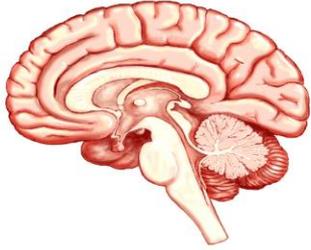




Gender Differences—in Response to Stress

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Brain References
www.arlenetaylor.org
www.LLM.life





Human Brains

www.ArleneTaylor.org



People have been fascinated by the brain since at least Hippocrates, the ‘Father’ of Medicine

The *age of the brain* provides the advantage of emerging technology

- **Brain scans show us how the brain functions**
- **Studies tell us how to care for the brain**
- **Research explains more and more about male-female brain differences**

Stress is Living

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Stress is the label for asking the brain and body to change, to do something different—and when they no longer can respond to change, they are history (absence of stress is death)

- **Eustress: Positive stress helps you grow**
- **Distress: Negative stress (avoid when possible)**
- **Misstress: Hidden stress (may be missed)**

Unmanaged distress and misstress can kill brain cells and damage body organs

Different Strokes for . . .

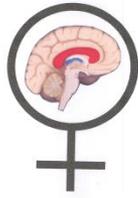
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Stress is a relative concept as every brain is unique: every thought changes your brain and every brain thinks different thoughts—so you become even more unique with age

Stress responses typically:

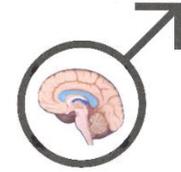
- **Are learned (often in childhood)**
- **Relate to perception and flexibility**
- **May be triggered by fear, a sense of being different, disenfranchised or unaccepted, etc.**
- **Can be unlearned and relearned**





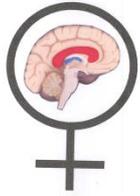
Stress and the Brain

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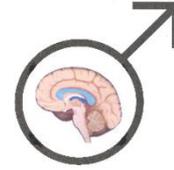
All brains need effective stress-management strategies as unmanaged stress is lethal to both brain and body—studies have shown that the brain responds differently to stressors based on gender

- **Statistically, females are twice as vulnerable as male brains to stress-related disorders such as PTSD and depression**
- **Male brains appear more likely to have a stress-related depressive disorder show up later in life**



Gender and Stress

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When feeling stressed in the moment, females may have heard: *“It’s no big deal; get over it!”*

When feeling stressed later on in life, males may have heard: *“Pull yourself together; get on with life!”*

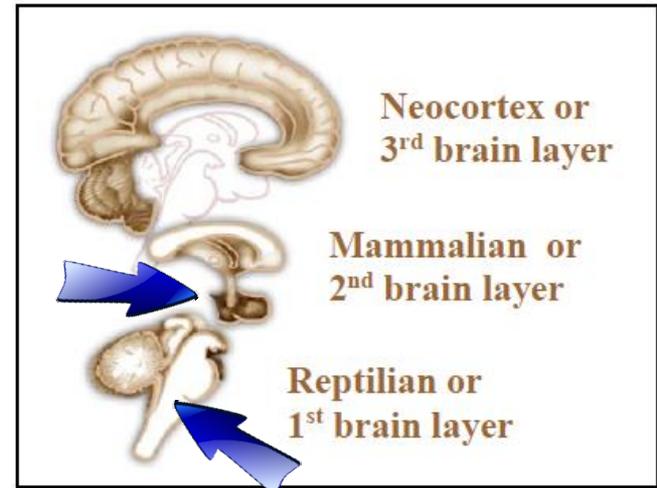
Naturally, neither response is helpful

Research now suggests a gender difference exists that is worth paying attention to—not only for the present moment but also for 25 years later

CRF

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In response to a stressor the hypothalamus in the Mammalian or 2nd brain layer triggers the secretion of CRF (Corticotropin Releasing Factor)



Both a neurotransmitter and a peptide hormone, CRF binds to receptors on cells in the locus ceruleus in the brain stem—an alarm center deep in the Reptilian or 1st brain layer

—*Molecular Psychiatry* (report)

News Flash

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The release of CRF is telegraphed throughout the brain via the chemical messenger norepinephrine—which influences sleep and alertness and is believed to be correlated with the Fight-Flight stress response

This news flash creates a heightened emotional arousal throughout the brain—such hyper-arousal can be adaptive and helpful for brief periods but not if it becomes chronic

Runaway CRF is a core feature of depression

CRF is Powerful

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- **Can suppress appetite and may be linked with anorexia nervosa**
- **Can increase subjective anxiety that may lead to depression**
- **Is linked with euphoric feelings that accompany alcoholism**
- **Triggers inflammation, a process that may be linked with Multiple Sclerosis**
- **High levels have been found in cerebrospinal fluid of individuals who had major depression and in those who committed suicide**

Rats

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Rats make good research subjects when you can't use human beings as rat and human peptides are identical



