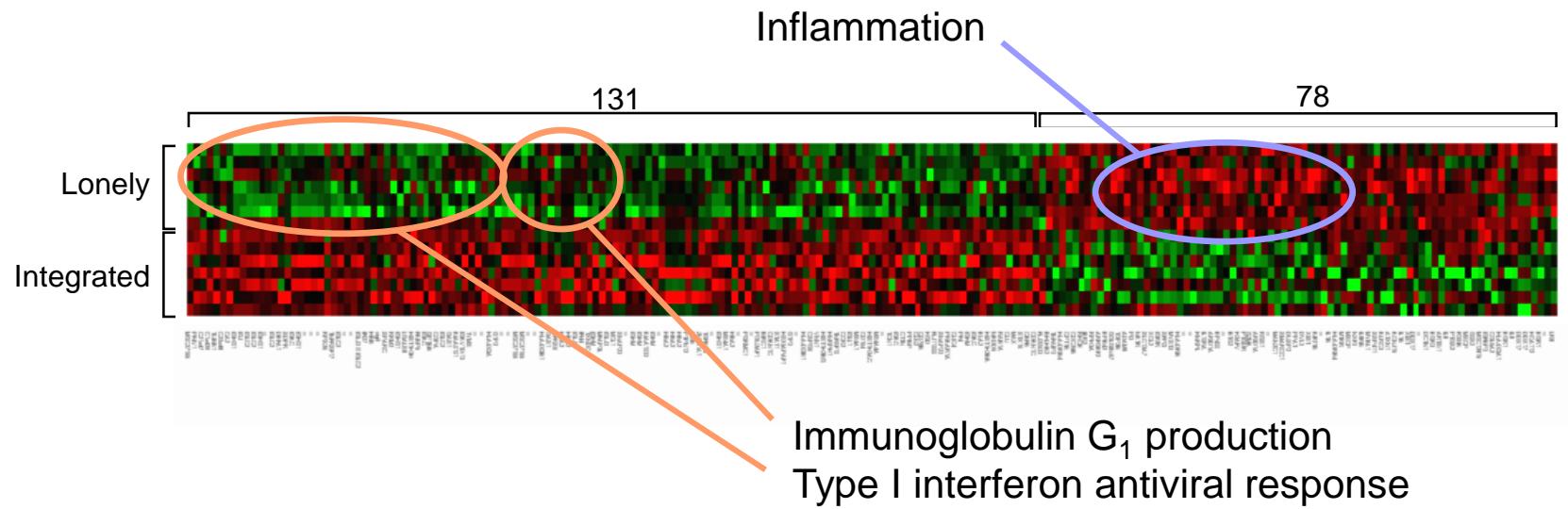


Trust, safety, and the social regulation of gene expression

Steve W. Cole, Ph.D.
UCLA School of Medicine

Social isolation



Low SES

Social loss / bereavement

Post-traumatic stress

Cancer diagnosis

Discrimination

Loneliness

Social instability

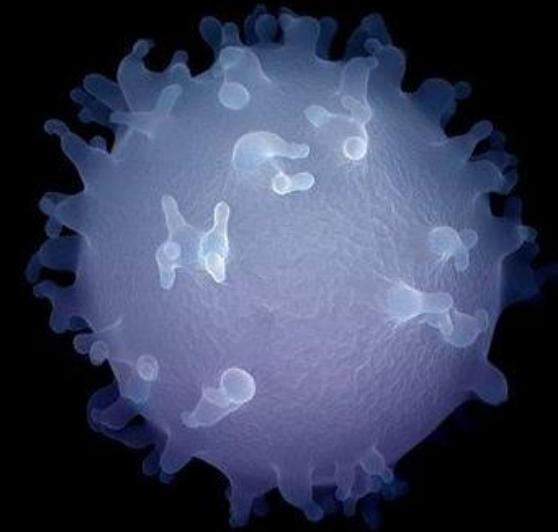
