A New Paradigm for Depression in New Mothers

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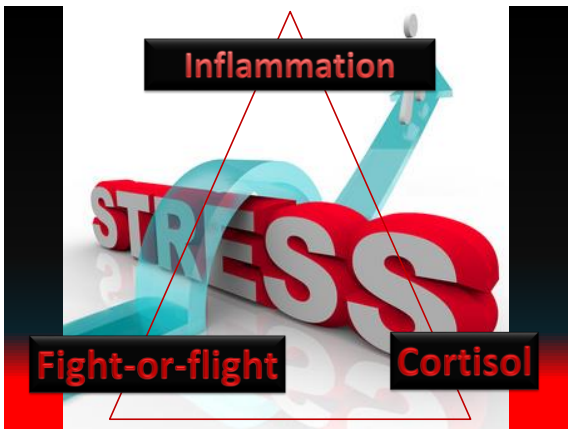
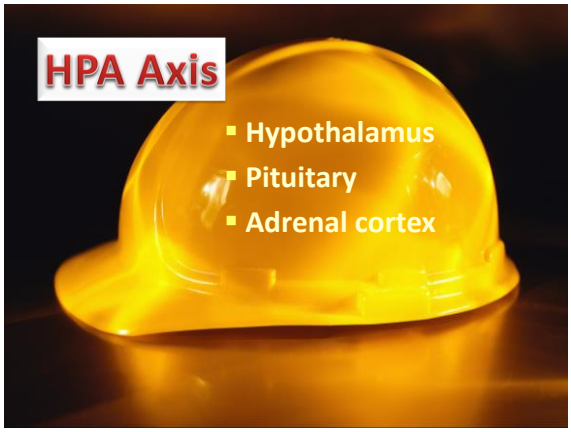
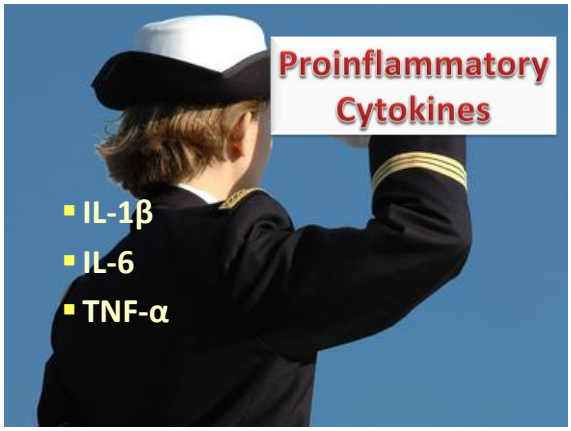
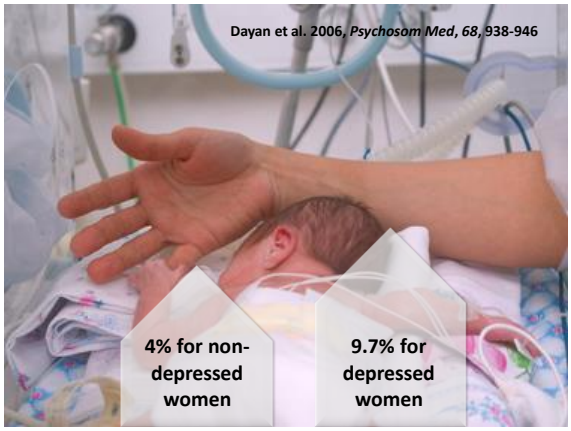


