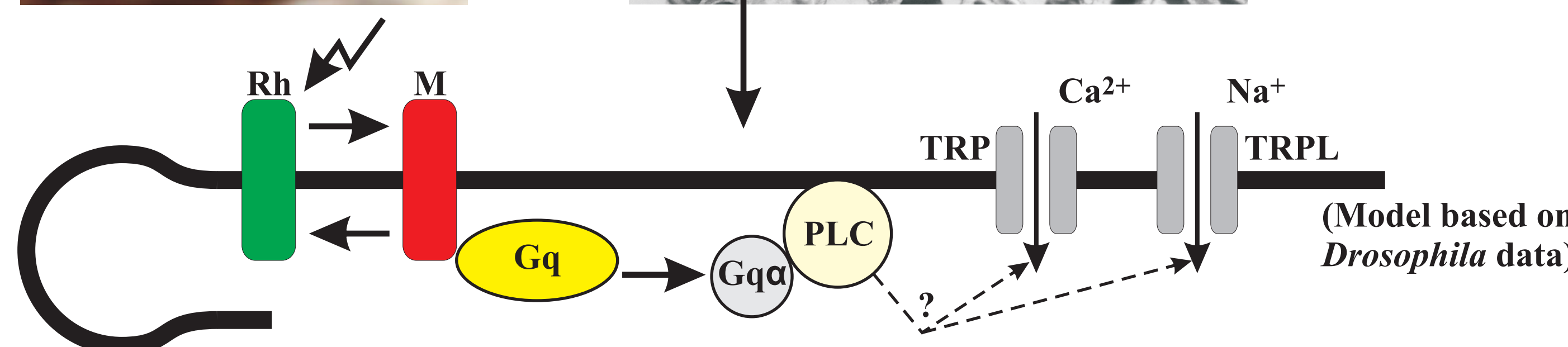
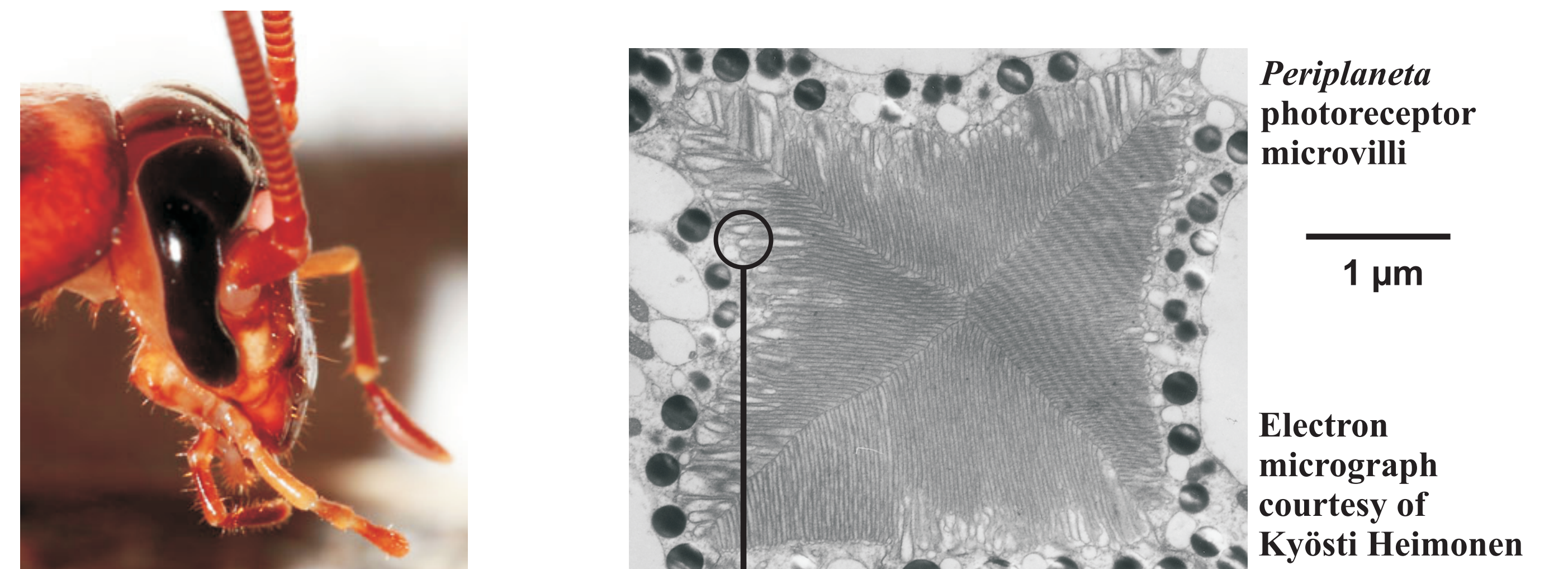


