Several neurodegenerative diseases are linked to defects in brain cholesterol metabolism. The brain comprises only ~6% of total body weight but contains 25% of cholesterol in the body. Unlike phospholipids, which are synthesized in both cell bodies and axons of neurons, cholesterol synthesis is restricted to cell bodies. Thus, efficient mechanisms exist for delivery of cholesterol to axons for axonal extension. We have investigated how cholesterol is supplied to distal axons of neurons via both endogenous synthesis and from exogenously-supplied lipoproteins. Niemann-Pick C (NPC) disease is a progressive neurological disorder in which cholesterol is sequestered in endosomes. In neurons from a mouse model of NPC disease the cholesterol content of distal axons is reduced and transport of endogenously-synthesized cholesterol into distal axons is impaired. We have also shown that in nerve terminals, NPC1 is located in endosomal vesicles that are likely involved in synaptic vesicle recycling. We propose that in NPC-deficient neurons this process is compromised. An important source of cholesterol for neurons is lipoproteins containing apo E that is secreted by astroglia. We have shown that glia-derived lipoproteins stimulate axon extension of central nervous system neurons. In addition, glia-derived, apo E-containing lipoprotein that bind to the low density lipoprotein receptor-related protein, protect neurons from apoptosis induced by removal of growth factors.