• Epinephrine
• Norepinephrine
• Dopamine
Catacholamine

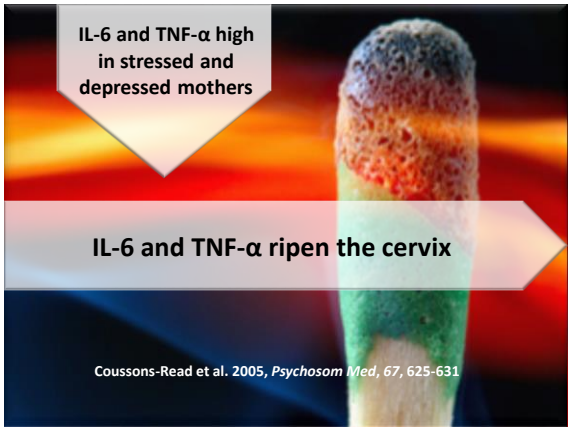

HPA Axis
▪ Hypothalamus
▪ Pituitary
▪ Adrenal cortex

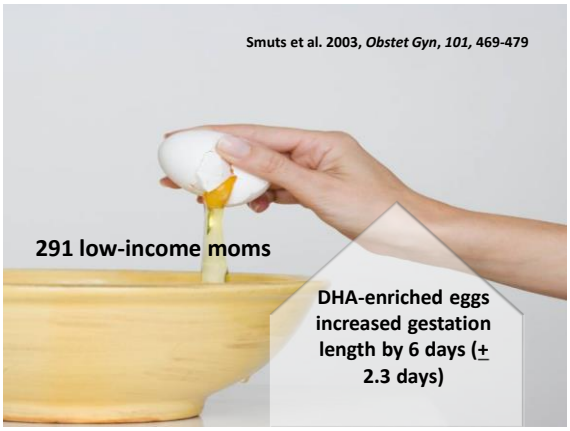

Proinflammatory Cytokines
▪ IL-1β
▪ IL-6
▪ TNF-α

Depression increases the risk for preterm birth


Dayan et al. 2006, *Psychosom Med*, *68*, 938-946
4% for non-depressed women
9.7% for depressed women

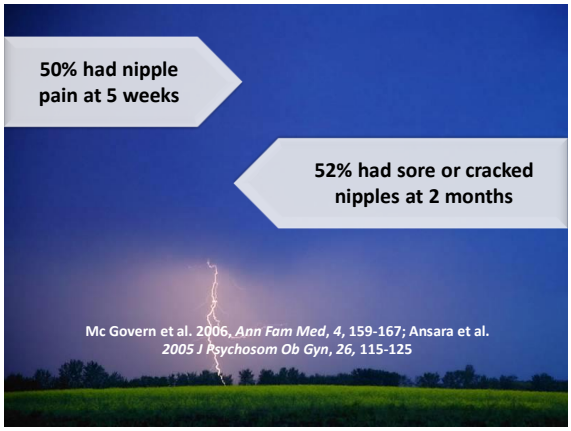
Goldenberg et al., 2008. The *Lancet*, *371*(9606), 75-84
Inflammation Identified as a risk factor for preterm birth

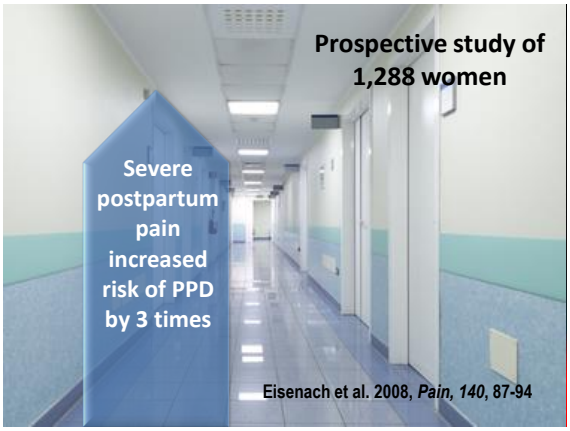

IL-6 and TNF-α high in stressed and depressed mothers
IL-6 and TNF-α ripen the cervix
Coussons-Read et al. 2005, *Psychosom Med, 67*, 625-631


Smuts et al. 2003, *Obstet Gyn, 101,* 469-479
291 low-income moms
DHA-enriched eggs increased gestation length by 6 days (± 2.3 days)

Pain

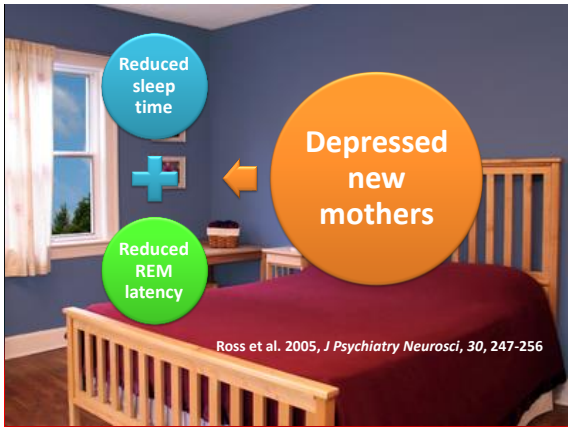
2,586 women in U.S.
Pain at Day 1, Week 1, Week 2
Depression at 2 months postpartum
Breastfeeding help protected mental health for women with moderate or severe pain
Watkins et al. 2011, *Ob Gyn,* 118(2), 214-221

