BNA2019
Festival of Neuroscience

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BSN British Society for Neuroendocrinology

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BNA2019 POSTER ABSTRACTS

SESSION 1 – SUNDAY 14TH MARCH

SESSION 2 – MONDAY 15TH MARCH

SESSION 3 – TUESDAY 16TH MARCH

SP = Standard poster PP = Preregistration poster

leptin activity in the LH of obese rodents lead to similar increases in preference for palatable food and rejection of standard chow suggesting the involvement of leptin in communication between the LH and LHb.
Based on these findings, we hypothesize that deficits in the LH – LHb - VTA circuit may emerge during weight gain and contribute to obesity-associated behavioural abnormalities.

Poster number: PS013 (SP)
Theme: Attention, motivation, behaviour

Intuition and reason: activity of the heart during moral judgement

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Introduction: Moral judgement is an important component of adaptive social behaviour. Harmful actions are usually associated with intense negative emotions and intuitively perceived as morally wrong. On the other hand, if harming someone results in a socially desirable outcome it can be judged as permissible. Utilitarian moral judgement (for example, allowing sacrificing one person's life to save more people) can be viewed as a conflict between intuition and reason (e.g. Greene et al., 2004). In this work we consider the intuitive and rational processes of moral judgement as an integral part of individual behaviour which is based on actualization of functional systems, the dynamic organization of physiological activity in the brain and the rest of the body which results in achieving an adaptive outcome (Anokhin, 1975; Shvyrkov, 1995; Alexandrov et al., 2000). This approach suggests that the heart is actively involved in the organisation of behaviour, and its activity should reflect the interplay between intuition and reason when making social judgements. In this work we tested a hypothesis that the dynamics of heart activity is different when individuals make utilitarian and non-utilitarian moral judgements.

Methods: ECG was recorded in 58 adult participants while they were evaluating permissibility of harmful actions in a set of moral dilemmas, including the traditional Trolley and Footbridge dilemmas. RR-intervals were analysed to describe the dynamics of heart rate (HR) and heart rate variability (HRV) indexes.

Analysis approach: HR and HRV indexes were compared using t-test and Mann-Whitney test (significance at $p<0.05$) in situations when participants responded with utilitarian and non-utilitarian judgements.

Results and conclusions: Utilitarian moral judgements were accompanied by shorter RR-intervals, indicating higher HR, than non-utilitarian judgements (see Figure below). Lower HR had previously been reported to accompany the feelings of empathy and compassion to suffering others (Stellar et al., 2015). Lower HR in case of non-utilitarian judgements is consistent with the view on the role of negative social emotions, such as harm aversion, in moral judgement (e.g. Crockett et al., 2010). Overall, the results show that the intuitive and rational components of moral judgement are reflected in heart activity.
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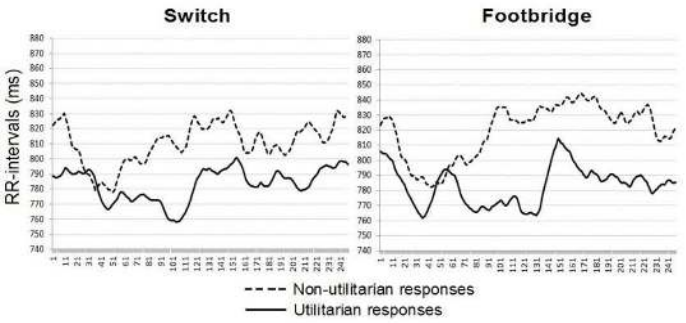

The dynamics of mean values of interpolated RR-intervals (ms) during solving Switch and Footbridge dilemmas resulting in utilitarian (solid line) and non-utilitarian (dotted line) responses. Shorter RR-intervals, indicating higher heart rate, were observed when participants made utilitarian judgements compared to non-utilitarian judgements, Mann-Whitney U test: U=4204, Z=16.58, p<0.001 for "Switch"; and U=4267, Z=16.54, p<0.001 for "Footbridge"

Poster number: PS014 (SP)
Theme: Attention, motivation, behaviour

Investigation of opioid receptor modulation in recovery of object discrimination deficits in the IFN-α depression model

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Complaints of cognitive dysfunction are core symptoms of major depressive episodes. Research into current and potential antidepressant therapies does not often take this symptom into consideration. Given the renewed interest and potential efficacy of mu, kappa and delta opioid receptors (MOR, KOR and DOR respectively) in the treatment of affective disorders [1] we aimed to examine the 12eutrally12ve effects of opioid modulators in a rat IFN-α depression model. We investigated the effects of specific opioid receptor modulators (MOR agonist: RDC 2944 (0.5-0.1mg/kg); KOR antagonist: DIPPA (1.0-2.5mg/kg); and DOR: SNC 80 (1.0-5mg/kg)) alone, or in combination, on IFN-α-induced cognitive dysfunction.
IFN-α/saline treated male Sprague Dawley rats (170,000 IU, IFN-α or saline (0.9%) 3 times per week for 4 weeks) were examined in the novel object exploration task as a measure of cognitive function [1]. Briefly, animals were habituated to the arena before the sample phase where animals were exposed to 3 identical objects for 3x5min sessions with 5min intertrial intervals. 24hr later one object was exchanged for a novel object and the animals explored for another 5min in the test phase. DIPPA/vehicle was administered (s.c.) 23.5hr before test. RDC 2944, SNC 80 or vehicle were administered (s.c.) 30min before test. Data were analysed by regular or repeated measures one- or two-way analyses of variance (ANOVA) followed by multiple comparison tests, where appropriate.
Vehicle treated IFN-α rats were significantly impaired in the novel object exploration task compared to vehicle treated saline controls (***p<0.0001). The DOR agonist, SNC 80 (5mg/kg) alone recovered IFN-α-induced deficits in the novel object exploration task (*p<0.05). Combinations of DIPPA 2.5mg/kg & SNC 80 3mg/kg, DIPPA 2.5mg/kg & SNC 80 5mg/kg or SNC 80 (3mg/kg) & RDC2944 (0.5mg/kg) each recovered IFN-α-induced cognitive deficits (**p<0.001, **p<0.001 and *p<0.05 respectively).
Together this data suggests opioid receptor modulation should be explored as a protagonist for depression related cognitive dysfunction.

1. Callaghan, C.K., et al., *Antidepressant-like effects of 3-carboxamido seco-nalmefene (3CS-nalmefene), a novel opioid receptor modulator, in a rat IFN-alpha-induced depression model.* Brain Behav Immun, 2018. 67: p. 152-162.