

## Dendrimer Based Multi-functional Devices

GPC analyses were performed on some dendrimer based multi-functional devices to provide benchmark data and to determine their purity, stability and dispersity. These nanometer-sized devices are intended for targeting intracellular drug delivery to tumor cells through folate receptors.

The instrumentation used included a Waters Alliance 2690 separation module and three detectors - Multi-angle light scattering (Wyatt DAWN laser photometer), Refractive Index (Optilab interferometric refractometer) and UV (Waters 2487 UV absorbance) all maintained at 40°C. Three TosohHaas TSK-Gel columns (25 ± 0.2 °C) - G2000PW, G3000PW and G4000PW, and a Guard PHW column were connected to obtain separation. The mobile phase was an aqueous 0.1M citric acid buffer, pH 2.74 with 0.025% sodium azide at a flow rate of 1 ml/minute. The sample concentration was 2-3 mg/ml and the injection volume was 100µL.

All the light scattering and UV detector peaks show sharp and unimodal distributions indicating the purity of the tri-functional device. The calculated  $M_n$  [32,160 Da] (including the longer elution time smaller RI detector peak) <  $M_n$  < 43,220 Da (excluding the smaller RI peak)] is *additional* confirmation of the successful synthesis according to the chemistry represented by Figure 1.

The low polydispersity index (PDI < 1.1) suggests relatively uniform distribution of functional groups along the dendrimer platform.

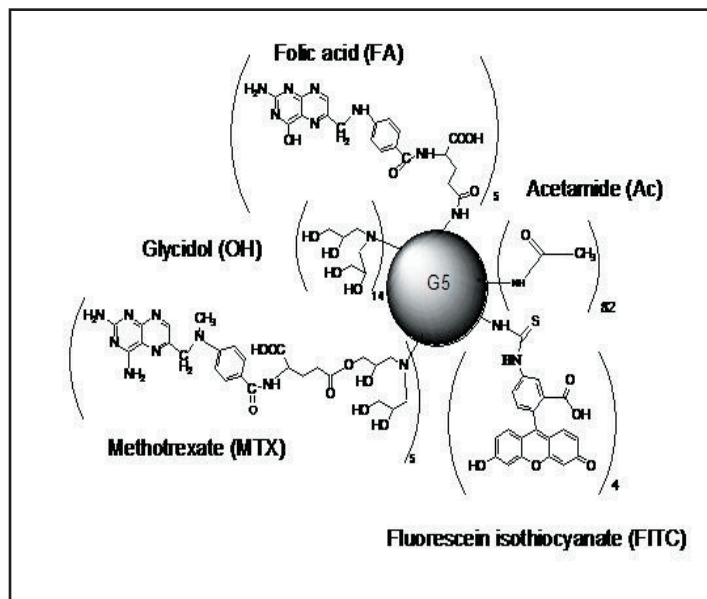


Figure 1: The tri-functional nanodevice G5.Ac.FITC.FA.OH.MTX. Folic acid (FA), fluorescein isothiocyanate (FITC), and methotrexate (MTX) were covalently attached to the terminal groups to provide targeting, imaging, and intracellular drug delivery capabilities, respectively. The subscripts indicate the average number of functional molecules attached to the generation 5 poly(amidoamine) dendrimer core (shown as G5 sphere).

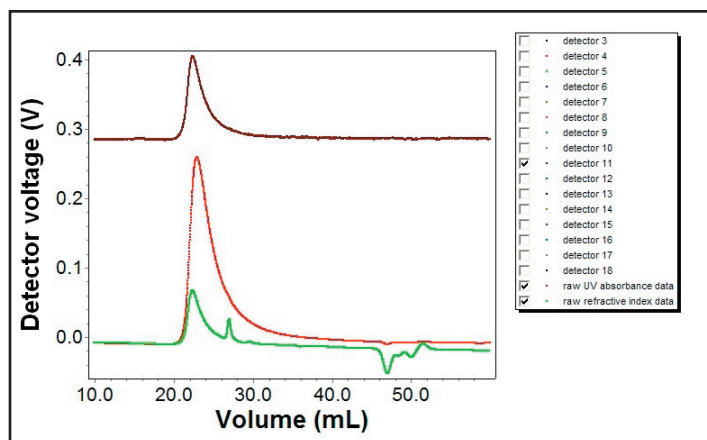


Figure 2: The 90 degree light scattering (brown), refractive index (green) and UV detector (red) signals for G5.Ac.FITC.FA.OH.MTX.

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