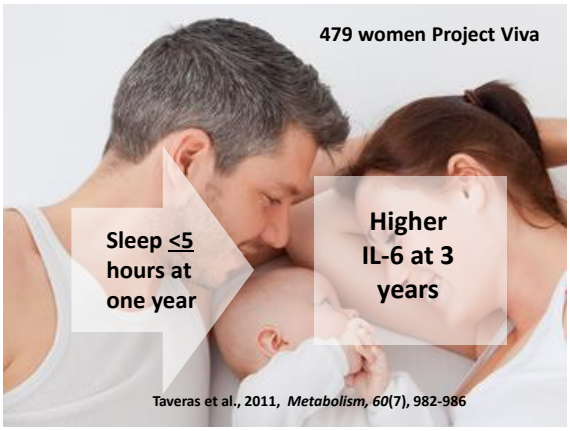

50% had nipple pain at 5 weeks
52% had sore or cracked nipples at 2 months
Mc Govern et al. 2006, *Ann Fam Med, 4*, 159-167; Ansara et al. *2005 J Psychosom Ob Gyn, 26,* 115-125


Prospective study of 1,288 women
Severe postpartum pain increased risk of PPD by 3 times
Eisenach et al. 2008, *Pain, 140*, 87-94

Sleep

Depression compromises sleep quality
Kendall-Tackett, *Trauma, Violence & Abuse*, 8, 117-126


Reduced sleep time
Reduced REM latency
Depressed new mothers
Ross et al. 2005, *J Psychiatry Neurosci*, *30*, 247-256


479 women Project Viva
Sleep <5 hours at one year
Higher IL-6 at 3 years
Taveras et al., 2011, *Metabolism, 60*(7), 982-986

Sleep problems
IL-6, TNF-α
CVD & Metabolic syndrome
Berk et al. 2013 *BMC Med 11*, 200; Suarez & Goforth, 2010, In *Psychoneuroimmunology of Chronic Disease.*

Trauma

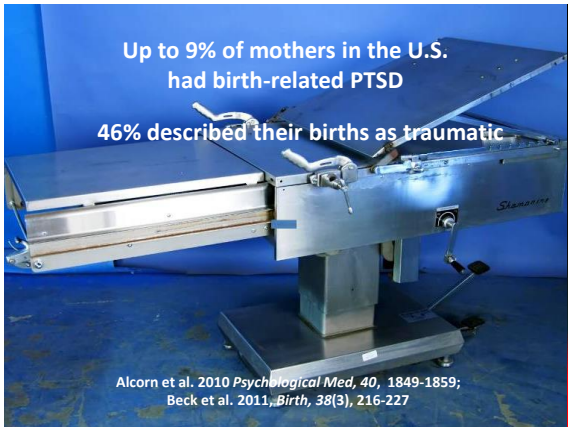
Suburban
Urban
11
22
46
57
PRENATAL DEPRESSION
LIFETIME ABUSE
Rich-Edwards et al. 2011, *Intl J Epidem, 40*, 375-384

Survey of Mothers' Sleep and Fatigue
6,410 mothers
16% Rape
25% CSA
32% Parental Substance Abuse
34% Physical Abuse
36% Parental Depression

Dunedin Multidisciplinary Health and Development (N=1,037)
Adverse childhood experiences increased rates of major depression, systemic inflammation, and metabolic risk factors at age 32
Danese et al. *2009 Arch Ped Adolesc Med*, 163, 1135-1143

C-Reactive Protein
Prenatal and Childhood Adversity
Collaborative Perinatal Project (1959-1972), 355 offspring (M age=42)
Slopen et al. 2015, *Psychoneuroendocrinology, 51*, 403-413

Prenatal adversity increased inflammation for the baby in adulthood by 3 times
Slopen et al. 2015, *Psychoneuroendocrinology, 51*, 403-413

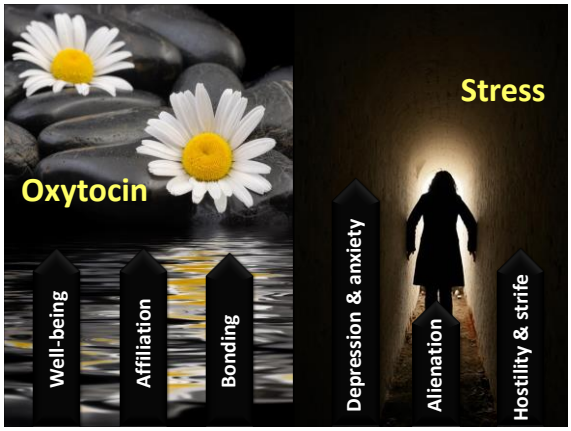

Up to 9% of mothers in the U.S. had birth-related PTSD
46% described their births as traumatic
Alcorn et al. 2010 *Psychological Med, 40*, 1849-1859;
Beck et al. 2011, *Birth, 38*(3), 216-227