Molecular and functional characterization of opsins and TRP channels in compound eyes of the cockroach, *Periplaneta americana*

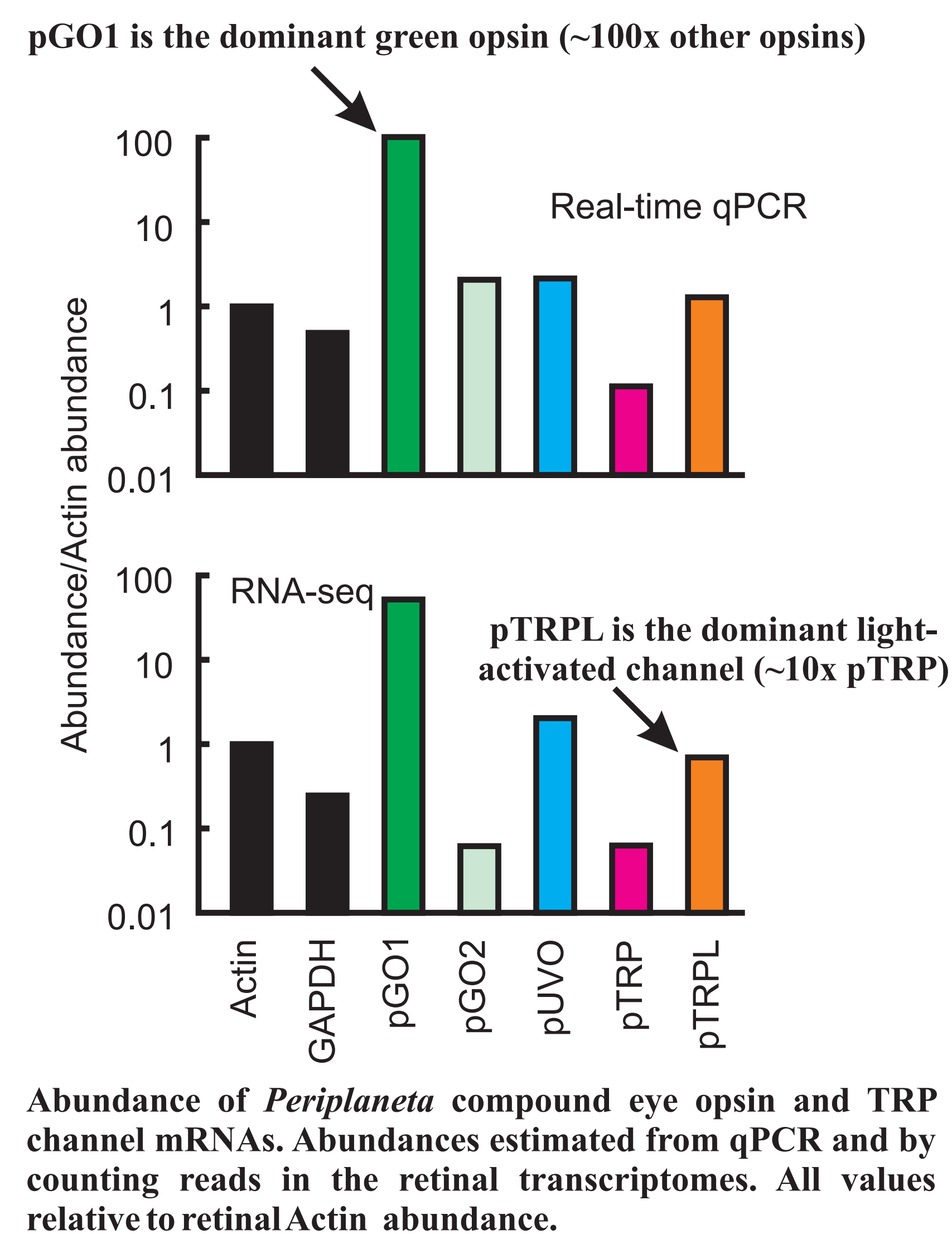
Andrew S. French, Päivi H. Torkkeli, Shannon Meisner, Hongxia Liu, Esa-Ville Immonen, Roman Frolov and Matti Weckström
Dalhousie University, Halifax, NS, Canada and University of Oulu, Finland

