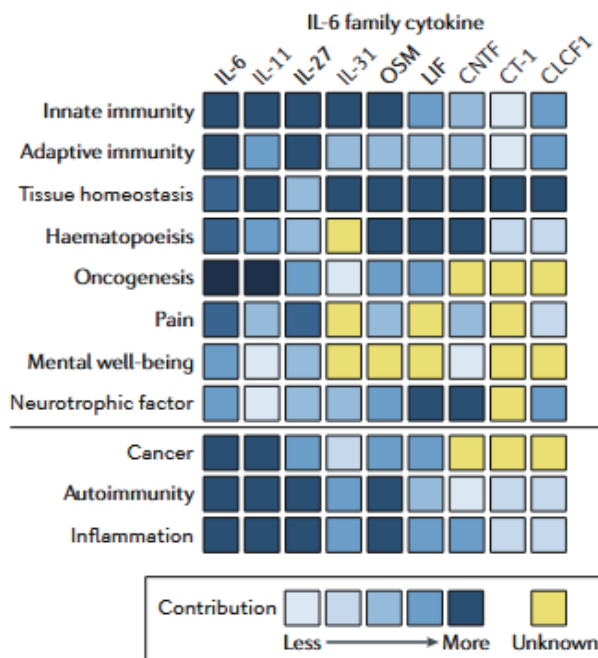


Application of magnetic microspheres in the chemiluminescence platform of Interleukin-6 (IL-6) detection

Background:

The interleukin-6 family includes IL-6, IL-11, IL-27, IL-31, Onostatin M (OSM), Leukemia Inhibitory Factor (LIF), Ciliary Neurotrophic Factor (CNTF), Cardiotrophic Factor -1 (CT-1) and cardiotrophin-like cytokine-1 (CLCF1). The members of this cytokine family are defined by a common β -receptor signal transduction subunit, and they can activate various intracellular signaling pathways. The member of the IL-6 family can cause critical reactions such as the control of immune homeostasis, hematopoiesis, inflammation, development, and metabolism. Therefore, the dysregulation of these cytokines often leads to chronic diseases and cancer; this pathological importance is reflected in the successful treatment of certain autoimmune diseases that target the IL-6 pathway.

IL-6 is a typical member of the IL-6 family, which regulates various functions related to hematopoiesis, tissue homeostasis, metabolism, and immunity. Since the discovery of IL-6, subsequent studies have shown that IL-6 has high functional redundancy in the IL-6 family. This redundant feature is reflected in the precise hierarchical participation of inflammation, metabolism, development, tissue regeneration, nerve regeneration, and tumor formation.



IL-6 has significant performance in cancer, autoimmunity, and inflammation. IL-6 detection has been widely carried out in clinical laboratories, and its detection methods mainly include biological detection and immunological detection. Immunological detection methods are widely used in clinical practice, and there are a variety of commercial kits, such as electrochemical and chemiluminescence IL-6 immunoassay kits. VDO Biotech has developed a series of magnetic microsphere products to facilitate the development of chemiluminescence products.

Magnetic Microspheres Based Chemiluminescence Detection of Interleukin-6 (IL-6)

1. Experimental method:

The IL-6 quantitative detection kit was used to compare the stability, precision, and reactivity of VDO Biotech's magnetic microspheres and Company J's magnetic microspheres at 37°C.

2. Material and reaction system:

- (1) Standard: IL-6
- (2) Reaction mode: two-step reaction
- (3) Magnetic microspheres: CMP1003SA (VDO Biotech) compared to Company J's magnetic microspheres
- (4) Streptavidin: 20µg SA/mg-beads
- (5) Antibody:

Labeled antibody 1: the molar ratio of antibody/biotin is 1/20

Labeled antibody 2: the molar ratio of antibody/acridinium ester is 1/20

- (6) Process: add 75µL sample, 100µL acridinium ester, and 100µL biotin into a tube, incubate at 37°C for 10 minutes; then add 40µL streptavidin magnetic microspheres into the tube, incubate at 37°C for 10 minutes, and then wash 5 times.

3. Result:

(1) Stability test at 37°C

Divided the magnetic microspheres CMP1003SA (VDO Biotech) and Company J magnetic microspheres coated with streptavidin into 2 parts separately. One part was placed at 2-8°C, and the other part was placed at 37°C. The signal intensity was tested on the 8th day. According to the following results, under the same experimental conditions, the signal intensity and stability of VDO magnetic microspheres are equivalent to that of Company J magnetic microspheres.