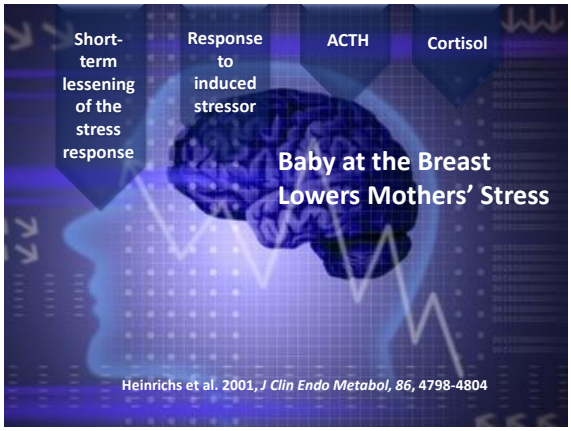
Stress
Response
Trauma

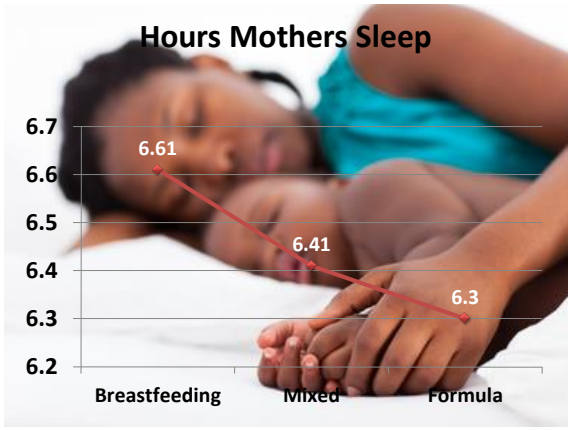
• Lower maternal stress
• Lower inflammation

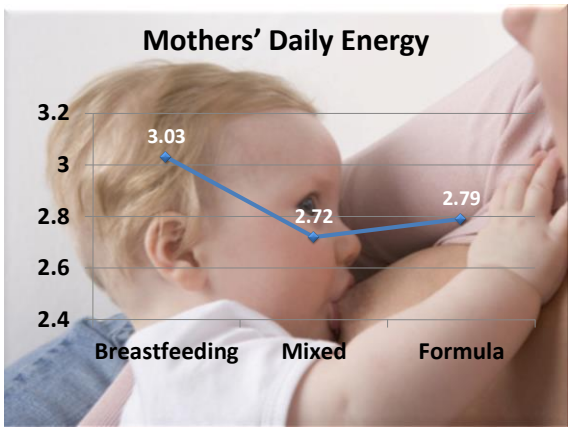
• Lowers stress
• Lowers inflammation

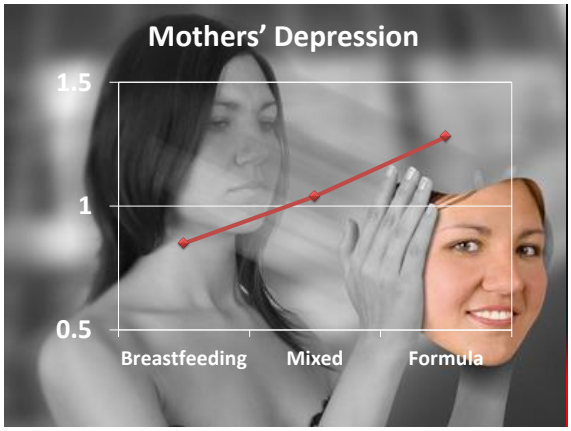
Good for both mother and baby


Oxytocin
Well-being
Affiliation
Bonding
Stress
Depression & anxiety
Alienation
Hostility & strife

