NEONATAL REPETITIVE SUCROSE EXPOSURE DECREASES WEIGHT GAIN ACROSS THE LIFESPAN IN MICE

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INTRODUCTION / AIM
Sucrose is widely used for routine procedural pain treatment for preterm infants in the NICU. Nutrition research has shown adverse effects of sugar on metabolism. However, no studies have examined the long-term effects of neonatal repeated sucrose exposure on parameters related to metabolic health in the context of pain. In a translational mouse model, we examined the effect of neonatal repeated sucrose treatment before a pain, tactile or handling intervention, on weight gain throughout the lifespan and on sugar preference in adulthood.

METHODS
Neonatal C57Bl/6J mice (n=118, 45% male) were randomly assigned to one of 2 treatments (sucrose vs water) and one of 3 interventions (needle-prick, touch, handling). Mice received treatment before 10 interventions over a 12h period (daytime) daily from postnatal day 1 to 6 (P1-P6). Single doses of 24% sucrose (0.1-0.2mg of sucrose/g weight) or water were given orally 2 min before each intervention. Mice were weighed before testing on P1-P7, P21, P60, P90. A 48hr sugar preference test (sucrose 10% solution vs water ad libidum) was done at P80-85.

RESULTS
Using GEE adjusting for weight at P1, mice given sucrose compared to water during the neonatal period had significantly lower weight gain from P2 to P90 (mean difference=0.089g [0.087-0.091], p=0.015). There was no significant treatment X intervention interaction. The sugar preference test revealed that mice exposed to sucrose compared to water in the neonatal period, irrespective of the intervention, drank significantly less sucrose solution (-6.16ml [1.005-10.501], p=0.001) without differences in the amount of chow or water consumed.

DISCUSSION / CONCLUSIONS
In a mouse model that closely mimics daily NICU procedural pain and pain treatment, early repeated exposure to sucrose reduced weight gain across the lifespan, regardless of pain exposure. Our findings may suggest adverse effects of repeated sucrose exposure early in life on metabolism long-term.

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