Chronic stress

Low social rank

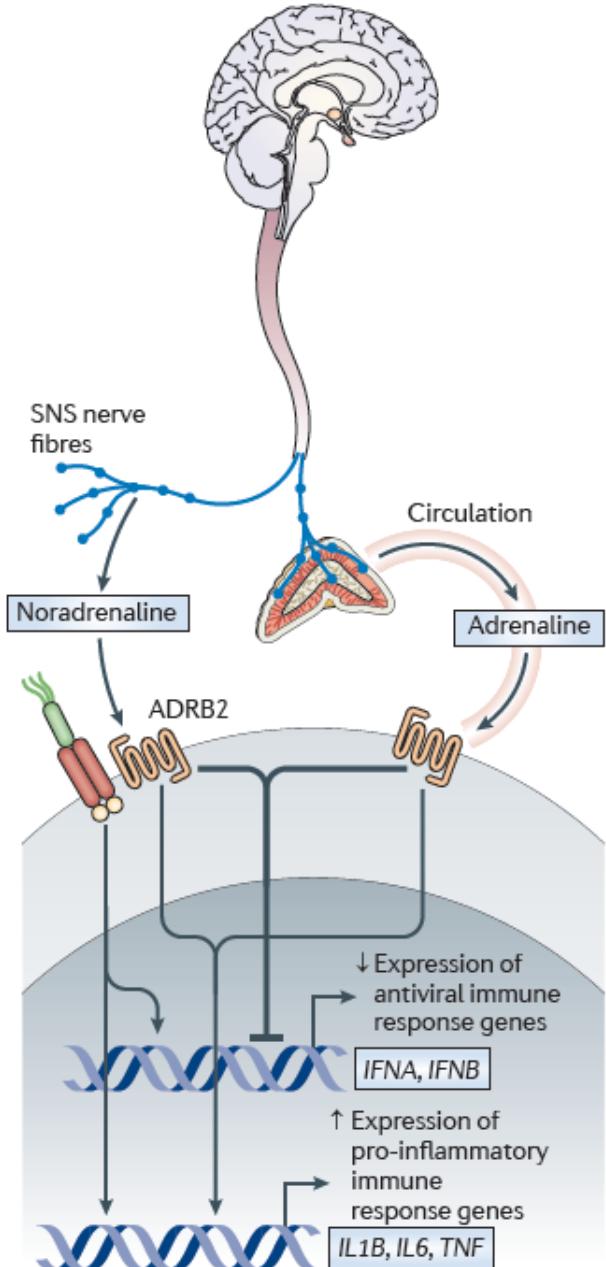
Caregiving for seriously ill

Anxiety

Early life adversity

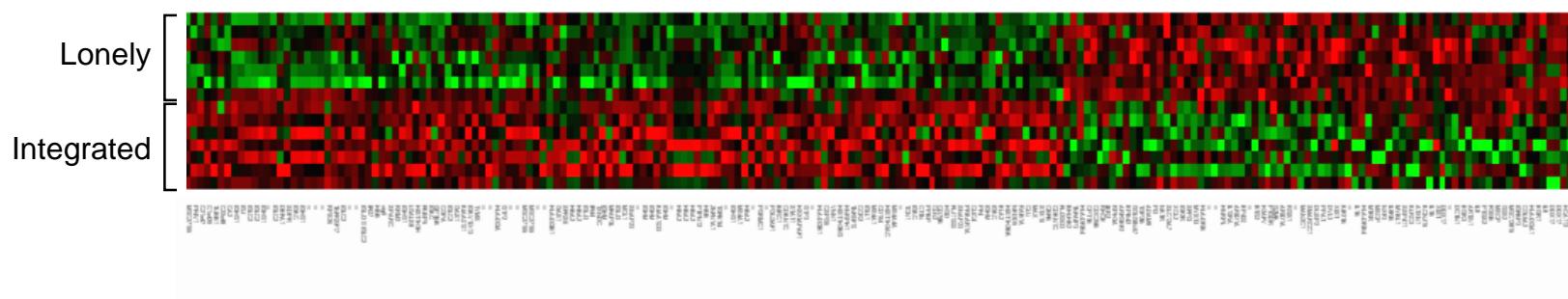


Cole et al. PNAS 2011
Powell et al. PNAS 2013
Heidt et al. Nature Medicine 2014
Cole et al. PNAS 2015
McKim et al., Cell Reports 2018





