"Self-Regulatory mothering vs nursery routine care postbirth: effect on salivary cortisol and interactions with gender, feeding and smoking"

Dr. Gene Anderson (USA)".

Infants cry more and appear stressed when separated from their mothers postbirth. Based on stress theory, we hypothesized that separated infants would have higher cortisol an accepted biologic index of estress. Eighty-four consecutive mothers and their healthy fullterm infants were randomlyassgned by computerized minimization at one hour postbirth to self- Regulatory Mother Care (SR) or Nursery Routine Care (NR) to determine the effect of SR care on infant salivary cortisol (ng/ml unbound, highly active). Ramdom assignment was done by minimization on 10 selected potentially confounding variables and groups were comparable thoughout the study. Groups were also comparable for cortisol at baseline (hour 1).

The SR intervention was given from Hours 1-6. No males were circumcised during this time. SR infants lay almost continuously on their mothers cherst or alongside them, sometimes skin-to-skin and helped these mothers to stay in close contact with their infants and respond to their cues in timely appropriate ways. NR infants went to the nursery at Hour land back to their mothers per standard care (M=4.5 hours).

Cortisol assays were done using the method described by Wood et al (1993), American Journal of Physiology. Cortisol deelined rapidly and was similar in both grounds at Hour 1 (n= 35) and Hours 2 and 3. Cortisol at Hour 6 was significantly different for effect a ee interactions which yielded surprising differences (see table).

N NR(M=SD) n SR (M=SD) Pa

Main effect 43 9.1 = 8.6 41 4.1 = 4.3 .001

Female 21 13.3 = 10.1 23 3.4 = 2.6 .000

Male 22 5.1 = 4.2 18 5.0 = 5.9 .986

Botle 25 10.5 = 8.5 24 3.2 = 2.7 .000

Breast 17 7.6 = 8.8 15 6.1 = 5.9 .575

No smoke 30 10.8 = 9.4 31 4.2 = 4.7 .001

Smoke 13 5.3 = 5.0 10 3.8 = 3.1 .414

Note: Main effect romanded for all transformation two- tailed tests.

Rodent studies have documented the following. Unbound cortisol readfly crosses the blood-brain. A 2.0 ng/ml elevation in cortisol can have profound effects. Under stressful conditions of maternal separation and isolation, a brief elevation of cortisol aids adaptation in the short term, but is biologically costly in the long term. Maternal separation in the early neonatal

period results in longer elevations, which alter glucocorticord receptor gene expression in the brain and in turn, heighten reactivity of the HPA (Hypothalamic-pituitary-adrenal) system to stressful stimuli. Female feruses have higher estrogen, which increases HPA reactivity. In contrast in male primates testosterone (which varies indirectly with cortisol) is high at birth and may dampen HPA reactivity. In humans, smoking elevates salivary cortisol.

We recognize that generations cannet be made with certainty from rats to humans. Given this caveat, we offer the following speculations. The maternally separed female infants, bottle-fed infants and infants of non-smoking mothers had high levels of salivary cortisol suggesting a high reactivity to stress. The separed male infants, breastfed, and infants of smoking mothers had lower levels in a stressful situation where higher cortisol is needed to adapt. This suggests that the capacity of the infant to respond to stress was dampened. The life-span implications of these findings may be profound. (Funded by the NINR, NIH, R01NU02444)

Summary: High mean cortisol in separated newborn infants has never been documented before, indicates these infants are stressed, is physiologically relevant and may have life-span sequelae.