	Company J's Magnetic Microspheres			VDO Magnetic Microspheres		
Antigen concentration (pg/mL)	2-8°C	37°C	Deviation	2-8°C	37°C	Deviation
0	1393	1405	0.85%	1487	1507	1.33%
5	8413	8589	2.05%	11150	11272	1.08%
10	20040	20380	1.67%	22390	22994	2.63%
100	98271	101612	3.29%	140919	144301	2.34%
1000	830407	856149	3.01%	1186483	1228010	3.38%
5000	4137743	4249436	2.63%	4873955	4976308	2.06%

(2) Precision test of magnetic microspheres

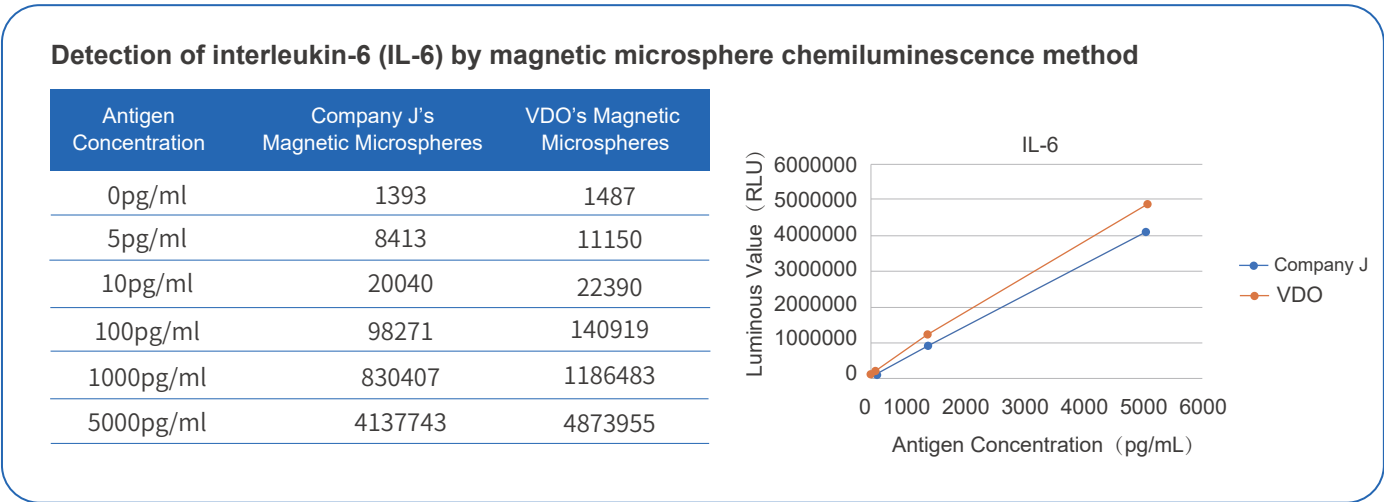
Select antigen concentration of 0, 5, 1000ng/mL, and test 6 times for each concentration. The results are as follows, which proves that the VDO magnetic microspheres are comparable in precision and repeatable compared with the Company J magnetic microspheres.

	Company J's Magnetic Microspheres			VDO Magnetic Microspheres		
Antigen concentration (ng/mL)	0	5	1000	0	5	1000
Signal strength	1477	8563	80975	1494	12492	1130791
	1356	8418	83614	1448	12293	1145821
	1445	8506	83966	1566	12189	1165914
	1486	8515	81145	1438	12093	1150800
	1413	8057	82069	1517	12119	1185323
	1435	8007	81985	1492	11871	1128856
AVERAGE	1435.3	8829	80033	1492.5	12176.2	1151250.8
STDEV	47.3	246.9	1244.5	46.8	208.3	21567.3
CV	3.30%	2.80%	1.55%	3.14%	1.71%	1.87%

Precision test of magnetic microspheres

(3) Reactivity test of magnetic microspheres

Test the reactivity of each antigen concentration of 0, 5, 10, 100, 1000, 5000 pg/mL. Under the same conditions, the signal of VDO's magnetic microsphere is stronger than Company J's; moreover, the signal of VDO's magnetic microsphere is 1.4 times that of Company J's when the antigen concentration is 100pg/ml.



4. Conclusion:

In the IL-6 test, VDO Biotech's streptavidin magnetic microspheres and Company J magnetic microspheres have comparable test results on key indicators such as stability, precision, and signal intensity, and are suitable for this test.

Reference:

Jones, Simon A., and Brendan J. Jenkins. "Recent insights into targeting the IL-6 cytokine family in inflammatory diseases and cancer." Nature Reviews Immunology 18.12 (2018): 773-789.

VDO Biotech Magnetic Microspheres for Chemiluminescent

VDO Biotech's magnetic microspheres for chemiluminescent have superparamagnetism and moderate magnetic content, excellent resuspendability and fast magnetic response. With our advanced microsphere synthesis technology, proprietary surface coating process, and variety selections of functional groups, our magnetic microspheres provide comprehensive solutions to meet customers' specific needs of different technology route development. The high-load functional group guarantees the binding capacity, and this series of products show outstanding performance in the field of immunoassay.



Cat. No.	Particle Size	Color	Surface Groups	Solids	Size
CMP0600CA	0.6 μ m	Brownish yellow	COOH	2.5%	10ml, 100ml, 1L
CMP1001CA	1 μ m	Brownish yellow	COOH	2.5%	10ml, 100ml, 1L
CMP1003CA	3 μ m	Brownish yellow	COOH	2.5%	10ml, 100ml, 1L
CMP0600SA	0.6 μ m	Brownish yellow	SA	1.0%	10ml, 100ml, 1L
CMP1001SA	1 μ m	Brownish yellow	SA	1.0%	10ml, 100ml, 1L
CMP1003SA	3 μ m	Brownish yellow	SA	1.0%	10ml, 100ml, 1L



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