Electronic Supplementary Material (ESI) for Nanoscale.

Electronic Supplementary Information

Magnetic nanoparticles assisted sensitive detection of nitrated α-syn in blood based on sensitizing electrochemical layer

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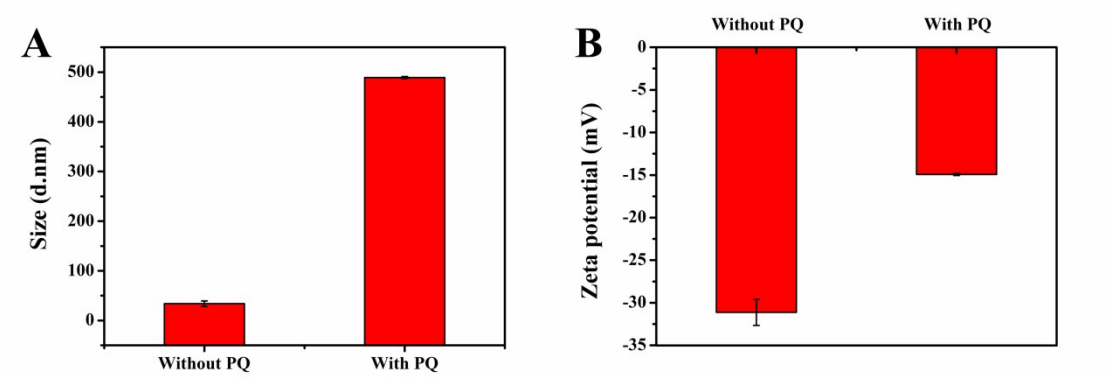

Fig. S1. Dynamic light scattering (A) and zeta potential results (B) of AuNPs with or without PQ.

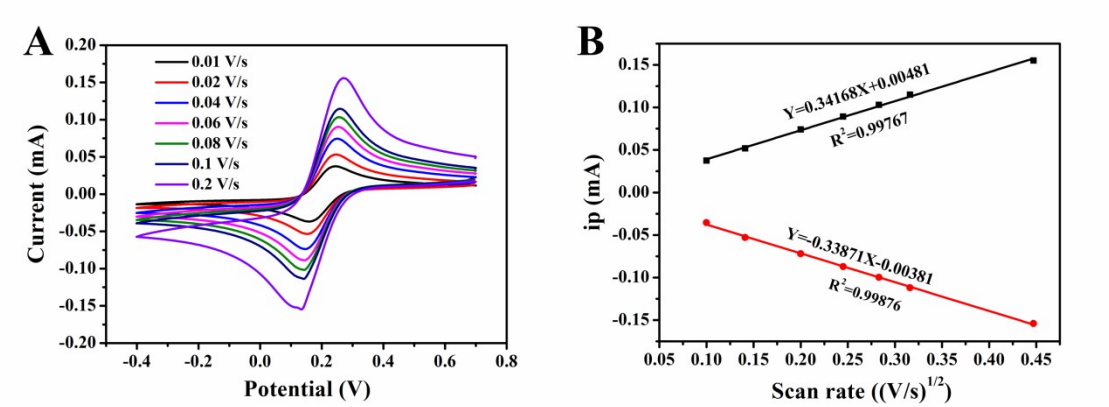

Fig. S2. (A) Diffusion control process for bare gold electrode, and (B) corresponding calibration curves.

