Here we present high-sensitivity Red GECIs may be used for:

- Optical imaging of calcium
- High throughput GECI testing in neurons in vivo
- R-GECO for parallel use with light-sensitive ion channel (ChR2)

Context:
- Optical imaging of calcium dynamics using genetically-encoded calcium indicators (GECIs) is a powerful tool for systems neuroscience.
- Current state-of-the-art GECIs emit green light (green GECIs).
- Red GECIs may be used for:
  - Deep tissue imaging
  - Dual-color imaging
  - Parallel use with light-sensitive ion channel (ChR2).
- Here we present high-sensitivity red GECIs based on RCaMP and R-GECO for in vivo imaging of neural activity.

Conclusions:
- New RCaMP and R-GECO variants have improved sensitivity and kinetics.
- Sensitivity of R-GECO1a in vivo was similar to GCaMP6.
- In vivo testing of other Red GECI variants is in progress.
- Reagents distributed through Addgene.org.