



# Gender Differences— in Reaction to Stressors

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9-24-16



# Stress is Living

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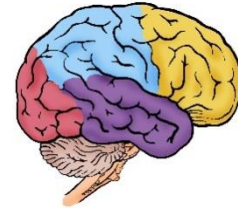
**Stress – a label for asking your brain and body to respond to change—when they no longer do that, you're history (absence of stress is death)**

- ❑ Eustress: Positive stress helps you grow**
- ❑ Distress: Negative stress (avoid when possible)**
- ❑ Misstress: Hidden stress (identify and minimize)**

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

# Stress

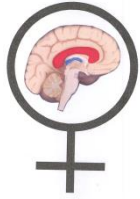
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**Stress is a relative concept because each brain is unique**

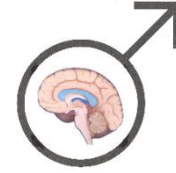
**Your individual reactions to stressors typically:**

- **Are learned – usually in childhood**
- **Relate to perception and flexibility**
- **May be triggered by fear: a sense of being different, disenfranchised, or unaccepted, etc.**
- **Tend to differ based on gender**



# Gender and Stress

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When feeling stressed in the present, females may hear: *“It’s no big deal; just get over it!”*

When feeling stressed later in life, males may hear: *“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 to reduce risk for a Major Depressive Episode (MDE) 25 years later

# Brain and Stressors

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

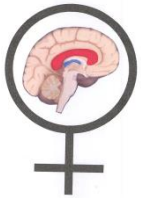
**It can stimulate a stress response for up to 72 hours after a stress event (real or imagined) or even longer if you keep rehearsing the event to yourself and/or to others**

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

# Gender Differences

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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**



**Female brains are twice as vulnerable to stress-related disorders such as PTSD and depression—especially in the ‘now’**



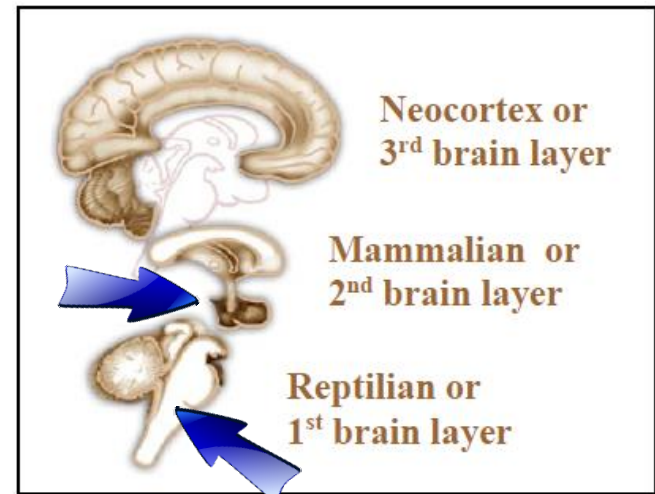
**Male brains are at higher risk for a Major Depressive Episode (MDE) 25 years in the future**

# CRF

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**In response to a stressor the hypothalamus in the Mammalian or 2<sup>nd</sup> 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 1<sup>st</sup> brain layer**



**—*Molecular Psychiatry* (report)**

# CRF - a News Flash

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**The release of CRF is telegraphed throughout the brain via norepinephrine—which functions as both a hormone and a neurotransmitter—influences sleep and alertness and is linked with the Fight-Flight stress reaction**



**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 - 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 with major depression and in those who committed suicide**

# Rats for Research

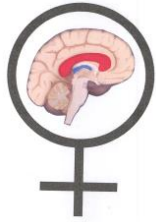
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**Rats make good research subjects when you can't use human beings as rat and human peptides are identical**



**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

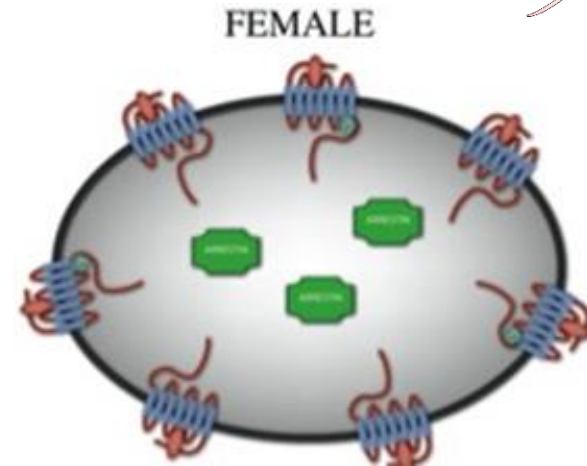
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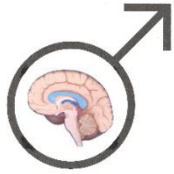
**In the stressed female rat,  
the brain acted *macho*—  
all CRF receptors stayed  
open on the cell surfaces**