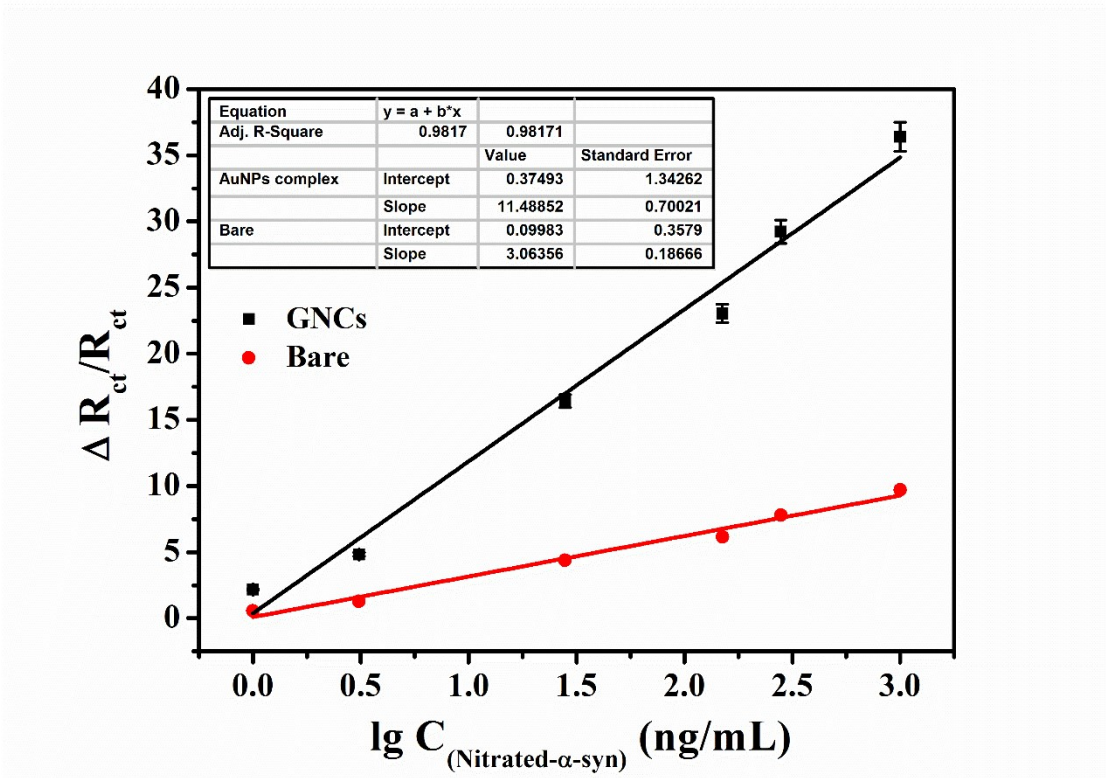

Fig.S3. The relationship between the electrode resistance response and the logarithm of nitrification α-syn concentration under different background signals.

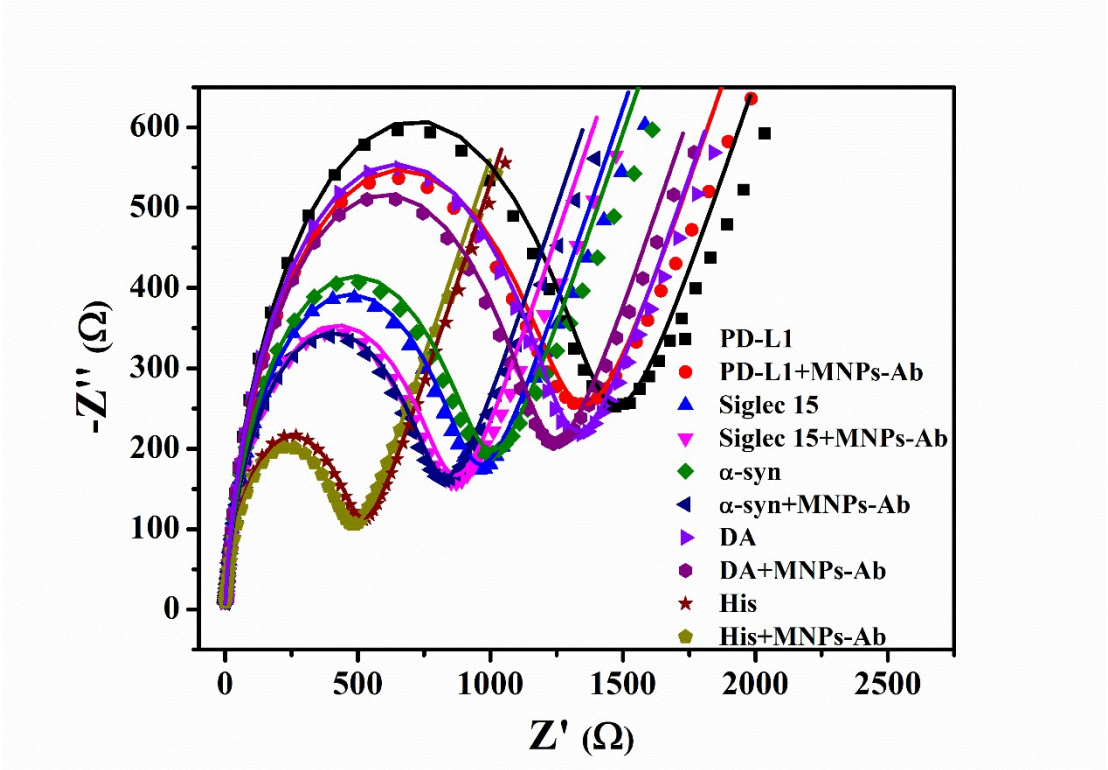

Fig. S4. EIS diagram in the process of detecting interfering substances of nitrated α-syn.

