Materials and Methods:

Reagents: VEGF165, bFGF, VEGF121 and EGF were obtained from R&D systems, Minneapolis, Minnesota. Tetrachloroauric acid trihydrate and sodium borohydride were from Sigma-Aldrich, St. Louis, Missouri. Heparan-sepharose 6 and [^{3}H]-thymidine was from Amersham Biosciences, Piscataway, New Jersey. Anti-VEGF antibody and VEGFR-2 antibody were from Santa Cruz Biotechnology, Santa Cruz, California. Phospho-tyrosine antibody was from Upstate Biotechnology, Lake Placid, New York.

Preparation of gold nanoparticles: In a typical experiment, 50 ml of aqueous solution containing 4.3 mg of solid sodium borohydride was added to 100 ml of 100 μM aqueous solution of tetracholoroauric acid under vigorous stirring that was continued overnight. Gold nanoparticles thus formed were filtered through 0.22 μm filter paper and used for experiments.

Cell proliferation assay: HUVECs (2X10^3) were seeded in 24-well plates, cultured for 2 d in EBM, serum-starved (0.1% serum) for 24 h, and then treated with VEGF165 or VEGF121 (10 ng/ml) that was first pre-incubated with gold nanoparticles overnight at 4°C and then added to the serum starved HUVECs. After culture for 20 h, 1 μCi [^{3}H]-thymidine was added to each well and 4 h later, cells were washed with cold PBS, fixed with 100% cold methanol and collected for the measurement of trichloroacetic acid-precipitable radioactivity.

Heparin sepharose precipitation: For the heparin-sepharose precipitation experiments, different concentrations of gold nanoparticles were pre-incubated with 10 ng/ml VEGF overnight at 4°C in Ca^{++}/Mg^{++} free PBS. The next day, 30 uL heparin-sepharose beads suspended in PBS were added to this conjugate and incubated on a

shaker for 1 h at 4°C. The supernatant fraction was collected after centrifugation at 3000 rpm. The beads were washed three times and suspended in 2X SDS sample buffer.

X ray photoelectron spectroscopy:

X-ray photoelectron spectra (XPS) was obtained on a PHI 5400 instrument using a Mg Kα X-ray (1253.6 eV) anode source operated at 250W, pressure was below 2×10^{-9} torr. The electron pass energy on the hemispherical analyzer was set at 89.45 eV for survey scans and 17.9 eV for high-resolution scans. The binding energy scale was referenced to that of C1s (284.5 eV). Samples were prepared by drop-coating gold-VEGF165 conjugated solution on a clean silicon wafer and the drops were allowed to air dry

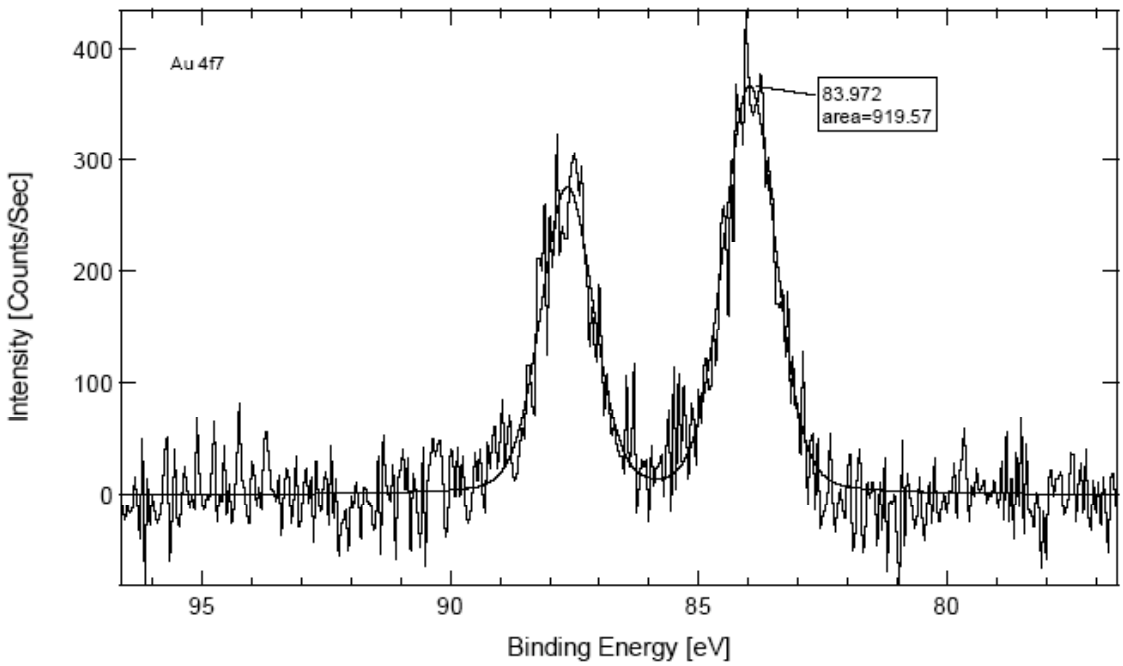

Figure 1a. X ray photoelectron spectra obtained from gold-VEGF165 conjugates drop coated onto a silicon wafer. Binding energy for Gold $Au4f_{7/2}$

