Supplementary Data

Materials

Succinic anhydride, 1,2-ethylenediamine, 1,4-diaminobutane, 1,6-diaminohexane, 1,8-diaminooctane, 1,10-diaminodecane, and 1,12-Diaminododecane were purchased from Aldrich.

Preparation of amino acid analogs

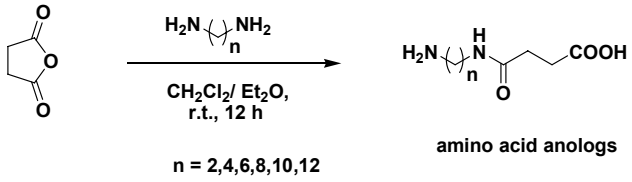

Fig. S1 The synthesis of amino acid analogs

A solution of succinic anhydride (1.00 g, 10 mmol, dissolved in 75 mL of methylene chloride and 75 mL of diethyl ether) was added dropwise to alkyldiamine (20 mmol, dissolved in 15 mL of methylene chloride) at 0 ^{o}C, followed by stirring at room temperature for 12 h. The mixture was then filtered and washed with methylene chloride. The solid powder was collected and dried by vacuum (yield: 80-90 %).

Reaction of mannose with amylamine in solution

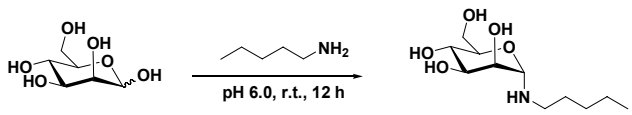

Fig. S2 The reaction of mannose with amylamine in solution

Amylamine (0.2 mmol) and mannose (0.2 mmol) were dissolved in 400 μl of 10 mM sodium phosphate buffer (pH 6.0, D_2O). The reaction mixture was stirred at room temperature for 12 h. The crude product was analyzed by 400 MHz NMR and ESI-MS, showing that the reaction product N-α-amyl mannopyranosylamine was obtained. δ_H (400 MHz; D_2O; Me_4Si) 4.68 (1H, s, 1-H), 3.39-3.69 (6H, m, 2-6 H), 2.44-2.49 (2H, m, NCH_2), 1.31 (2H, br s, NCH_2 CH_2), 1.11 (4H, br s, $CH_2CH_2CH_3$), 0.71 (3H, br s, CH_2CH_3). δ_C (400 MHz; D_2O; Me_4Si) 86.5, 77.2, 73.9, 71.1, 70.3, 67.1, 61.1, 44.6, 28.8, 28.4, 21.9, 13.3. m/z (ESI-MS) $[M + H]^+$ 250.13.

Quantitative analysis of carbodydrate immobilization

Sulfuric acid-phenol (SAP) assay

We used Glc as a model to determine the amount of carbohydrate immobilized on a microplate well using the SAP method. The experimental details are described as follows.

A 8 μL portion of each Glc solution (0–100 mM) was pipetted into a 96-well microplate. A 10% phenol solution (8 μL) was added to each sample, followed by the addition of concentrated H_2SO_4 (70 μL). The mixture was incubated for 30 min at room temperature, and the absorbance at 490 nm (A_{490}) measured. The A_{490} values were plotted against the concentrations of Glc to construct a calibration curve (Fig. S3).

A 40 μL portion of Glc (150 mM) was added to each well of the microplate coated with linker 7, followed by shaking for 12 h. The remaining Glc solution was collected after immobilization. A 8 μL portion of this solution was then pipetted into a 96-well microplate, and SAP assays were performed as described. The average A_{490} was determined to be 1.32 (corresponding to 49.3 mM Glc). The amount of immobilized Glc was found to be 4 μmol, using the following equation:

