Supplemental Information

We have previously observed that rewarding and aversive taste stimuli rapidly modulate dopamine release in the shell subregion of the nucleus accumbens (NAc) (1). However the NAc is a heterogeneous structure with core and shell subregions mediating different behavioral functions (2-4). Therefore we initially examined subregion specific dopaminergic responses to the intraoral application of rewarding (saccharin) and aversive (quinine) tastants. Measurements were made using fast-scan cyclic voltammetry, an electrochemical technique with the temporal resolution necessary for distinguishing rapid changes in dopamine release (5). Naïve rats (n = 6 shell, n = 6 core) were intraorally infused with brief, repeated, small volumes (0.2 ml delivered through a solenoid over 3.5 s/trial, approximately 1 trial/min) of a sweet 0.15% saccharin solution presented across a 45 min session, then a bitter, 0.001M quinine presented in the same manner while dopamine release was monitored.

Results

Dopamine release in response to rewarding and aversive taste stimuli

Rats exhibited appetitive taste reactivity in response to the palatable saccharin infusions, and aversive taste reactivity in response to the unpalatable quinine infusions (Inserts: Figure S1A and B). Aversive responses were seldom elicited by the saccharin solution: (mean ± SEM: Shell = 2.17 ± 0.60, Core = 1.67 ± 1.12). Likewise, appetitive responses were seldom elicited by the quinine solution: (mean ± SEM: Shell = 0.5 ±

0.34, Core = 0.83 ± 0.48). These responses did not differ significantly between the Shell and Core groups, ($P > 0.05$ for both groups).

Post hoc tests of a significant main effect of epoch indicated a significant elevation of dopamine in response to saccharin presentations in the shell ($F_{10,50} = 3.32$, $P < 0.01$), but not the core ($F_{10,70} = 0.26$, $P > 0.05$) of the NAc (Figure S1A and C). Similarly, we observed a significant reduction in dopamine release events in response to quinine in the shell ($F_{10,50} = 8.81$, $P < 0.01$), but not the core ($F_{10,70} = 1.32$, $P > 0.05$), of the NAc (Figure S1B and C). The regionally-specific response to primary motivational stimuli dictated a restriction of subsequent examinations to the shell subregion.

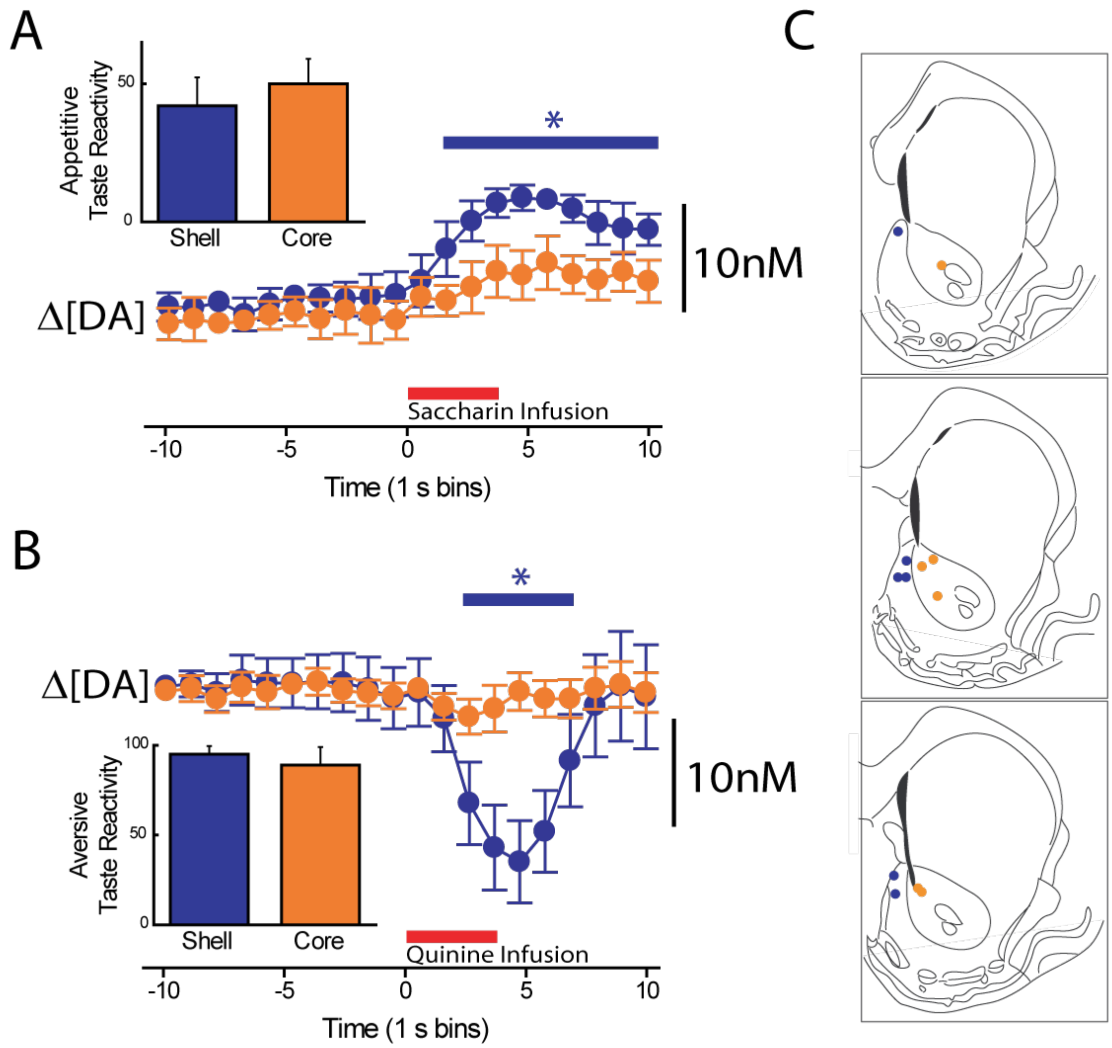

Figure S1. Dopamine release for appetitive and aversive stimuli in the core and shell of the NAc. **(A)** Time locked increases in dopamine release (mean ± SEM) were observed during the intraoral infusion of a saccharin solution in the shell (blue circles) but not the core (orange circles). Inset: Mean counts of appetitive taste reactivity events during the saccharin infusion were similar across shell and core recording animals (no difference across groups, $P > 0.05$). **(B)** Likewise, intraoral infusions of an innately bitter solution (quinine) reduced dopamine release in the shell (blue circles) but not in the core (orange circles). Inset: Mean counts of aversive responses to quinine were not significantly different across groups, $P > 0.05$. **(C)** Histological reconstruction of electrode placements showing recording locations in the shell (blue circles) and core (orange circles) of the NAc. Asterisks indicate significant differences.

References

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