Supplemental Figure 1

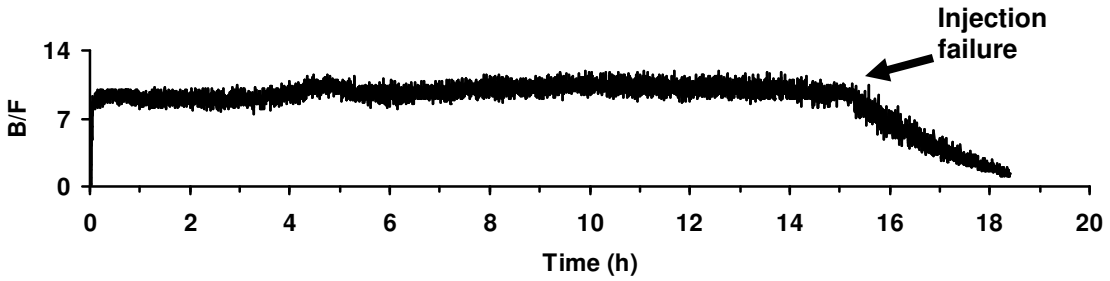

Figure S1. Failure of injections after long-term chip operation. After several hours of continuous chip operation, the fluorescence signal began to gradually decrease. The decrease in signal was later determined to be an effect of failed electrokinetic injections, resulted in loss of immunoassay (B/F) stability.

Supplemental Figure 2

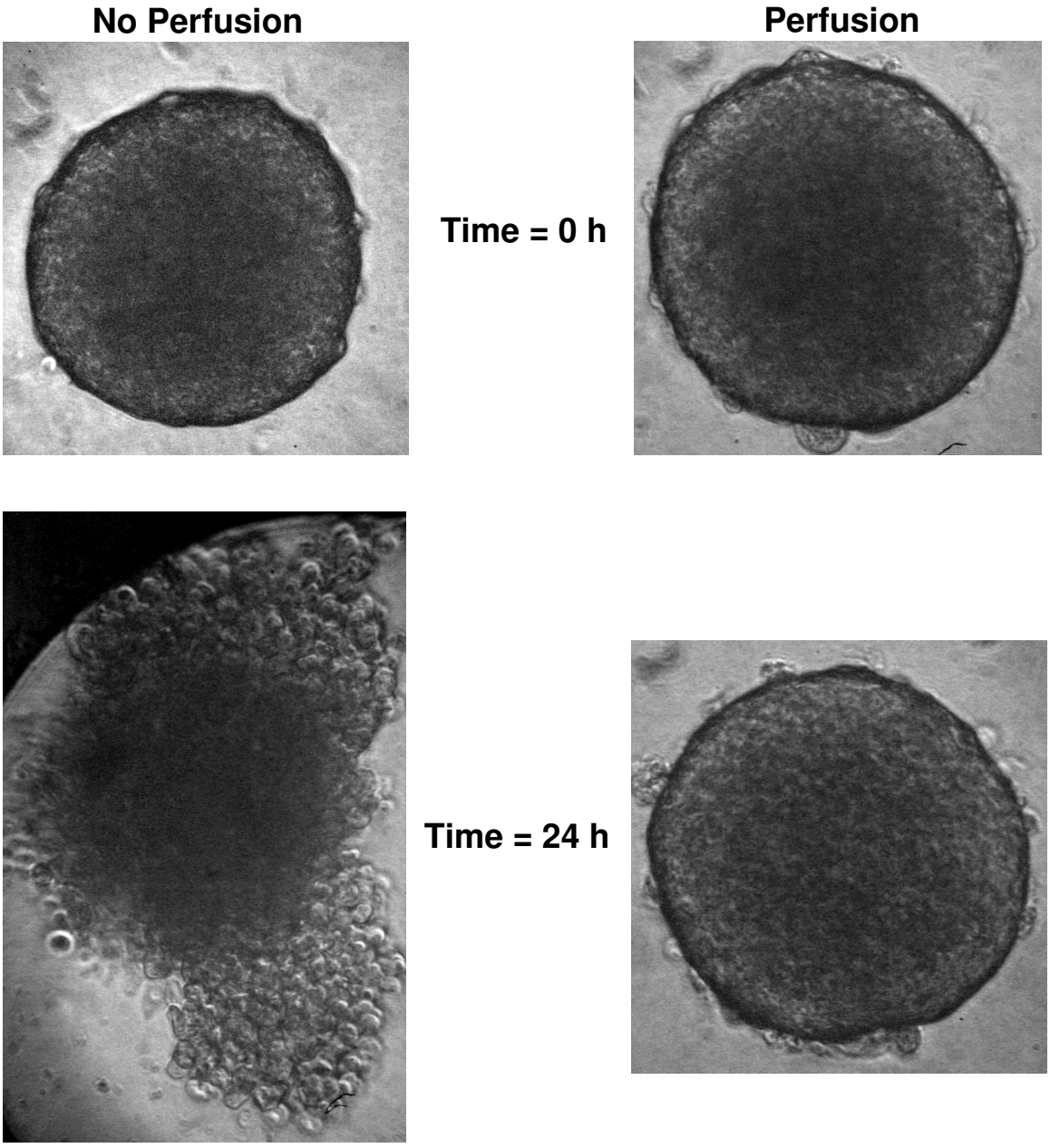

Figure S2. Islet morphology. Two islets were placed in 11 mM glucose in a 360 μm drilled microfluidic access hole on a heated long-term microfluidic device for 24 hours. There was no perfusion to one islet, while the second islet was continuously bathed with fresh buffer. After 24 hours with no perfusion, the islet membrane appears seriously disrupted, the islet cells are leaking out from the islet core, and, thus, the islet does not appear healthy. Additionally, there is some evidence of necrosis in the non-perfused islet, as indicated by a dark region in the islet. In contrast, after being perfused with fresh buffer for 24 h, the second islet's membrane remains intact, there is no indication of necrosis, and thus, the islet appears viable. This evidence suggests that perfusion with fresh media helps to maintain islets in a healthy environment.