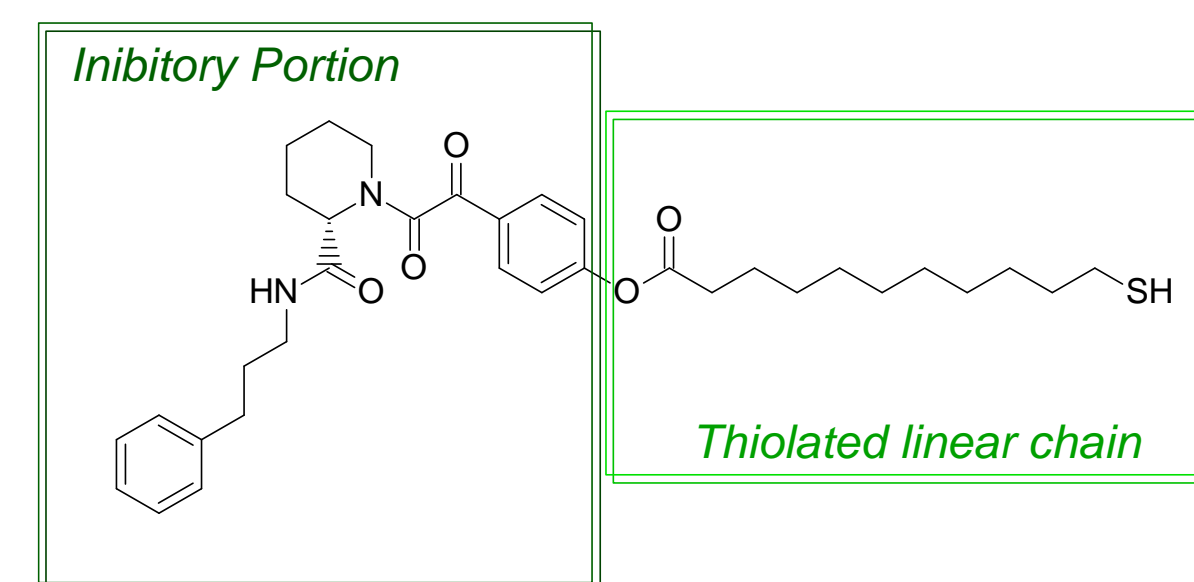


FKBP12

Self-assembled monolayer (SAM) with GPS-SH1 receptor and specific antifouling molecular scaffold (C₁₂-SH; PEG-SH).