**Metaphor: all windows  
are wide open, allowing  
CRF to enter the cell freely**

**The CRF heightened the neuron's stress  
sensitivity and reactivity**



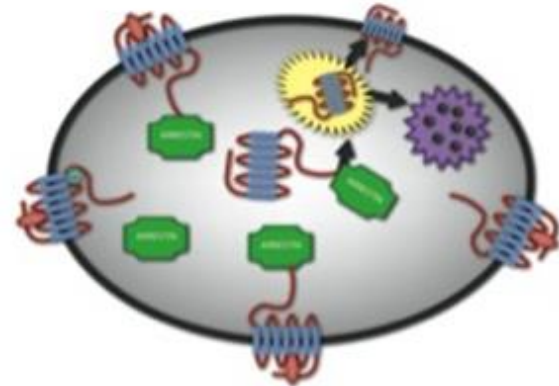
***Locus ceruleus neuron  
in female rat brain***



# Male Rat Brain - CRF



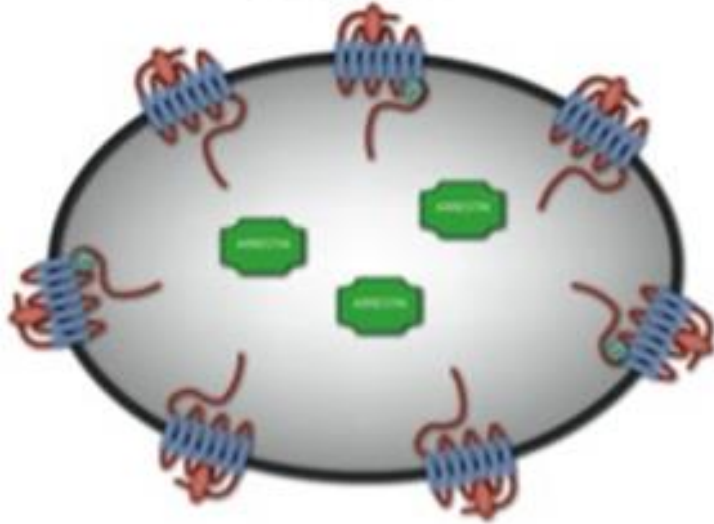
**In the stressed male rat brain, internal proteins called arrestins (green) helped some CRF receptors retreat inside the cell where they could not bind with CRF**



*Locus ceruleus neuron  
in male rat brain*

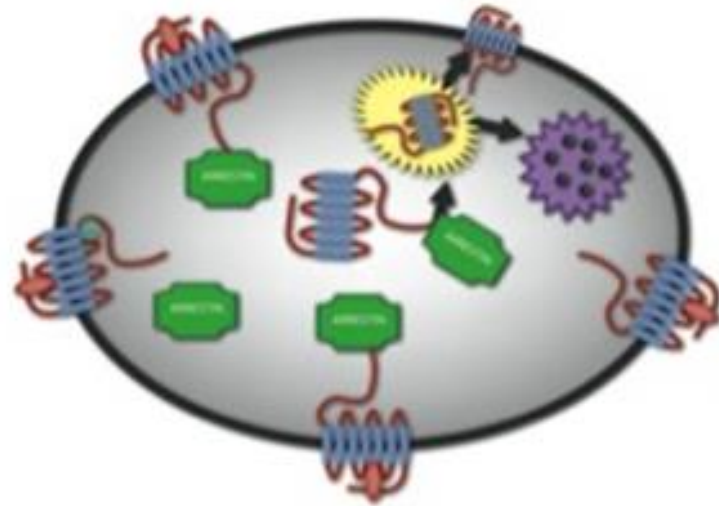
**Metaphor: arrestins closed half the windows—this process, unique to the male brain, limited the amount of CRF taken into the cell and reduced the neuron's stress sensitivity**

FEMALE



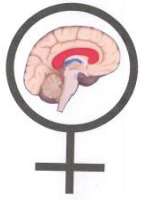
Receptors (blue) on cell surfaces stay open , which increases CRF binding and stress reactivity

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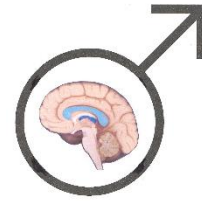
**The female alarm system is more sensitive to stressors and to CRF, period; even in the absence of stressors, the female stress signaling system is more sensitive from the start**

—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 (tend to overreact)**

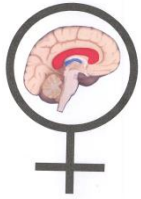
# Male Brain

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**Increased receptor internalization in the male brain could translate into enhanced ability to cope with high levels of CRF—making the stressor seem less intense in the present moment (tend to underreact)**