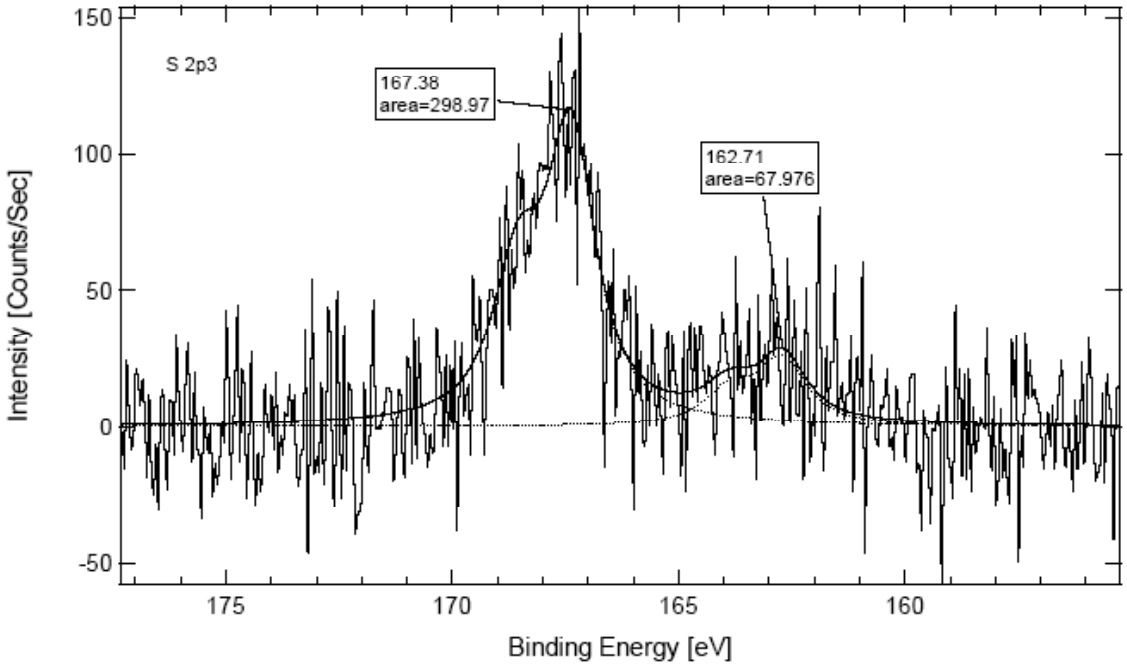

Figure 1b. Binding energy for $S2p_{3/2}$.

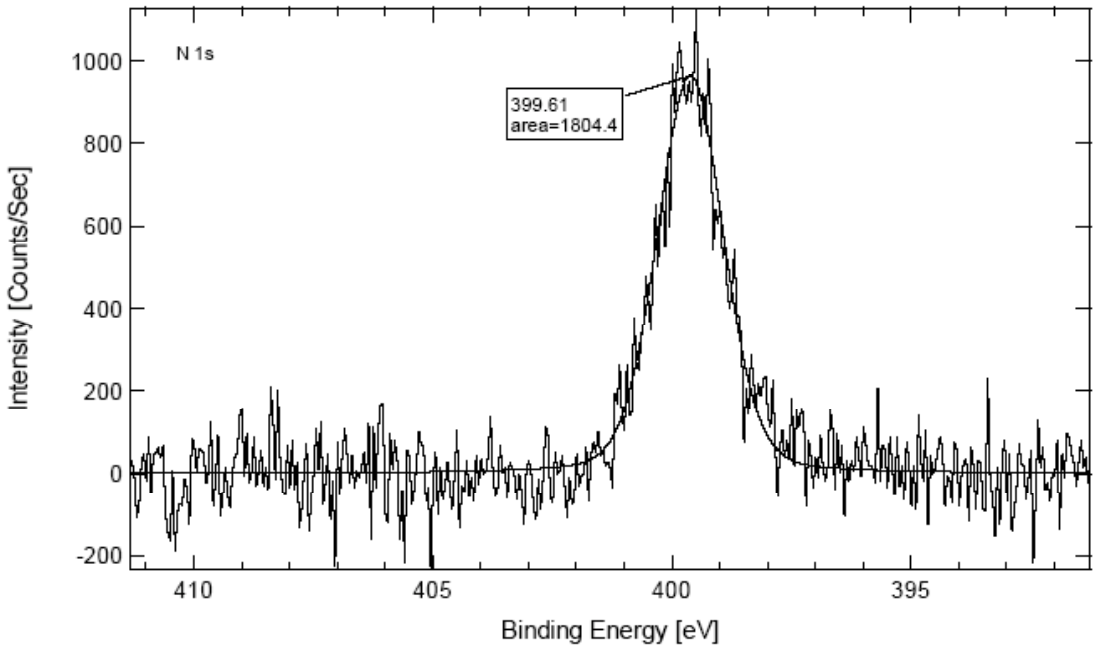

Figure 1c. Binding energy for N 1S