The effect of Anandamide and Cannabidiol on feeding in *Tetrahymena pyriformis*

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The physiological control of appetite and fullness in humans is complex and involves the endocannabinoid system (ECS) which comprises lipid endocannabinoids (e.g. Anandamide [AEA]) that bind to known receptors (CB1, CB2, GPR55, TRPV1). The ECS can also be stimulated by Δ9-tetrahydrocannabidiol (THC) and cannabidiol (CBD) in cannabis. The effect of AEA on feeding in multicellular organisms is well documented and is biphasic. Low doses stimulate feeding and high doses inhibit feeding. The few studies investigating CBD effects on feeding are inconclusive.

Single-celled protists respond to AEA, THC and CBD often showing reduced motility and cell death, yet they do not possess any known cannabinoid receptor. No study has examined cannabinoid effects on feeding or identified the molecular target in these cells. This study examined the effect of AEA and CBD on the ciliate *Tetrahymena pyriformis* whilst feeding on a live fluorescent bacterial prey (*Synechococcus*).

At <2µM AEA/CBD feeding was stimulated whereas at ≥2µM it was depressed (i.e. biphasic). The latter was accompanied by a lag phase before feeding, the length of which was dose dependent in any given experiment. However, between experiments (at 4µM) there was much variation in the length of the CBD-induced lag (27-65 min) whilst little variation was recorded with AEA (27-30 min). Also, the resumption of feeding with AEA closely matched the control while CBD induced higher feeding rates.

We are currently testing the following hypotheses. That AEA shuts down ingestion, phagosome processing and defecation for *ca*. 30 mins then normal feeding resumes. That CBD only stops prey ingestion, but phagosome processing and defecation continue as normal, so when feeding resumes the cells are ‘empty’ and feed more. Resumption of feeding can only occur when cells are not defecating; the timings of this will differ between experiments, hence the differences in CBD-induced lag times.