How not to live



How should we live?



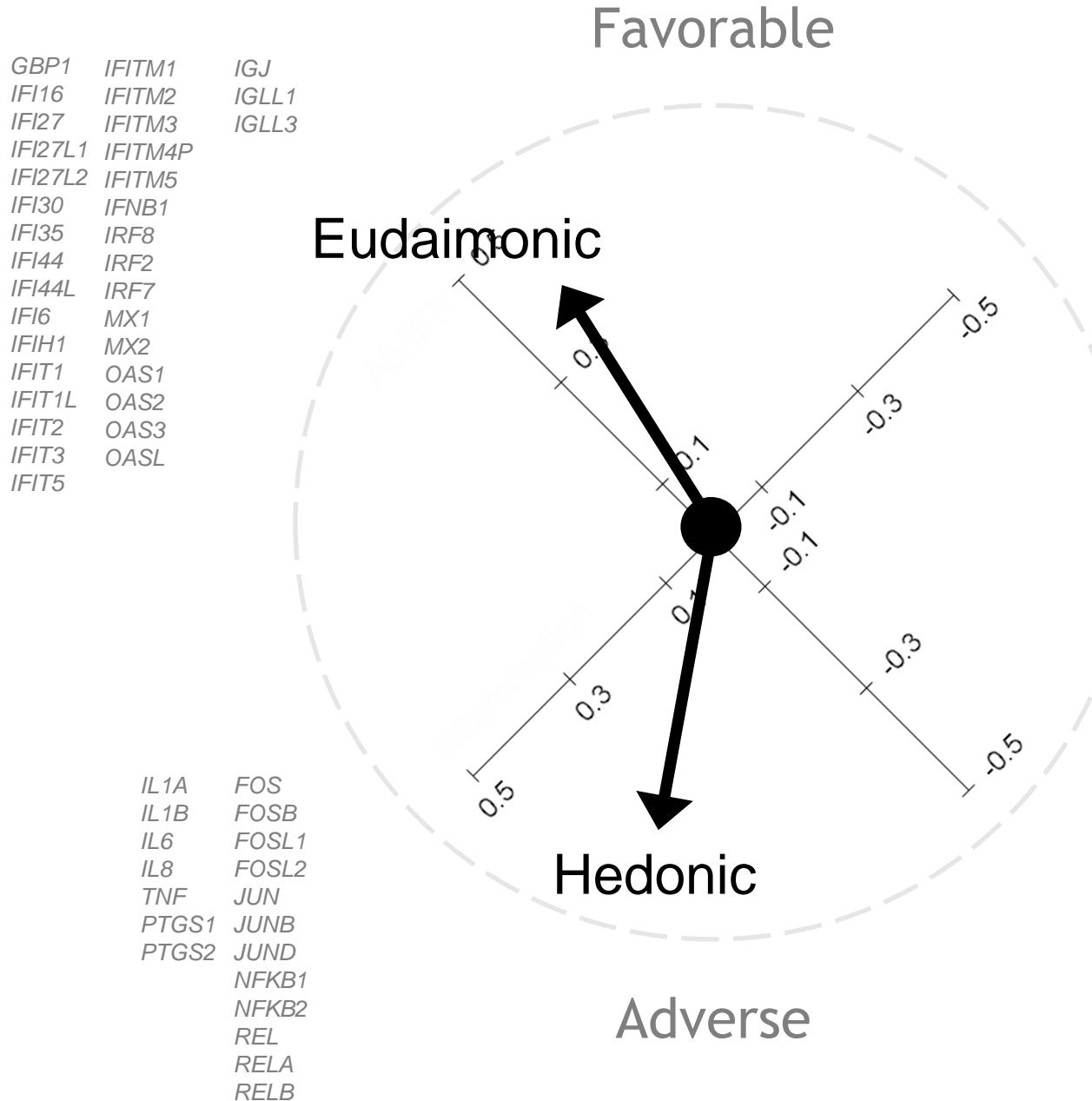
Hedonic

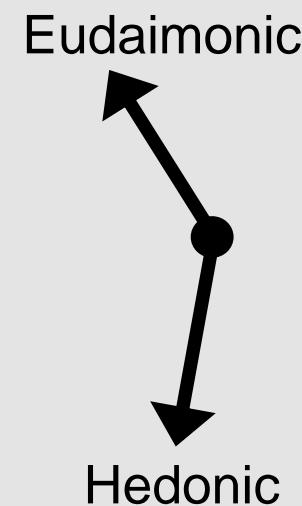
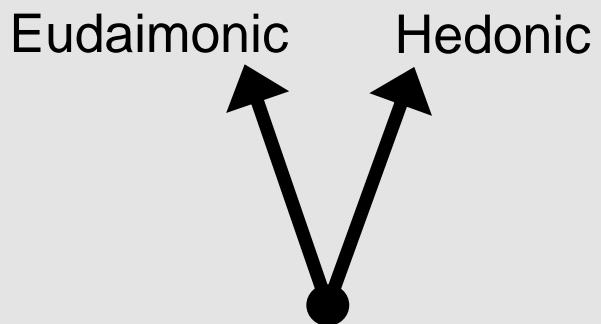
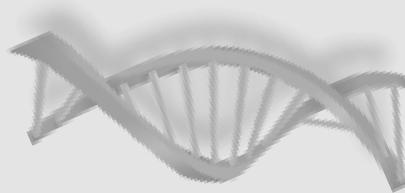


Eudaimonic

How often do you feel **happy**?
How often do you feel **satisfied**?

Life has **direction** and **meaning**?
Grow and become a **better person**?