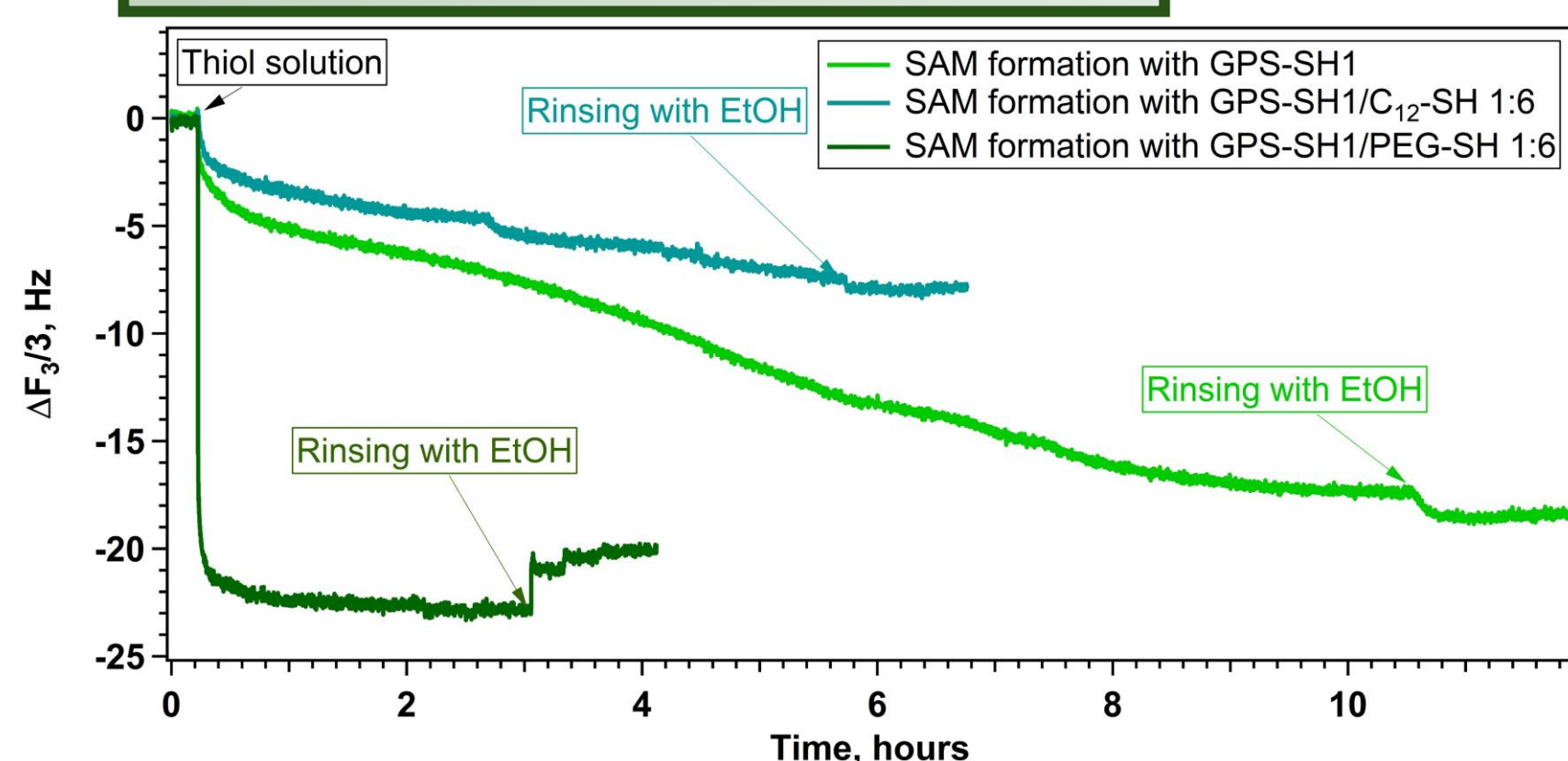
QCM support in Au.