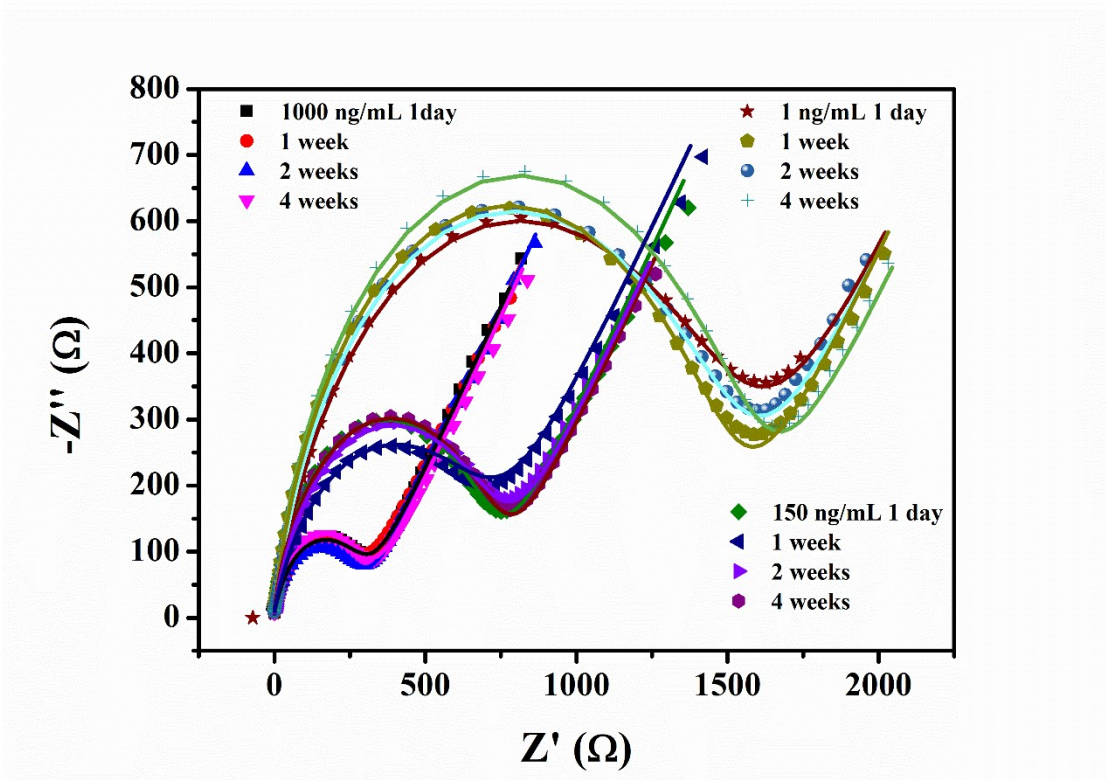

Fig. S5. EIS diagram of detecting different concentrations of nitrated α-syn in different store time (1 day, 1 week, 2 weeks, 4 weeks).