**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**

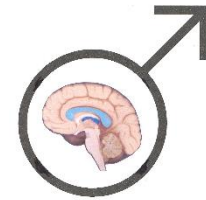
**The data were broken out by gender and by race**

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



# **Black-White Paradox**

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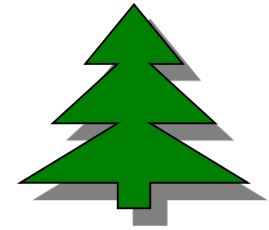
**Researchers found a stronger predictive role of SLEs and risk of MDEs for white males compared with black males 25 years later**

**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](http://journal.frontiersin.org/article/10.3389/fpubh.2016.00049/full)

# Different Strokes...

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**Every brain is different—trees that cannot flex with the wind are at high risk of uprooting in a storm**

**At higher risk for MDEs following stressors:**

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

**Note: your stress reaction style can be relearned**

# Think Ahead

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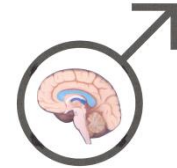
**Stop exposing yourself to repeated, unpredictable stressors over which you have little if any control**

- **Abusive rage-aholic partner**
- **A boss who flies into rages**
- **A spouse who has a pattern of cheating**
- **Jobs where any customer may lash out or slam the door in your face**
- **'Friends' who continue to treat you badly**
- **Fill in the blank \_\_\_\_\_**

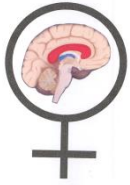
# Challenges – Males

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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**



# Challenges - Females

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**Understand that females tend to overreact to stressors**

- **Learn to identify stressors without overreacting and ‘blowing them out of proportion’**
- **Collaborate with a trusted male friend and use his differing perspective to select appropriate coping strategies to help you deal with the stressors effectively and timely**

# My Strategies

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- 1. Learn about stressors and gender differences, turn the information into knowledge, and apply it on a daily basis**
- 2. Address the female brain tendency to overreact; collaborate with a male brain for perspective and to brainstorm options**
- 3. Live a balanced 'Longevity Lifestyle' – studies have shown that the brain and body function best in balance**



# My Strategies, Cont'd

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- 4. Live the 20:80 Rule (avoid the event and the 20% when possible; manage the 80% when the event cannot avoided)**

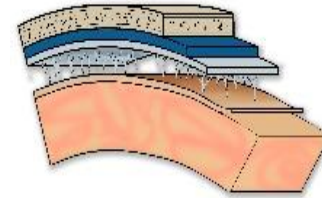


**Stressors interact with the brain in a predictable equation: only 20% of the negative impact is due to the stressor event; 80% is due to your perception of the event—even when you can't do anything about the 20%, you can do almost everything about the 80% because you create your own perceptions**

# My Strategies, Cont'd

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5. Include the use of judicious supplements to help support my brain and immune system



***In order to optimize brain function over your lifespan, high amounts of brain nutrients are required from both food and supplements***

**—Gary W. Arendash PhD, Research Professor  
Florida Alzheimer's Research Center**



# More Tips for Coping with Stressors

**Drive carefully, especially when you are coping with stressors—it's not only cars that can be recalled by their maker**

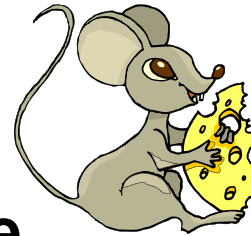


**Be careful what you say during episodes of high stress—if you can't be kind, be silent, or at least have the decency to be vague**

**Never put both feet in your mouth  
at the same time, or you won't  
have a leg to stand on**

**Birthdays are very good for you—  
the more you have, the longer  
you live so learn to enjoy them**

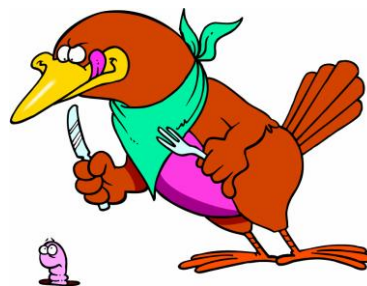
**Stop the mad competitive  
rush—it's the second  
mouse that gets the cheese**





**Learn from crayons. Some are sharp, some are pretty, some are dull, some have weird names, and each is a different color—but they all have to live in the same box**

**Sleep late whenever possible—it's the early worm that gets eaten by the bird**





**Accept that some days  
you're the pigeon and some  
days you're the statue -  
practice laughter on the days  
you're the statue**



**The truly happy—and typically low-  
stress personality—is the one who can  
actually enjoy the scenery on a detour**