GPS-SH1 receptor



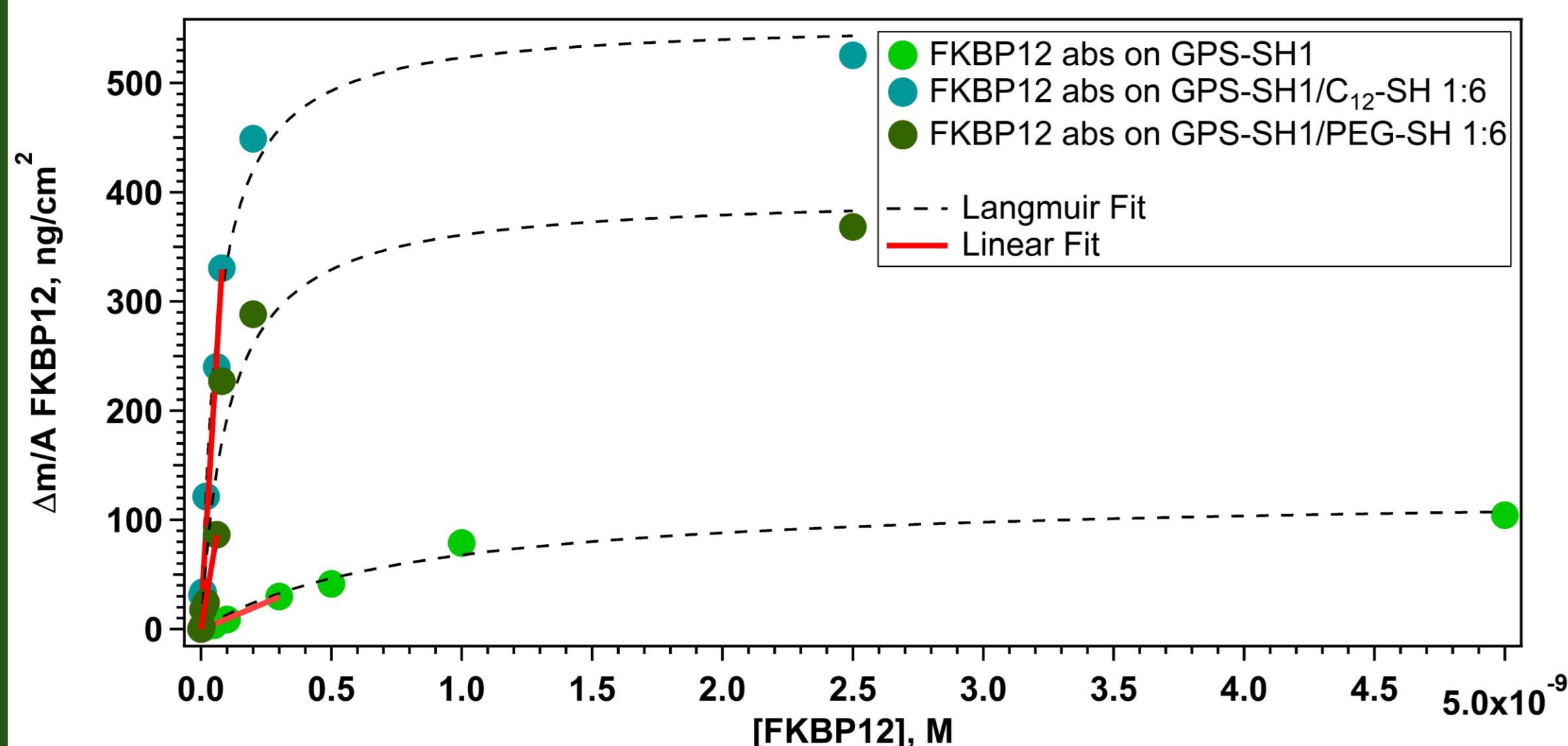
The GPS-SH1 receptor was designed and synthesized to specifically bind FKBP12 and to enable its direct detection in biological samples².

