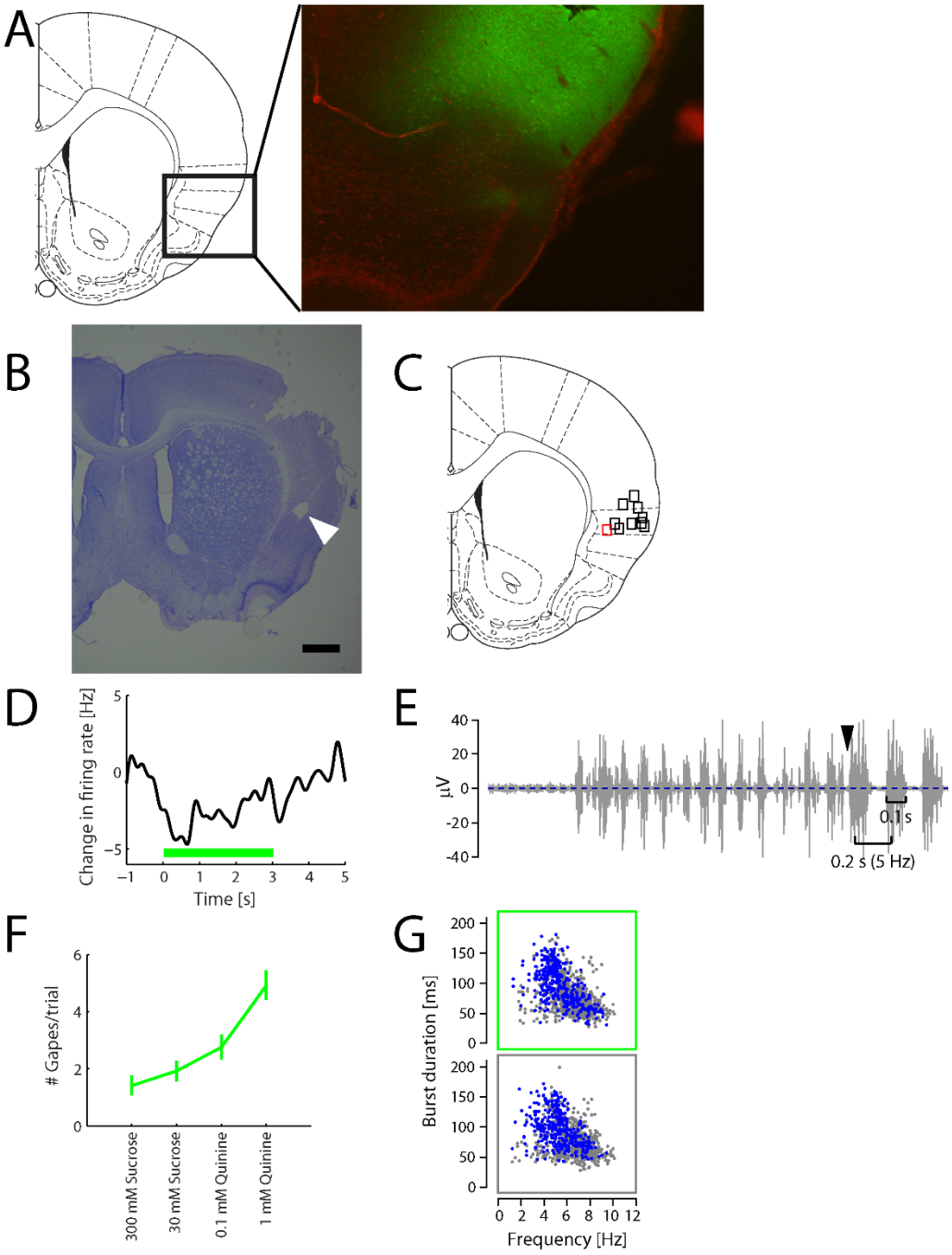

Figure S1 related to Figure 2. Anatomical and functional characterization of ArchT infection. A. Slice of brain tissue (approximate location indicated by box on schematic on the left), stained with fluorescent Nissl (red) and anti-GFP, showing expression of ArchT (in green) in GC neurons. **B.** Slice of brain tissue, stained with cresyl violet, showing fiber placement in GC. White arrowhead indicates the tip of the fiber. **C.** Summary of reconstructed fiber locations (location illustrated in **B** is shown in red). Light strength at the tip of the fiber was calibrated such that irradiance up to 1 mm from the tip of the fiber was sufficient to activate ArchT, ensuring that inactivation was limited to GC only. **D** Average firing rate of a single GC neuron in response to GCx applied for 3 seconds (indicated by the green bar; same parameters as

described in the Online Methods). Spiking activity was significantly inhibited but not completely eliminated by GCx. Inhibition of firing rate was observed in 9 out of 12 neurons (75%). These results are consistent with those of other in vivo studies, which demonstrate inhibition, but not complete elimination of firing rate via ArchT illumination [S1, S2]. Action potentials were recorded using an electrode wire rigidly attached to the optic fiber and cut to extend 0.5 mm below the tip of the fiber. **E.** Raw EMG activity recorded from the anterior digastric muscle following a single delivery of 1 mM quinine. Marked are the parameters burst duration and period (frequency) of individual movement events, which were fed into a classifier to detect gapes. Arrowhead indicates the time at which the first gape occurred. **F.** Average number of gapes elicited by an array of four different taste solutions of monotonically decreasing palatability on GCx trials. This pattern of gaping as a function of palatability is indistinguishable from the results obtained from control trials (data not shown). **G.** Characteristics of individual movement events evoked by all tastes (non-specific movements in gray; gapes in blue) on control and GCx trials. No differences were observed between control and GCx conditions. Performance of the classifier on detecting gapes was also not different between control and GCx conditions (data not shown).

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S2. Han, X., Chow, B.Y., Zhou, H., Klapoetke, N.C., Chuong, A., Rajimehr, R., Yang, A., Baratta, M.V., Winkle, J., Desimone, R., et al. (2011). A high-light sensitivity optical neural silencer: development and application to optogenetic control of non-human primate cortex. Front Syst Neurosci *5*, 18.