

# **FA** *Failure Analysis*

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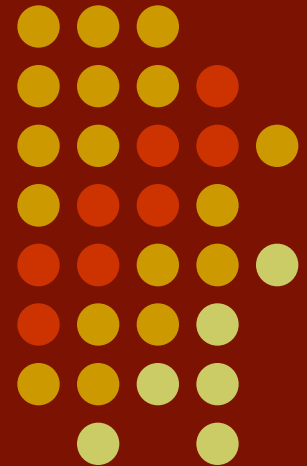
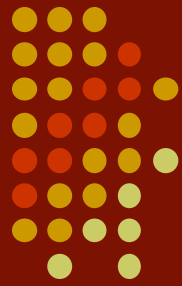
## **Using the Brain's Fight-or-Flight Response to Predict Mental Illness on the Canadian Space Agency's Human Space Flight Program**

by

**Len Losik, Ph.D**

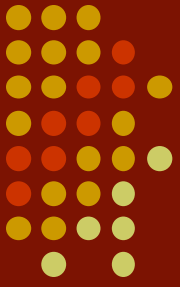
**2013 IEEE Aerospace Conference**

**Big Sky, Montana**



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### ● This Paper Defines the Cause, Prevention and the Cure for Mental Illness when it Occurs during Deep Space Missions

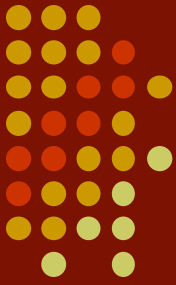
- Today, 50% of all people in the U.S. will acquire mental illness, sometime during their life and the rate is increasing every year
- After acquiring mental illness, the treatment only addresses the symptoms and not the cause symptoms
- Symptoms only grow worse requiring higher doses and more
  - No drugs stop the progression or reverse the severity of mental illness
- Mental illness may be caused by the brains fight-or- flight response (FOFR), which bathes the brain in cortisol and adrenaline causing premature aging resulting in a chemical imbalance that is responsible for mental illnesses
- 100% of all local, state and federal funding is spent on treating the symptoms
  - Pharmaceutical company's develop drugs that alter the dopamine, serotonin and norepinephrine that effect the communications between synapses
- If the FOFR is proven to be the cause of mental illness , pharmaceutical companies may eventually produce the drugs that stop or reverse the brain damage as well as treat the symptoms



Synapses in the Brain

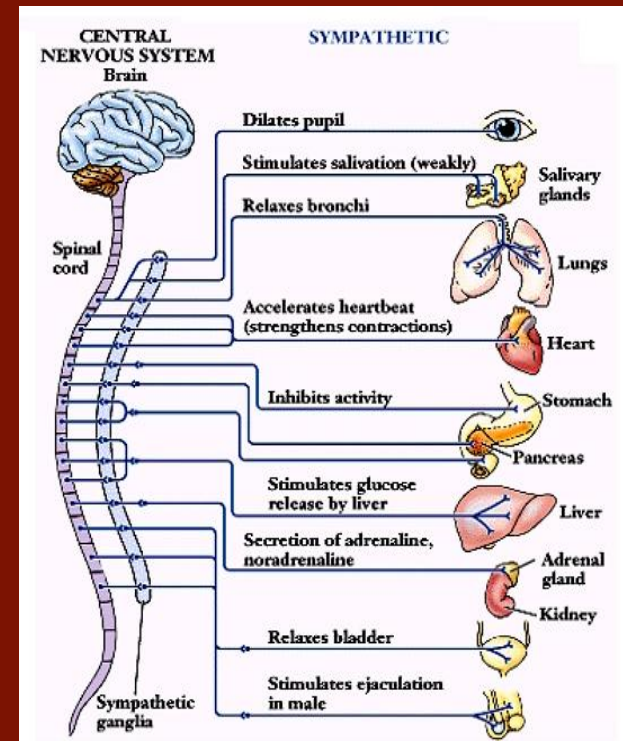
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### ● Characteristics of the Fight-or-Flight Response

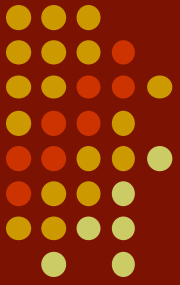
- The FOFR was developed to eliminate danger by running away from it or standing ground and fighting for survival
- The FOFR is most powerful response of the brain
  - Controls or influences all areas of the brain and body and takes control of any function of the body instantaneously, to any analog extent to ensure personal safety
  - The FOFR over-rides the conscious when it determines a threat exists that the conscious mind is too slow to react
- FOFR is to be activated for extremely short periods (ms)
- When the FOFR is activated, it releases cortisol and adrenaline that triggers an avalanche of thousands of other chemicals throughout the body that are toxic if present long term causing premature aging of the body and brain and premature death
- The chemicals that are produced throughout the body by the long term activation of the FOFR may be responsible for more than 99.9% of all diseases



The FOFR Controls all Brain and Bodily Functions Short Term to Remove or Run Away from Danger

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- **We Propose the CSA use Predictive Algorithms and Measurements from an Astronaut's Circadian and Ultradian Rhythms to Predict Mental Illness on Deep Space Missions**