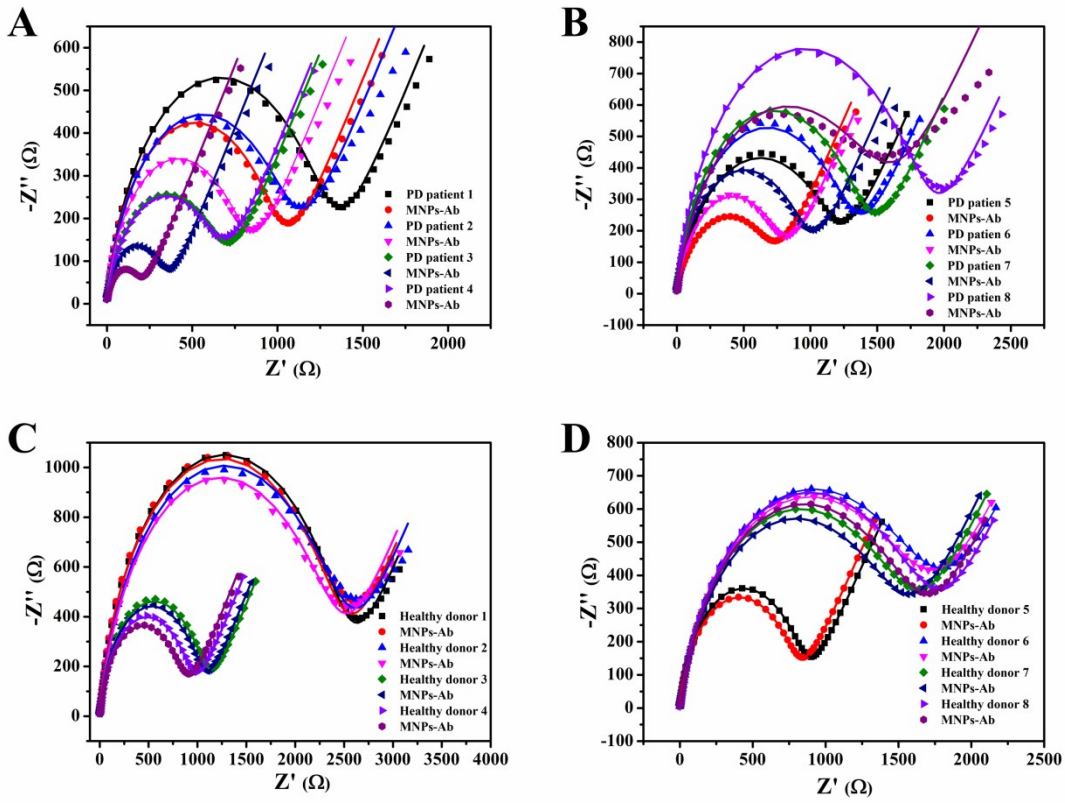

Fig. S6. EIS diagram for the determination of healthy donors (n=8) and PD patients (n=8).

Table S1. Performance comparison of various neurological disease markers biosensors

Method	Biomarker	Linear range (pg/mL)	LOD (pg/mL)	Reference
Electrochemical assay	Tau protein	1.1×10^7-200×10^6	1.1×10^7	[1]
Electrochemical assay	Tau protein	0.55-5.5×10^5	1.65	[2]
Electrochemical assay	Tau protein	1.375×10^4-1.375×10^7	8.25×10^3	[3]
Electrochemical assay	Myelin Basic Protein	9.259×10^3-9.259×10^6	5.55×10^3	[3]
Electrochemical assay	Amyloid-beta 1-42	500-5×10^5	100	[4]
Electrochemical assay	α-synuclein	1×10^4-1×10^6	3.62×10^3	[5]
Electrochemical assay	α-synuclein oligomer	864-3.11×10^8	144	[6]
Electrochemical assay	Nitrated α-syn	1000-1×10^6	310	This work

Table S2. Measurement of nitrated α-syn in fetal bovine serum with the designed sensor.

Sample	Added (ng/mL)	Theoretical ΔR_{ct}	Actual ΔR_{ct}	Recovery (%)	RSD (%)
1	2	153	145	94.7	4.57%
2	3	219	198	90.4	2.41%
3	20	612	562	91.8	6.31%

Table S3. Information of clinical serum samples.

Patient ID	Gender	Age (y)	Clinical Investigations	Serum time
1	Male	58	Parkinson's Disease	12/8/2020
2	Female	74	Parkinson's disease, cerebrovascular disease	12/8/2020
3	Male	68	Parkinson's Disease	12/10/2020
4	Female	79	Primary parkinsonism	12/8/2020
5	Female	53	Parkinson's Disease	12/16/2020
6	Female	33	Parkinson's Disease	12/17/2020
7	Male	78	Parkinson's Disease	12/25/2020
8	Male	72	Parkinson's Disease	1/5/2021
Donor ID	**Gender**	**Age (y)**	**Clinical Investigations**	**Serum time**
1	Male	59	Diabetes	1/8/2021
2	Female	71	Urinary Tract Infection	1/8/2021
3	Female	73	Diabetes	1/7/2021
4	Female	73	Diabetes	1/4/2021
5	Female	73	/	1/6/2021
6	Female	78	Arthritis	1/6/2021
7	Male	78	Stomach cancer	1/4/2021
8	Male	73	Arthritis	1/4/2021

Reference

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