Figure S1. Lack of Ca^{2+} buffer effects on the time course of $\Delta[Ca^{2+}]_{res}$ at the large MFB. ***A***, A time course for loading of the large MFB with 200 μM OGB1. To slow down the dye loading, we used pipettes with high resistance (6~8 MΩ). Assuming that resting $[Ca^{2+}]_i$ is not substantially altered during the loading period, we regarded the resting fluorescence intensity (F_0) as a parameter representing the dye concentration. The F_0 at the bouton was measured every 5 min after patch break-in at the soma. Typically, it took more than 30 min after patch break-in for the F_0 at the MFB to reach a plateau level in the loading curve. Higher laser intensity was used to measure F_0 at 5 and 10 min (*open circle*) than the later phase of loading, because the F_0 at the bouton during the early phase was too dim to be reliably measured. Each value of F_0 was normalized to the corresponding laser intensity, and resulting relative F_0 values were plotted against the whole-cell recording time. To compare an AP-CaT and a TS-CaT at each time point of the loading curve, we stimulated the bouton with a single AP and then with HFS (33 Hz for 5 s) with a time interval of 5 s. Raw fluorescence traces corresponding an AP-CaT and a TS-CaT are shown along the dye loading curve (For clarity, the former was displayed in an expanded time scale than the latter by a factor of 25). ***B***, Three AP-CaTs evoked at 5, 10, 40 min after patch break-in were superimposed (*red*, 5 min; *green*, 10 min and *blue*, 40 min). ***C***, Immediately after the recording each AP-CaT (*B*), a CaT was evoked by HFS (33 Hz, 5 s). The HFS-induced CaTs measured at 5, 10 and 40 min were superimposed. The fluorescence transient at 5 min of loading did not return to the baseline, probably because the dye concentration was substantially increasing during the period of recording the CaT (100 s). To compensate this, the raw fluorescence intensity trace was adjusted by subtracting a line connecting values at the start and the end of the trace assuming that the dye intensity linearly increases during the scanning period. ***D***, Each value

for integral of post-tetanic $\Delta[Ca^{2+}]_{res}$ was normalized to the value at 5 min and plotted against the whole-cell recording time (n = 4).

Figure S2. Effects of CGP37157 on post-tetanic potentiation (PTP) at the mossy fiber synapse onto the mossy cell. Experiments similar to Figure 6 were conducted. The time course of ensemble-averaged EPSC amplitudes under control conditions (*filled circles*, same trace from *Figure 6C*) and in the presence of 20 μM CGP37157 (*gray circles*, n = 12) are shown.