Supporting information

Selective Isolation of Myosin Subfragment-1 with a DNA-Polyoxovanadate Bioconjugate

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Preparation of $TBA_4[V_{10}O_{26}]$. A suspension of 3.62g V_2O_5 in 20 mL water was heated at 60°C and 4.04g triethylamine was added drop-wisely to the suspension. After heating the mixture at 60°C for 30 min under continuous stirring, the solution became homogeneous, and the undissolved materials were filtered while the excessive amount of amine was evaporated. 100 mL acetone was then added to the pale yellow homogeneous solution at room temperature to generate a milky white suspension. Afterwards, 25.8g TBA was added to the mixture to produce a yellow homogeneous solution. The undissolved material was filtered out and 2.17g $VOSO_4 \cdot 3H_2O$ in 5 mL water was then added into the mixture with vigorous stirring. A black-purple mixture was obtained and precipitates were immediately formed. After stirring for 30 min, the purple powder was collected and washed with water, ethanol and ether alternatively, and the product was finally obtained.

IR (KBr, 500-1000 cm^{-1}): ν= 530 (m), 577 (m), 660 (vs), 756 (m), 842 (vs), 893 (vs), 926 (vs), 972 (vs), 993 (vs) cm^{-1}

Preparation of $TBA_4[V_{12}O_{32}(CH_3CN)]$. 284mg hydrogen peroxide (30%, v/v) was added to a violet solution of 948mg $TBA_4[V_{10}O_{26}]$ in 10 mL acetonitrile. The resulting brown solution was stirred for 1 h at room temperature, and 40 mL diethyl ether was added to yield a brown powder.

IR (KBr, 500-1000 cm^{-1}): ν= 521 (s), 550 (s), 647 (vs), 710 (s), 760 (vs), 791 (sh), 860 (vs), 993(vs) cm^{-1}

Preparation of $Cl_3Sn(CH_2)_2COOH$. In a 500-mL reaction flask, 20.0g $SnCl_2$ was stirred in 100 mL ether and 7.2 mL acrylic acid was added immediately. The reaction flask was immersed in an ice-water bath (0°C) and was flushed with dry nitrogen for 3 min. Hydrogen chloride gas was slowly bubbled into the reaction mixture, causing an exothermic reaction. After 30 min all the tin (II) chloride had dissolved. The excessive ether and HCl were removed under vacuum in a rotary evaporator and the remaining amorphous off-white powder was purified by washing with $CHCl_3$ to remove excessive acrylic acid and dried at air.

IR (KBr, 500-4000 cm^{-1}): ν= 742 (vs), 1125 (m), 1404 (vs), 1429 (vs), 1557 (m), 1642 (vs), 3113 (s) cm^{-1}

Preparation of NH_2-Fe_3O_4. 0.135g $FeCl_3 \cdot 6H_2O$, 1.8g sodium acetate and 0.5g ethylene imine polymer were added to 20 mL ethylene glycol to form colloid mixture under vigorous stirring at room temperature for 45 min, then 18 mL of the mixture was sealed in a teflon-lined stainless-steel autoclave of 20-mL capacity. Finally, the autoclave was heated and maintained at 200°C for 12 h, and allowed to cool down to room temperature naturally. The black product was washed for twice with ethanol followed by washing with ddH_2O for twice. The magnetic nanoparticles were dispersed in ddH_2O and stored at room temperature.

Preparation of streptavidin-modified magnetic nanoparticles (SVM). A mixture containing 5.0 mg NH_2-Fe_3O_4 and 1.0 mL glutaraldehyde (25%, v/v) was added into 19 mL phosphate buffer (pH 8.0). After stirring for 4 h at room

temperature under dark, the product, i.e., the functional magnetic nanoparticles (MNPs), were washed with ddH_2O for twice. The MNPs were dispersed into phosphate buffer (pH 8.0) with ultrasonic processing for 10 s. 1.0 mg streptavidin was then added followed by stirring the mixture for 4 h at 4°C under dark, ddH_2O was used to wash the product for twice for obtaining the streptavidin-modified magnetic nanoparticles.