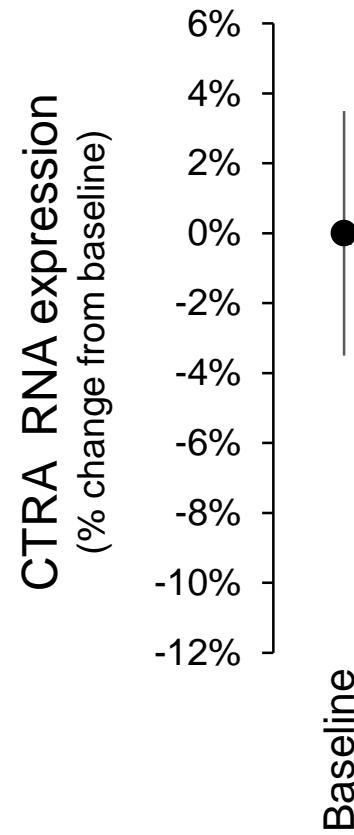


Fredrickson et al. PLOS One 2015
Cole et al. Psychoneuroendocrinol 2015
Kitiyama et al. Psychoneuroendocrinol 2016
Boyle et al. Psychoneuroendocrinol 2019
Snodgrass et al. Brain Behav Immun 2019
Seeman et al. Psychoneuroendocrinol 2020
Moieni et al. Brain Behav Immun 2020
Kim et al. under review 2020



