Improved calcium imaging in transgenic mice expressing a troponin C-based biosensor.

Fluorescent Ca(2+) indicator proteins (FCIPs) are attractive tools for studying Ca(2+) dynamics in live cells. Here we describe transgenic mouse lines expressing a troponin C (TnC)-based biosensor. The biosensor is widely expressed in neurons and has improved Ca(2+) sensitivity both in vitro and in vivo. This allows FCIP-based two-photon Ca(2+) imaging of distinct neurons and their dendrites in vivo, and opens a new avenue for structure-function analysis of intact neuronal circuits.