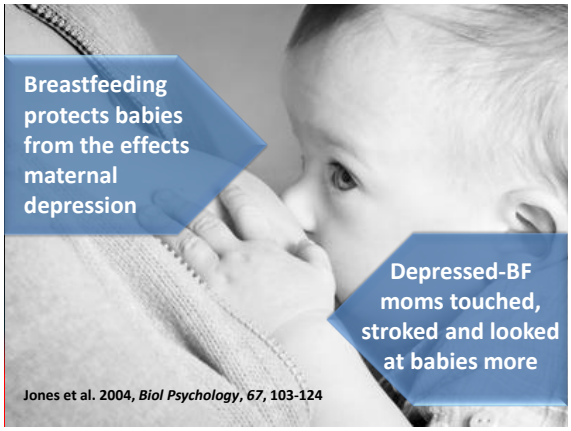

Short-term lessening of the stress response
Response to induced stressor
ACTH
Cortisol
Baby at the Breast Lowers Mothers' Stress
Heinrichs et al. 2001, *J Clin Endo Metabol, 86*, 4798-4804


Hours Mothers Sleep
6.7
6.6
6.5
6.4
6.3
6.2
6.61
6.41
6.3
Breastfeeding
Mixed
Formula


Mothers' Daily Energy
3.2
3
2.8
2.6
2.4
3.03
2.72
2.79
Breastfeeding
Mixed
Formula


Mothers' Depression
1.5
1
0.5
Breastfeeding
Mixed
Formula

Hypertension
Diabetes
CVD
High Triglycerides
Lifetime Protection For Mothers
Schwartz et al. 2009, Obstet Gyn, 113, 974-982


Breastfeeding protects babies from the effects maternal depression
Depressed-BF moms touched, stroked and looked at babies more
Jones et al. 2004, Biol Psychology, 67, 103-124

Breastfeeding >12 months
=
Better child mental health
Oddy et al. 2009, J Pediatrics 156, 568-574

Child Behavior Checklist Scores
Never BF
BF 12+ Months
Age 2 16.1 9.6
Age 5 26.3 16.0
Age 8 19.4 13.5
Age 10 15.2 12.6
Age 14 16.7 10.9

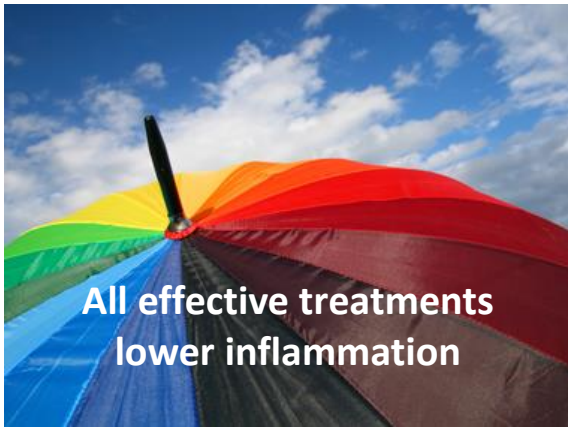
Shorter duration was associated with a fear bias
Neurocoritical study revealed that longer duration of exclusive breastfeeding gave infants a "happy bias"
Krol et al. 2015, Frontier Behav Neurosci, 8, 485

Mothers who breastfed for 4 months were 3.8 times less likely to neglect their children
Strathearn et al. 2009, Pediatrics, 123, 483-493

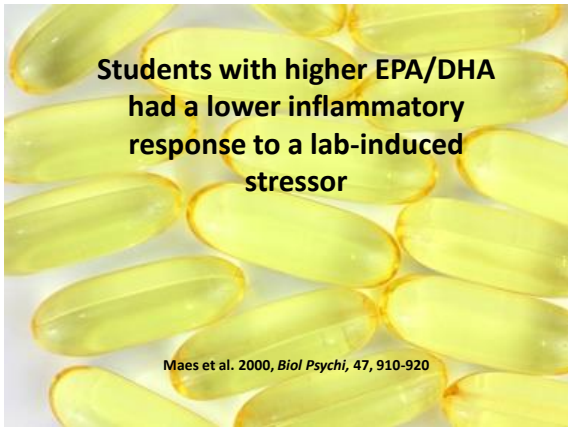
VIOLENCE
And 2.6 times less likely to physically abuse them
Strathearn et al. 2009, Pediatrics, 123, 483-493