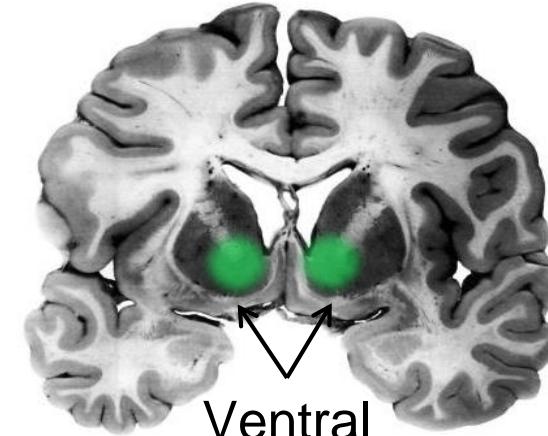
How to make more eudaimonia?

GenX LA
UCLA Gerontology & LAUSD
60-80 yo local resident classroom mentors
for at-risk K-3rd graders in South-Central LA



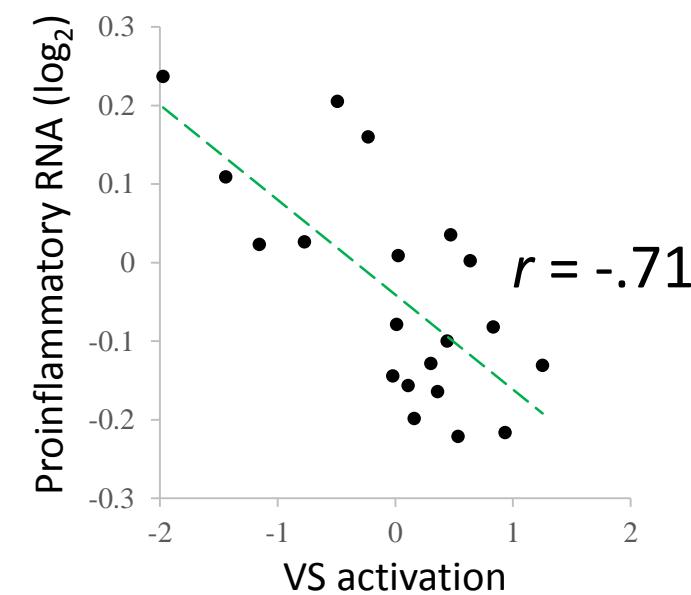


Goetz et al. Psychological Bulletin 2010
Porges Int J Psychophysiology 2001
Porges Psychophysiology 1995



Ventral
Striatum

Eisenberger & Cole, Nature Reviews Neuroscience 2012





Collado-Hidalgo et al. *Brain Behav Immun* 2006
Sloan et al. *Cancer Res* 2010
Powell et al. *PNAS* 2013
Eyre et al. *Pharmacopsychiatry* 2017
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Creswell et al. *Brain Behav Immun* 2012
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Fredrickson et al. *PNAS* 2013
Fredrickson et al. *PLOS One* 2015
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Kitiyama et al. *Psychoneuroendocrinol* 2016
Boyle et al. *Psychoneuroendocrinol* 2019
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Seeman et al. *Psychoneuroendocrinol* 2020
Moieni et al. *Brain Behav Immun* 2020
Kim et al. under review 2020
Cole Krueger et al. in prep 2020

Take-home points:

- Chronic **threat** and **insecurity** activate a **defensive genomic program**
- That “Conserved Transcriptional Response to Adversity” (CTRA) raises disease risk
- CTRA is mediated by fight-or-flight stress responses
- CTRA can be inhibited by...
 1. Pharmacologic interventions targeting CNS threat circuits *OR* peripheral β_2 -adrenergic signaling
 2. Behavioral interventions to reduce stress, promote coping & enhance efficacy/security
 3. Activation of the brain’s reward system, e.g., by eudaimonic engagement
 - Prosocial: caregiving / mentoring / generativity
 - Goal directed: creative / productive engagement
 4. A safe, supportive, secure, and ideally generative social environment



Collaborators

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