Amount of immobilized Glc = 40 μL × 150 mM – 40 μL × 49.3 mM = 4 μmol

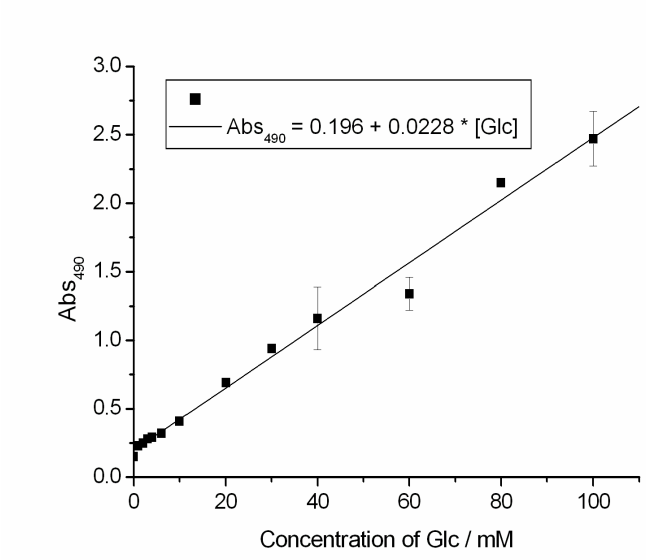

Fig. S3 Visible absorption measurements (490 nm) of different concentrations of Glc determined by SAP assay. The mean A_{490} values and error bars were obtained by absorbance measurements of 6 replicate samples.

Quantitative analysis of inhibition

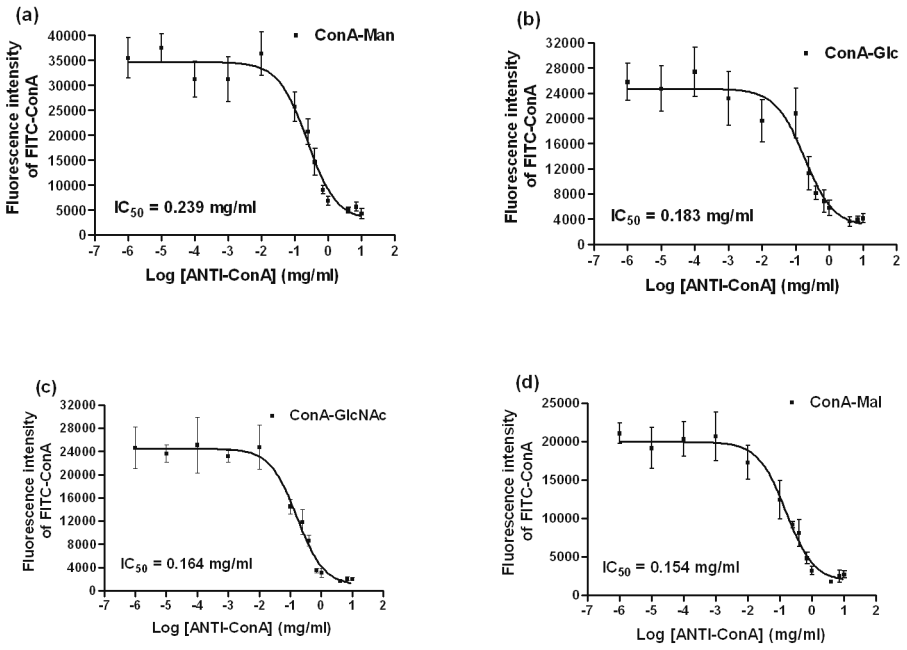

Fig. S4 Determination of the IC_{50} values for ANTI-ConA against ConA binding to various carbohydrate arrays. (a) Inhibition of ConA binding to GlcNAc. (b) Inhibition of ConA binding to Glc. (c) Inhibition of ConA binding to Man. (d) Inhibition of ConA binding to Mal. The carbohydrate arrays were prepared by coupling GlcNAc, Glc, Man and Mal to linker 7. The mean fluorescence signals and error bars were obtained by fluorescence measurements of 6 replicate samples.