Host lipid alterations are centrally involved in *Leishmania donovani* infection, and infected patients exhibit hypocholesterolemia. In this issue of *Cell Host & Microbe*, Ghosh et al. (2013) show that the metalloprotease GP63 released by *L. donovani* in the liver cleaves DICER1, inhibiting miR-122 maturation, which regulates cholesterol metabolism. These events decrease serum cholesterol and promote parasite growth.