**Figures captions**

**Figure 1: Recording protocol.** It consisted of 5 min of spontaneous activity (white), followed by insular stimulation at either 50 Hz (LF-IS) or 150 Hz (HF-IS) (black). After stimulation was stopped, spontaneous activity was further recorded for 30 min (grey). In order to better assess the potential effects of either IS frequencies, the 30 min post stimulation period was divided into six 5min time intervals.

**Figure 2: Two typical examples of the firing rate of NN cells, one included in the 50 Hz insular stimulation protocol (A) and the second in the 150 Hz protocol (B).** The figure shows parts of the recording (middle row), a closer look at 2 spontaneous neuronal recording segments before (Pre) and after (Post) insular stimulation (upper row) and rate histograms before and after stimulation (lower row).

**Figure 3:** **Spontaneous firing rate of VPL and PoM cells before and after low-frequency insular stimulation (LF-IS).** (**A**) LF-IS effect on the three different types of cells (NS: nociceptive specific – red triangle, WDR: wide dynamic range – green squares and NN: non nociceptive – blue circles) together with individual representation of each cell that was analyzed. (**B**), (**C**) and (**D**) show the mean firing rate over the whole recording protocol for NS, WDR and NN cells, respectively. PreIS block refers to the 5 min recording of spontaneous activity, IS block refers to the 10 min of 50 Hz stimulation, and PostIS blocks (1 to 6) refer to the mean activity during each of the 6 consecutive 5 min blocks from the overall 30 min recording of spontaneous activity after stimulation. Values are represented as mean ± SEM (\*\*≤0.03 compared to PreIS values).

**Figure 4: Spontaneous burst occurrence in VPL and PoM cells before and after low-frequency insular stimulation (LF-IS).** (**A**) LF-IS effect on the three different types of cells (NS: nociceptive specific – red triangle, WDR: wide dynamic range – green squares and NN: non nociceptive – blue circles) together with individual representation of each cell that was analyzed. (**B**), (**C**) and (**D**) show the mean burst occurrence over the whole recording protocol for NS, WDR and NN cells, respectively. PreIS block refers to the 5 min recording of spontaneous activity, IS block refers to the 10 min of 50 Hz stimulation, and PostIS blocks (1 to 6) refer to the mean activity during each of the 6 consecutive 5 min blocks from the overall 30 min recording of spontaneous activity after stimulation. Values are represented as mean ± SEM (\*≤0.05, \*\*≤0.03 compared to PreIS values).

**Figure 5: Spontaneous firing rate of VPL and PoM cells before and after high-frequency insula stimulation (HF-IS).** (**A**) HF-IS effect on the three different types of cells (NS: nociceptive specific – red triangle, WDR: wide dynamic range – green squares and NN: non nociceptive – blue circles) together with individual representation of each cell that was analyzed. (**B**), (**C**) and (**D**) show the mean firing rate over the whole recording protocol for NS, WDR and NN cells, respectively. PreIS block refers to the 5 min recording of spontaneous activity, IS block refers to the 10 min of 50 Hz stimulation, and PostIS blocks (1 to 6) refer to the mean activity during each of the 6 consecutive 5 min blocks from the overall 30 min recording of spontaneous activity after stimulation. Values are represented as mean ± SEM.

**Figure 6: Spontaneous burst occurrence in VPL and PoM cells before and after high-frequency insula stimulation (HF-IS).** (A) LF-IS effect on the three different types of cells (NS: nociceptive specific – red triangle, WDR: wide dynamic range – green squares and NN: non nociceptive – blue circles) together with individual representation of each cell that was analyzed. (**B**), (**C**) and (**D**) show the mean burst occurrence over the whole recording protocol for NS cells, WDR cells and NN cells, respectively. PreIS refers to the 5 min recording of spontaneous activity, IS refers to the 10 min of 150 Hz stimulation, and PostIS1 to 6 refers to the 30 min recording of spontaneous activity after stimulation, each PostISn representing a 5 min interval. Values are represented as mean ± SEM.