1. Phototransduction in *Periplaneta*

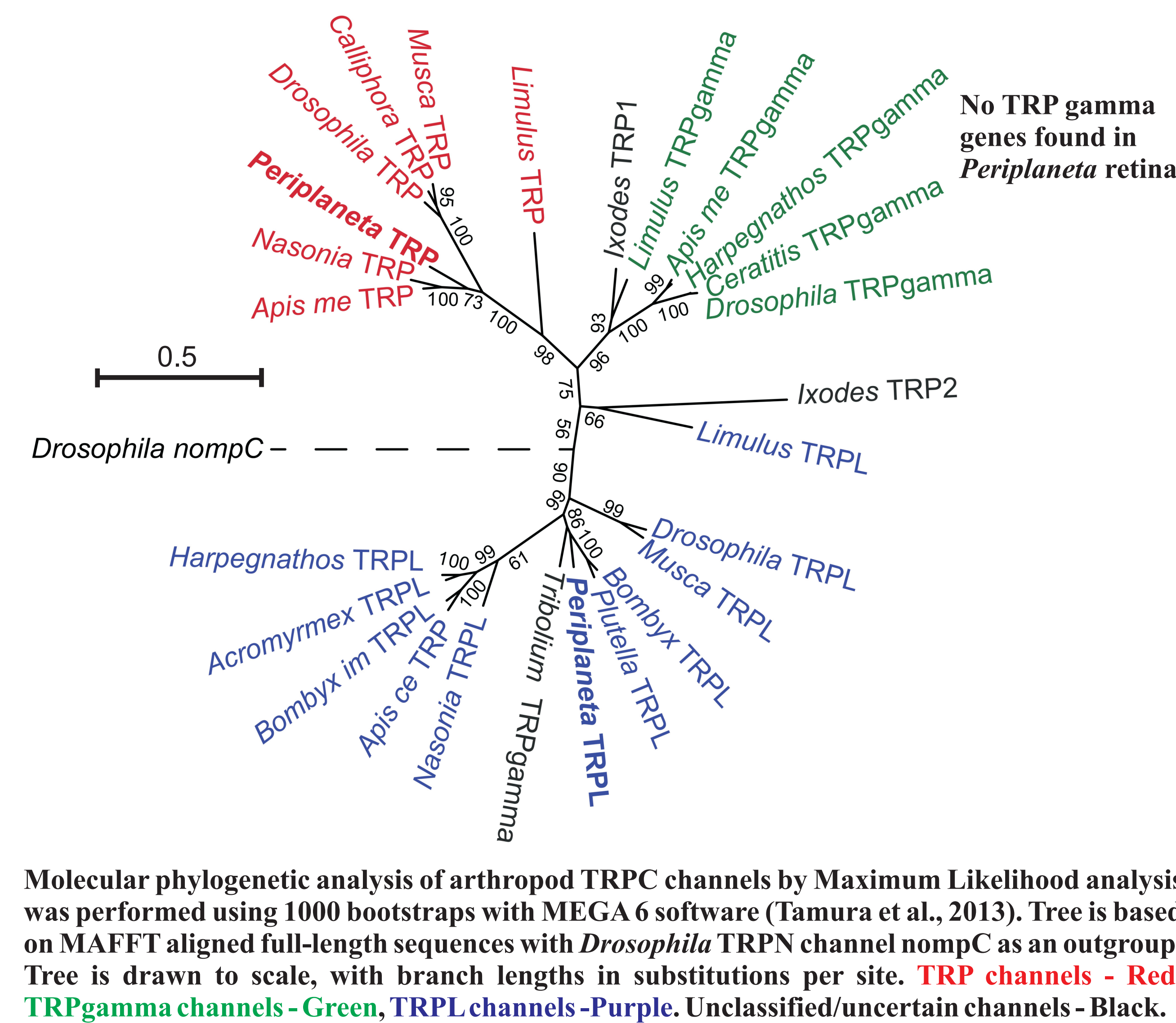


- Simplified phototransduction. Light converts rhodopsin (Rh) to metarhodopsin (M), activating PLC via Gq. TRP and TRPL are light-activated members of the TRPC family. The step opening TRP and/or TRPL from PLC is still unknown. TRP and TRPL make similar contributions in *Drosophila*.
- Properties of light-activated current in *Periplaneta* are more characteristic of TRPL than TRP.
- Questions for *Periplaneta*: (1) What are the Opsins? (2) Are homologs of *Drosophila* TRP and TRPL present? (3) How much does each contribute to the light-activated current?