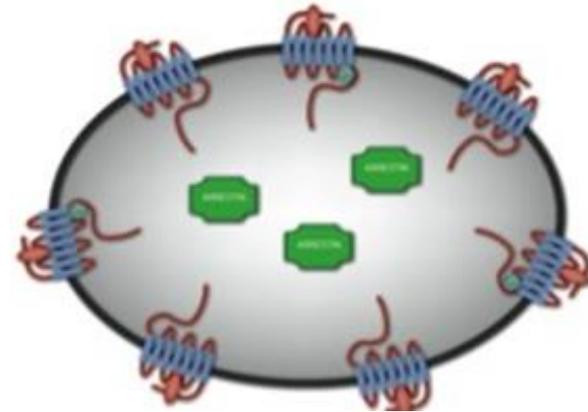
Peptides are molecules consisting of two or more amino acids that impact your mood; some are hormones, others are neurotransmitters, and some are a combination of both

Researchers studied how the brains of male and female rats handled stress (swimming in a vat of water for up to 48 hours)



Female Rat Brain – CRF

The brain of a stressed female rat acted *macho*—all CRF receptors stayed on the cell surface and open so CRF could enter the cell freely and the green arrestins remained inactive



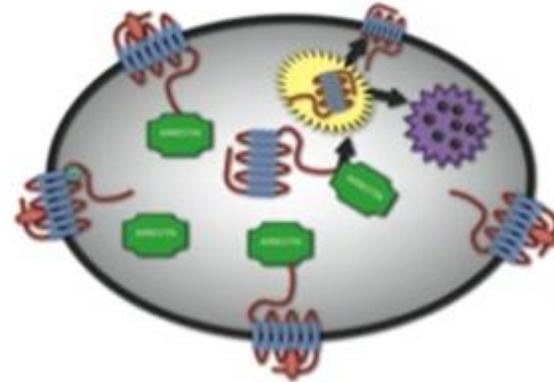
Neuron in female rat brain

Metaphor: all windows were wide open letting in the storm of CRF easily; this increased CRF binding heightened the brain's stress reactivity



Male Rat Brain - CRF

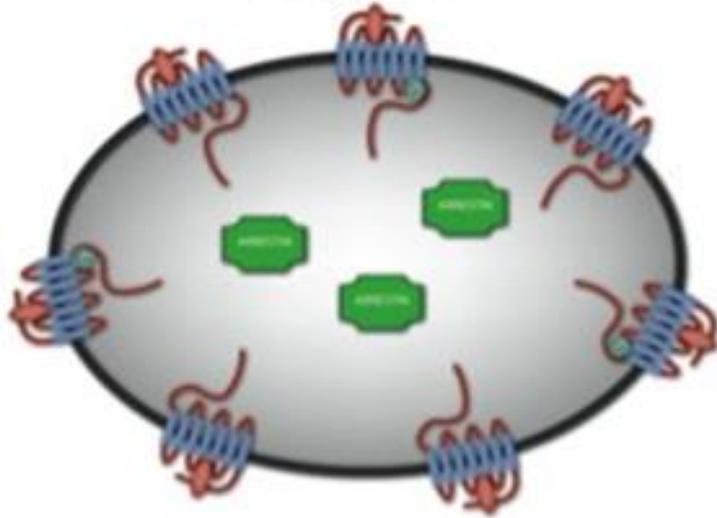
In the stressed male rat brain, internal proteins called arrestins (green) helped some CRF receptors retreat inside the cell where they could not bind with CRF



Neuron in male rat brain

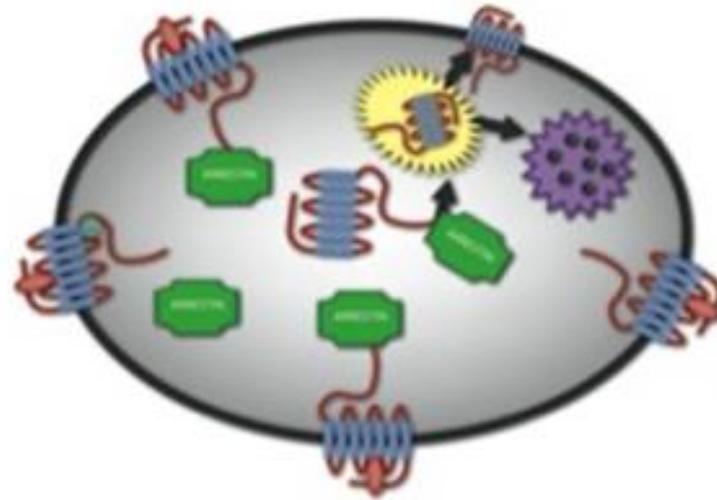
Metaphor: arrestins closed half the windows—this process, unique to the male brain, toned down the neuron's stress sensitivity due to less CRF being taken into the cell