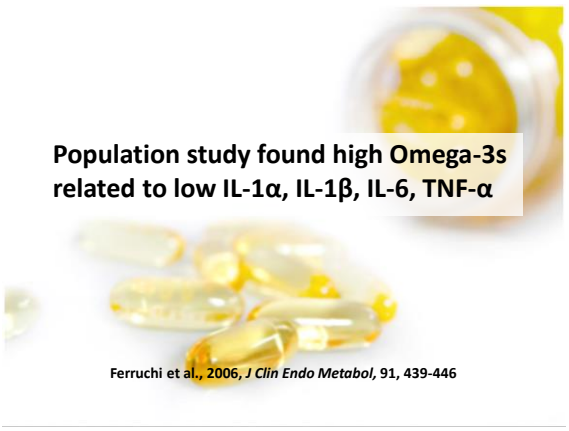
Secure Attachments Decrease Adult Health Problems

Insecure attachments at 12-18 months associated with inflammation-based illness at age 32
Puig et al. 2013, Health Psychology, 32(4), 409-417

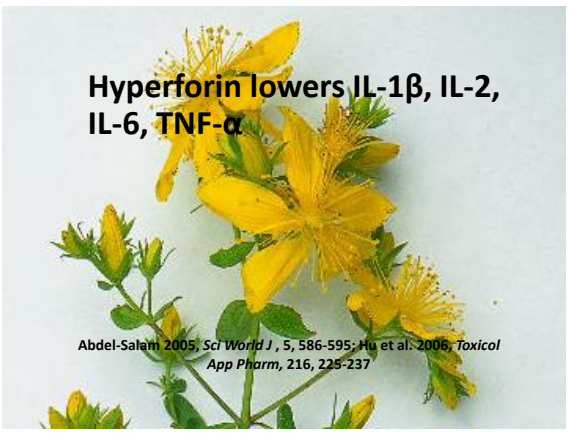

All effective treatments lower inflammation

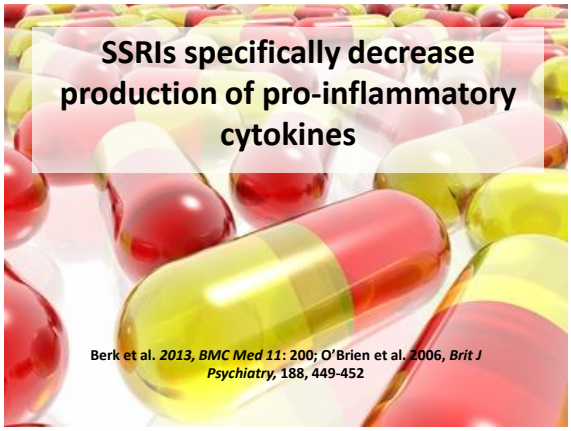
Exercise
Omega-3s
Bright light
Acupuncture
CBT/MCBT
IPT
St. John's wort
Antidepressants

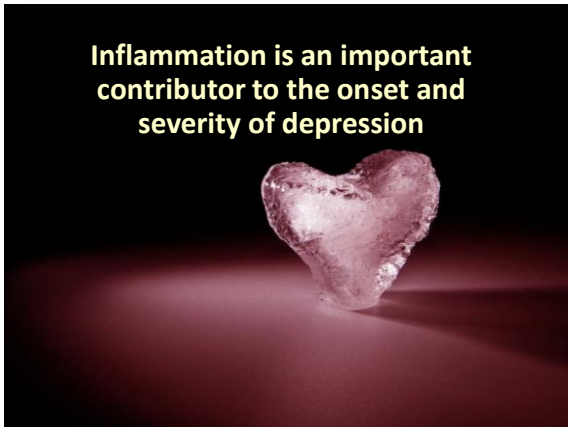

Students with higher EPA/DHA had a lower inflammatory response to a lab-induced stressor
Maes et al. 2000, *Biol Psychi*, 47, 910-920


Population study found high Omega-3s related to low IL-1α, IL-1β, IL-6, TNF-α
Ferruchi et al., 2006, *J Clin Endo Metabol*, 91, 439-446

Study of 116 women in Finland with depression
• ACEs associated with low social support
• High social support associated with low CRP
Runsten 2013 *Nordic J Psychiatry*: Apr 30


Hyperforin lowers IL-1β, IL-2, IL-6, TNF-α
Abdel-Salam 2005, *Sci World J* , 5, 586-595; Hu et al. 2006, *Toxicol App Pharm*, 216, 225-237


SSRIs specifically decrease production of pro-inflammatory cytokines
Berk et al. 2013, BMC Med 11: 200; O'Brien et al. 2006, Brit J Psychiatry, 188, 449-452


Inflammation is an important contributor to the onset and severity of depression

Breastfeeding attenuates stress and protects maternal mood

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