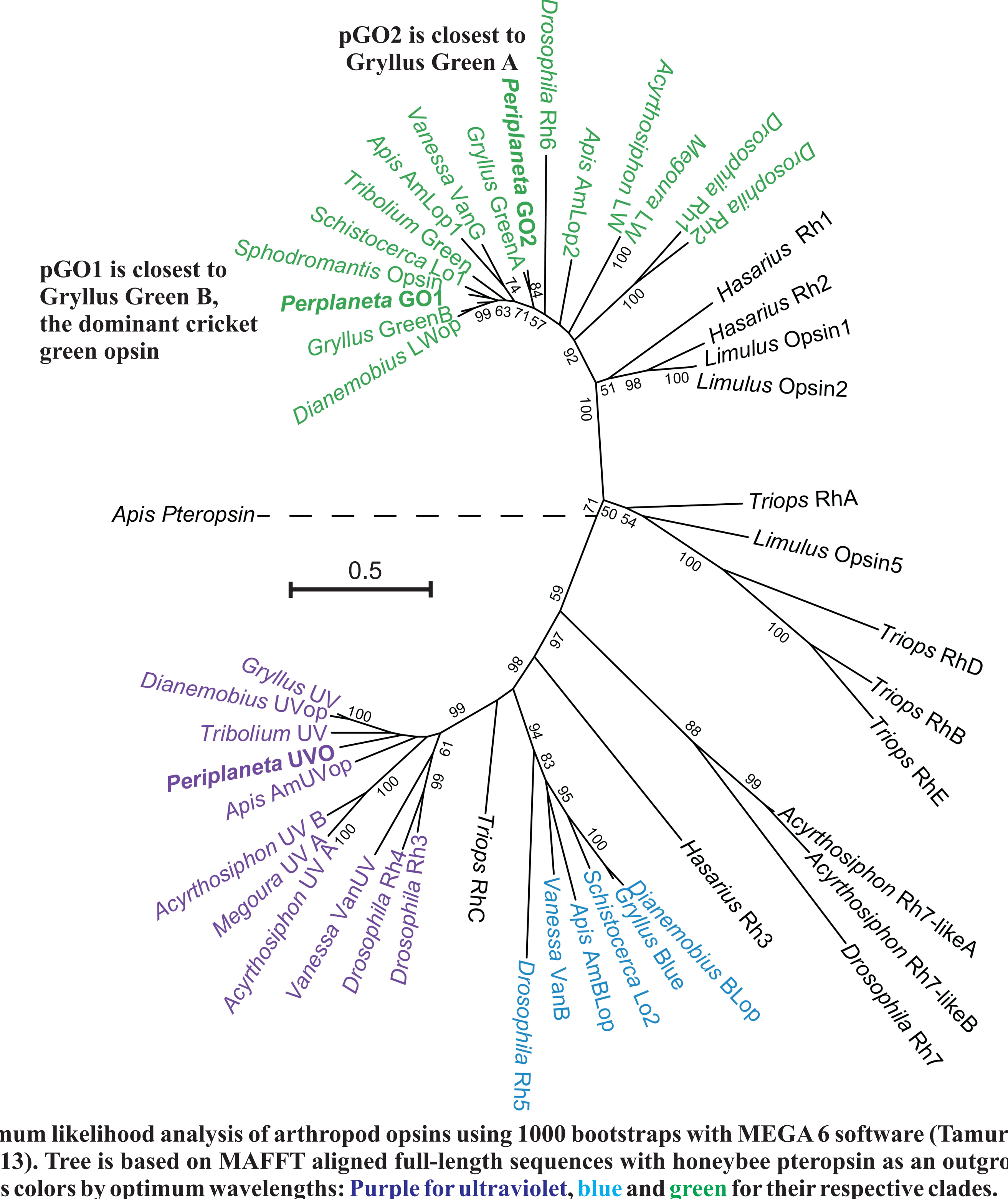
2. Opsin and TRP mRNA



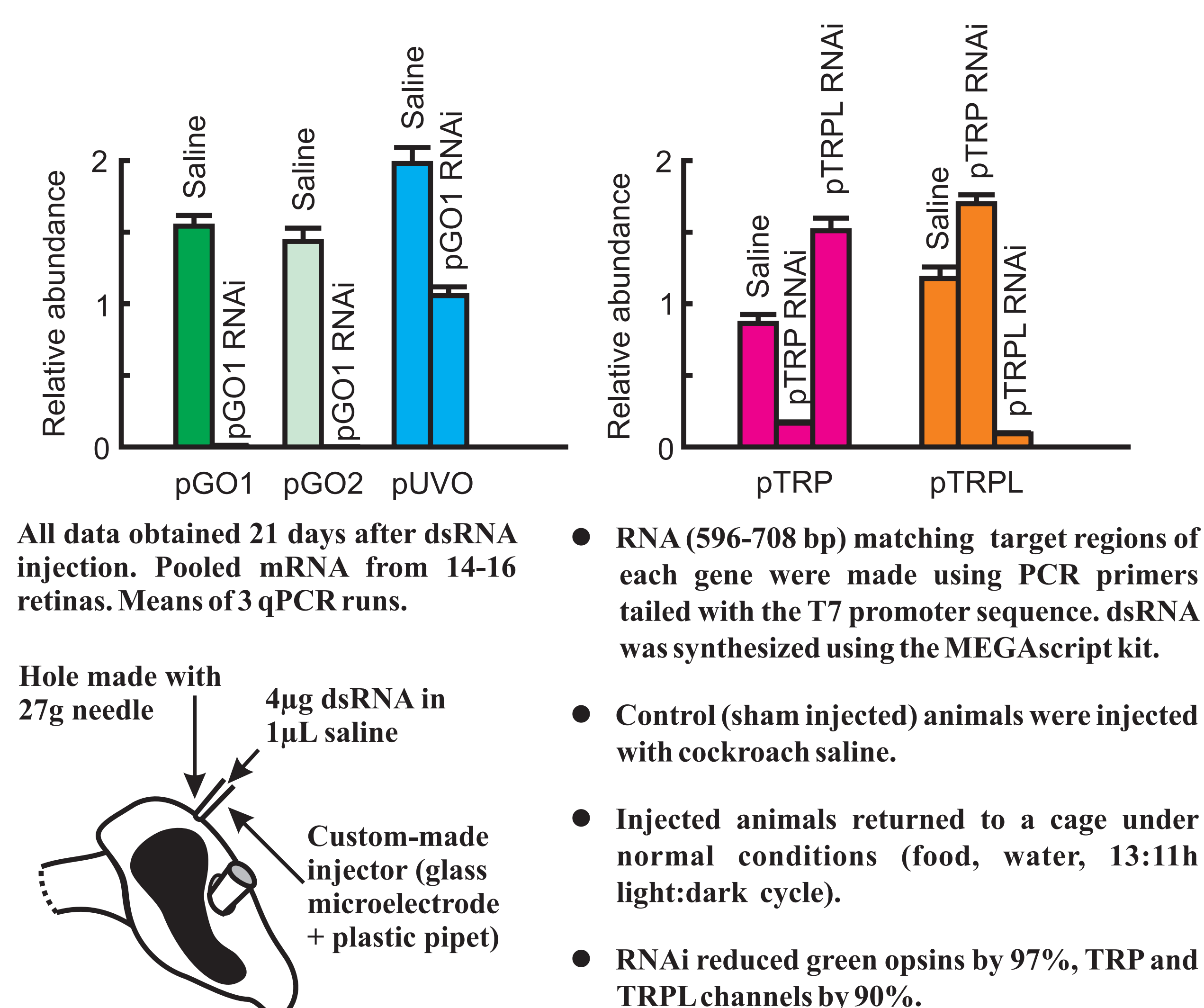
3. Phylogeny of arthropod trpC channels



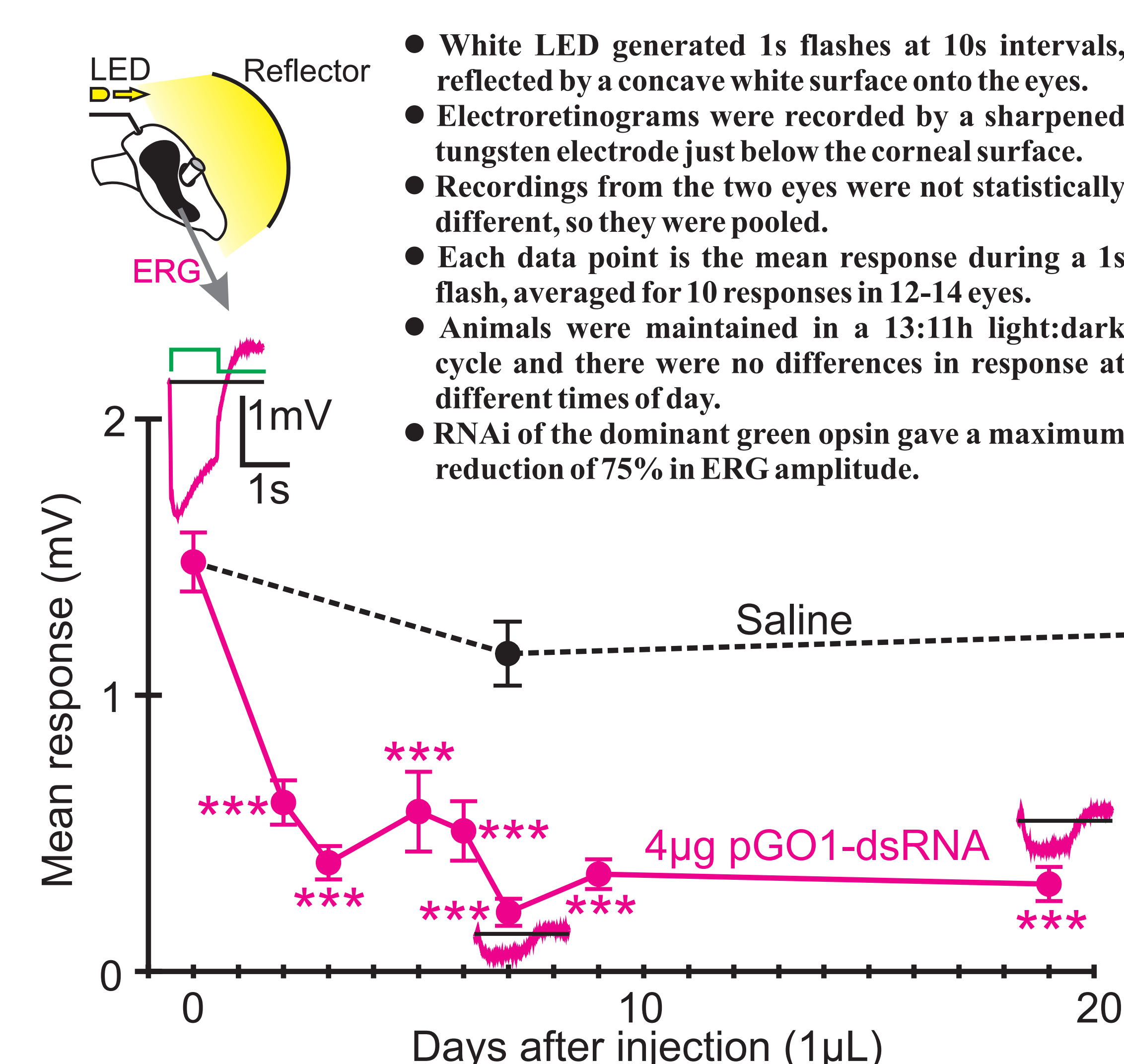
4. Phylogeny of arthropod opsins



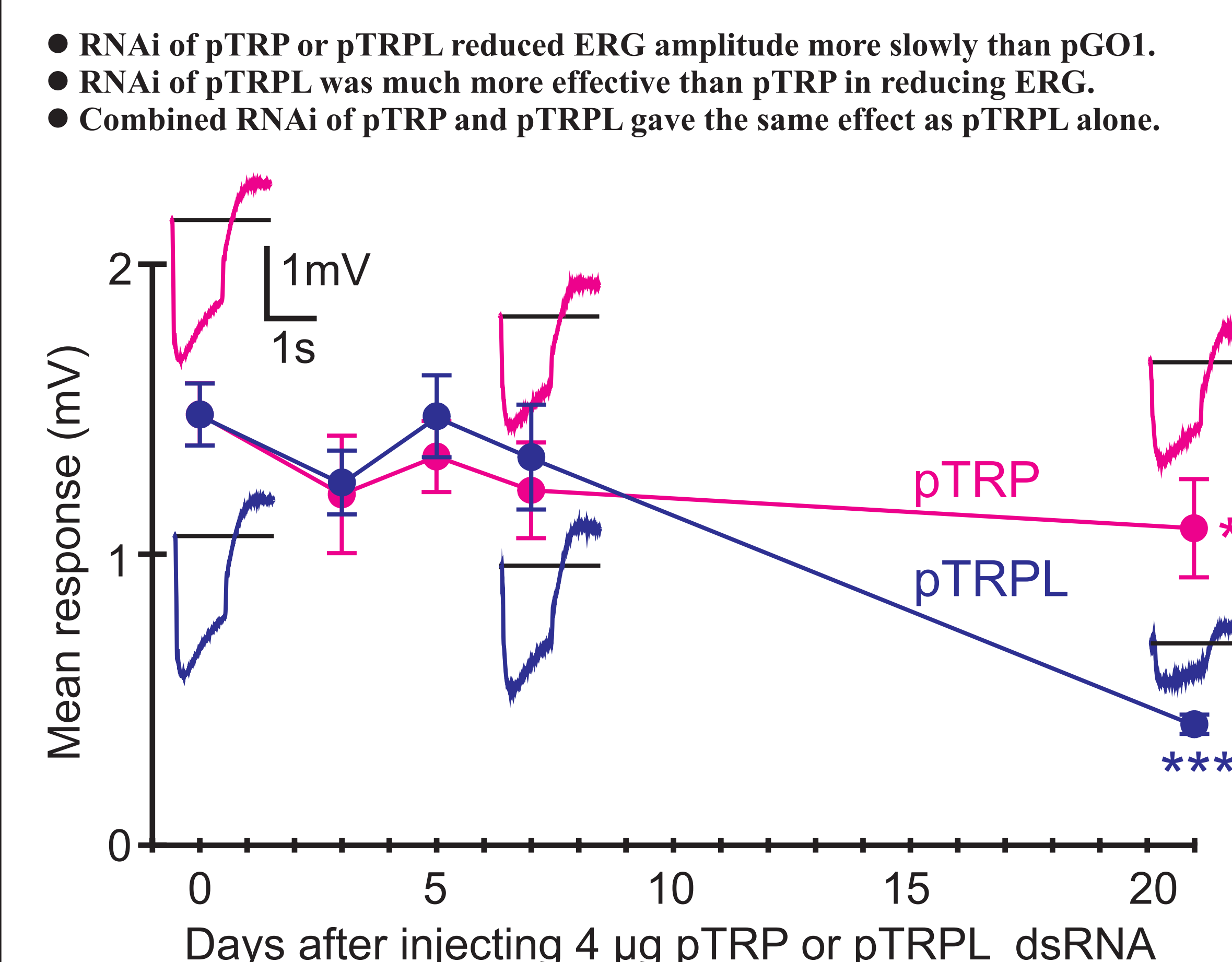
5. qPCR after *in vivo* RNA interference



6. RNAi of pGO1 reduced ERG



7. RNAi of pTRP and pTRPL



8. Conclusions

- Opsins:
- *Periplaneta* compound eyes have two green opsins, pGO1 and pGO2 that are homologous to cricket Green B and Green A.
 - mRNA for pGO1 is highly represented compared to other opsins (>100x) and to most other genes.
 - There is a UV opsin, pUVO, in the same clade as other insect UV opsins.
 - No opsin homologous to the cricket Blue opsin was found. This correlates with the absence of any specialized dorsal rim in the cockroach eye.
 - RNA interference of pGO1 strongly suppressed the electroretinogram of the whole compound eye.
- Light-activated TRP channels:
- pTRP and pTRPL channels homologous to *Drosophila* dTRP and dTRPL channels are both present.
 - pTRPL mRNA is more strongly represented than pTRP (about 10x more).
 - RNAi of pTRP weakly suppressed the ERG, but RNAi of pTRPL strongly suppressed the ERG.
 - These data agree with electrophysiological evidence that light-activated current in *Periplaneta* eyes is mainly carried by pTRPL channels.
 - This contrasts with *Drosophila*, where at least half the current is carried by TRP channels.
 - We hypothesize that different TRP/TRPL ratios in insect eyes may allow adaptation to different visual environments and lifestyles.

See this poster again at: <http://asf-pht.medicine.dal.ca>

