

Supplementary information

Below is a comparative table which summarises the key experimental requirements such as the sample volume and the reaction time required in conventional methods such as ELISA and the new method (Immunoassay on magnetic heterostructures).

Conventional Elisa				immunoassay on encoded magnetic heterostructures			
	Sample volume	washing steps	Reaction time		Sample volume	washing steps	Reaction time
CA9	100 µl	8	4.5 Hours	CA9	100 µl	10	4 Hours
AQP-1	100 µl	8	4.5 Hours	AQP-1			
PLIP	100 µl	8	4.5 Hours	PLIP			
NMP22	100 µl	8	4.5 Hours	NMP22			
Total for the screening of 4 biomarkers	400 µl	32 washing steps	18 Hours *	Total for the screening of 4 biomarkers	100 µl	10 washing steps	4 Hours

Figure. Comparison between Conventional ELISA and the immunoassay on magnetic heterostructures. The kit used for the comparison is the Human Carbonic Anhydrase IX Quantikine ELISA Kit (R&D Systems Catalog #: DCA900), which is used for measuring human CA9 in urine samples. (*) The reaction time to screen for the four biomarkers could be reduced if the samples are run in parallel, however, this might introduce a higher risk of experimental errors due to a higher level of manual handling.