SAM CHARACTERIZATION



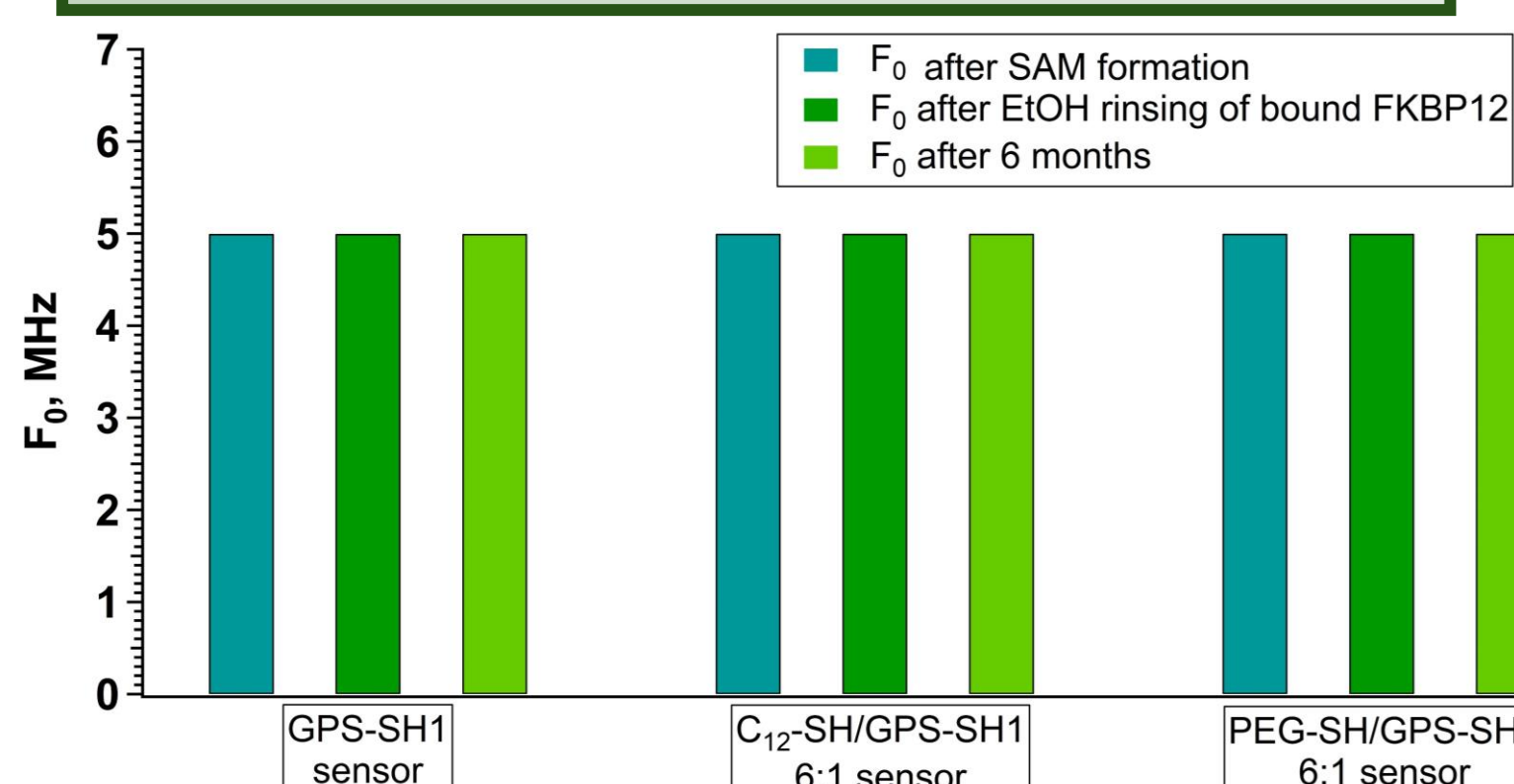
	$\Delta m/A$ (ng/cm ²)	#molec _{GPS-SH1} (x10 ¹³)	A/molec (Å ²)	Thickness (Å)
GPS-SH1	322.9	25.6	31	19
GPS-SH1/C₁₂-SH 1:6	135.6	4.13	32	16
GPS-SH1/PEG-SH 1:6	321.7	1.41	0.92	25

DETECTION OF FKBP12



	$\Delta m/A$ (ng/cm ²)	#molec _{FKBP12} (x10 ¹³)	Linear Range (M)	R ²	LOD (pM)
GPS-SH1	104.3	0.403	2 x 10 ⁻¹¹ 3 x 10 ⁻¹⁰	0.99654	16.2
GPS-SH1/C₁₂-SH 1:6	525.3	2.03	4 x 10 ⁻¹² 8 x 10 ⁻¹¹	0.98576	8.29
GPS-SH1/PEG-SH 1:6	368.3	1.42	4 x 10 ⁻¹² 6 x 10 ⁻¹¹	0.98592	6.50

SHELF-LIFE and RECONDITIONING



Interfering proteins characteristic of the biological samples to be analyzed, such as BSA and IgG, were studied and their signal was found to be negligible, thus demonstrating the selectivity and specificity of the system.

REFERENCES

- [1] G. Caminati et al., **2021**, International Publication Number WO2021/124269A1.
 [2] M. R. Martina et al., *J Med Chem.* **2013**, 56, 1041-1051.

ACKNOWLEDGEMENTS

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