The surface of the gold electrode was functionalized with a hydrophilic monolayer of 1-thio-β-D-glucose formed by spontaneous self assembly. The Langmuir-Blodgett/Langmuir-Schafer (LB/LS) method was then used to assemble the bilayer onto the modified Au(111) surface. The outer leaflet was composed of 70:30 mol % DMPC:cholesterol. For the inner leaflet, monolayers of GM1:cholesterol:DMPC with mole ratios of 10:30:60, 20:30:50, and 30:30:40 were studied. A bilayer lipid membrane (BLM) was separated from the Au(111) electrode surface by incorporating the monosialoganglioside GM1 into the inner leaflet of a bilayer composed of 1,2-dimyristoyl-sn-glycero-3-phosphocholine (DMPC) and cholesterol. Due to the amphiphilic properties of GM1, the hydrophobic acyl chains were incorporated into the BLM while the large hydrophilic carbohydrate headgroups are physically adsorbed to the Au(111) electrode surface creating a “floating” BLM (fBLM). This model contained a water rich reservoir between the BLM and gold surface. In addition, due to the bilayer being physically adsorbed onto the support, the fluidity of the BLM was maintained. The compression isotherms were measured to determine the phase behaviour and optimal transfer conditions. The fBLMs containing 10, 20, and 30 mol % GM1 had a minimum capacitance of 2.2 μFcm⁻². The atomic force microscopy (AFM) images and force distance measurements showed that the structure of the fBLM evolved with increasing GM1 content from 10 to 30 mole %; undergoing a transition from a ripple to a homogenous phase. This change was associated with a significant increase in bilayer thickness (~5.3 to 7.3 nm). Therefore, the highest quality fBLM was produced with 30 mol % GM1.