FEMALE



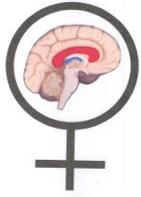
Receptors (blue) on cell surfaces stay open, which increases CRF binding and stress reactivity

MALE



Arrestins (green) help some receptors retreat inside the cell, which decreases CRF binding and stress reactivity

http://www.nimh.nih.gov/science-news/2010/stress-hormone-receptors-less-adaptive-in-female-brain.shtml?WT.mc_id=twitter&sms_ss=email



Female Brain

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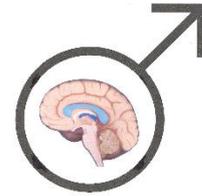
The female alarm system is more sensitive to stressors and to CRF, period; even in the absence of stressors, the female stress signaling system is more sensitive from the start

—Debra Bangasser PhD

Lack of receptor internalization in the female brain could translate into impaired ability to cope with high levels of CRF, as occurs in depression and PTSD—making the stressor seem even worse in the present moment

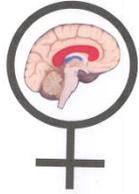
Male Brain

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Increased receptor internalization in the male brain could translate into enhanced ability to cope with high levels of CRF—causing the stressor to seem less intense or problematic in the present moment

However, it is possible that the less-intense stress response in the present moment may be more problematic over time, increasing the male brain's risk for a Major Depressive Episode (MDE) 25 years later



SLEs and MDEs

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University of Michigan, Ann Arbor, MI, USA

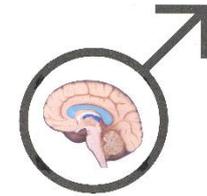
**Researchers studied stressful Life Events (SLE)
and the Risk of a Major Depressive Episode (MDE)
25 Years Later**

The data were broken out by gender and by race

- **There was no difference for risk of a MDE based on race for females (women use coping strategies including faith, religion, social support networks, and emotional expression)**

Black-White Paradox

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Researchers found a stronger predictive role of SLEs and risk of MDEs for white males compared with black males 25 years later

Despite higher levels of exposure to SLE, black males have disproportionately lower rates of depression—black males may have a higher tendency to implement adaptive coping strategies, including positive reappraisal and maintenance of hope and optimism

journal.frontiersin.org/article/10.3389/fpubh.2016.00049/full

Different Strokes . . .

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Stress is a relative concept because every brain is unique; stress responses are typically learned and often relate to personal flexibility—trees that cannot flex with the wind are at high risk of uprooting in a storm

More likely to experience MDEs following stress:

- **Males: related to work, divorce, and separation**
- **Females: related to conflict, serious illness, or death, in their proximal social network**

Stress Response

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The brain is the first body system to recognize a stressor and it reacts with split-second timing

It can stimulate a stress response for up to 72 hours after a stress event (real or imagined) or even longer if you keep rehearsing the event to yourself and/or to others

The resulting secretion of stress chemicals and hormones can suppress the immune system and contribute to illness and disease



Brain-Stress Equation

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Stressors interact with the brain in a predictable equation: only 20% of any negative impact to your brain and body is due to the stressor event; 80% is due to your perception of the event and the weight you give to it

It's not so much what happens that matters as what you think about what happens

—Epictetus, 2nd Century Greek Philosopher

Be anxious for nothing

—Apostle Paul, Philippians 4:6-8



Live the 20:80 Rule

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**Even when you can't do anything about the 20%,
you can do almost everything about the 80%
because you create your own perceptions**

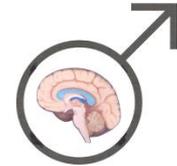
**Researcher Shelley E. Taylor recommends
identifying your GMM or gold medal moment—
everyone has one**

**When you recognize a stressor or perceive a
negative interpretation of the event, recall your
GMM, which can help you manage the 80%**

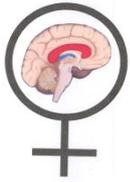
Strategies – Males

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Understand that males tend to underreact to stressors in the short term



- **Learn to identify stressors in the moment and avoid ‘blowing them off’ as no big deal**
- **Collaborate with a trusted female brain to get another perspective and use that to help you create and implement appropriate strategies to manage stressors now—even if they don’t register as all that serious—which can help reduce your risk for MDEs in the long term**

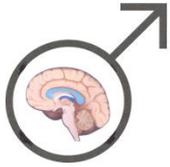


Strategies - Females

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Understand that females tend to overreact to stressors in the short term

- **Learn to identify stressors in the moment and avoid over-reacting and ‘blowing them all out of proportion’**
- **Collaborate with a trusted male friend and use his differing perspective to craft and implement appropriate coping strategies to help you deal with the stressors effectively and timely**



Your Choice!

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Recognize your tendency to under-or over-react and avoid disparaging remarks related to differences

Collaborate to find middle ground and appropriate responses and strategies to manage stressors

Study what the other gender does well and implement a version that works for you

Realize that increased knowledge, practically applied, can result in positive communication