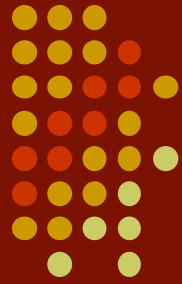
- The Circadian and Ultradian rhythms generate the timing for all periodic body functions
- Circadian and Ultradian rhythms are generated near the FOFR
- Use telemetry data derived from measurements of the performance of an astronaut's Circadian and Ultradian rhythms and predictive algorithms from PHM
- Pre-flight, launch and spaceflight activities provide the baseline behavior astronaut for processing with predictive algorithms to illustrate the presence of accelerated aging
- NASA has reported astronauts experiencing depression and anxiety disorder while in low earth orbit
- Future deep space missions will increase the severity and frequency of mental illness occurring in astronauts and well as in any future space tourism industry
- The results of this proposed validation, will provide manned space missions and the civil<sub>4</sub> community with the tools to predict, prevent and cure mental illness



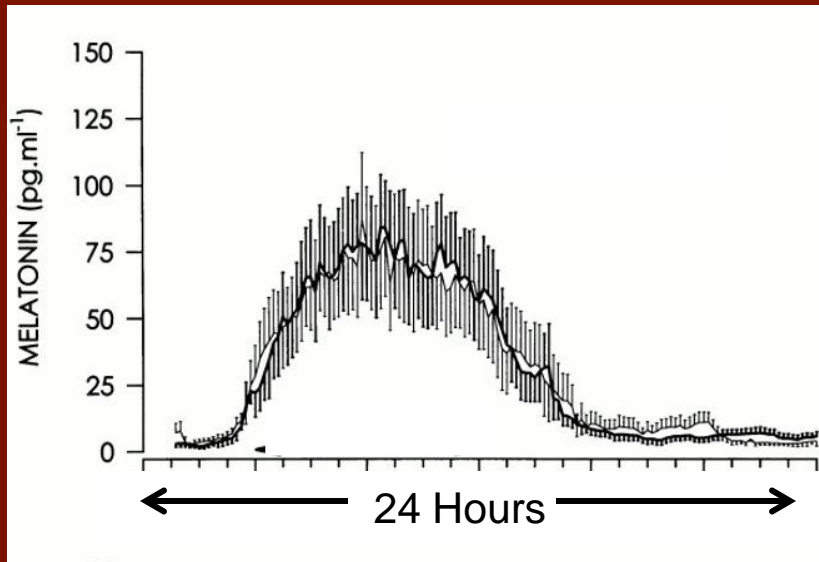
Canadian Human Space Program

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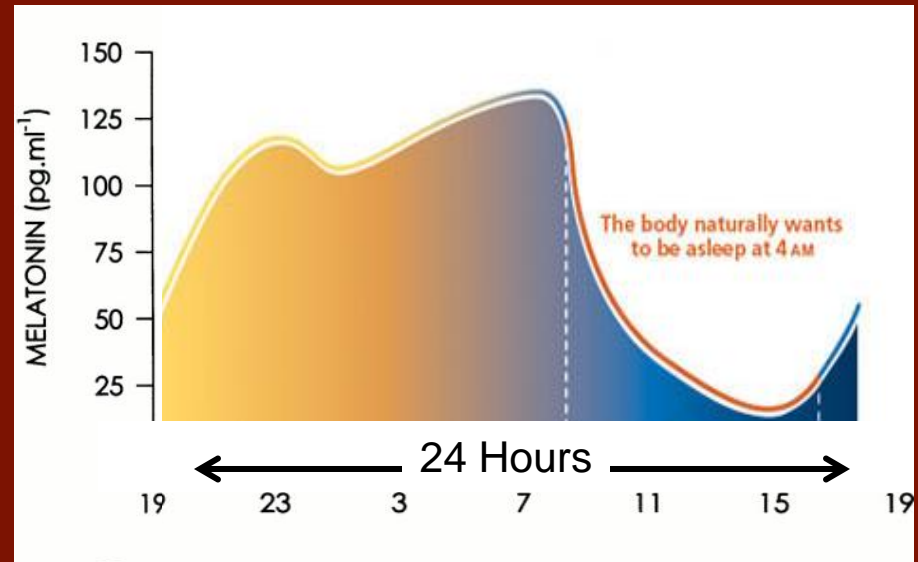


- **What Does Accelerated Aging look Like using Data from the Circadian and Ultradian Rhythms after Processing with Predictive Algorithms?**



**Normal Circadian Rhythm for Melatonin**

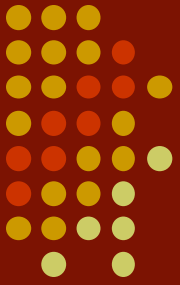
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**Distorted Circadian Rhythm for Melatonin During Sleep Due to Premature Aging of the Brain, Powerless and being Out of Control**

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### ● Why is Mental Illness more Common Today?

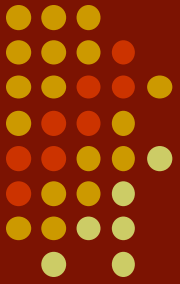
- Stopping the treatment of the brain in the mid 1700's by the church stopped the development of treatments for mental illnesses
- The movement of people from a farm-based community to a city-based community
- The belief by those in positions of authority that a person's brain has no limits for experiencing fear, stress from bad behavior by management personnel behind closed doors
- The belief that mental illness is acquired genetically or passed in families



Data from the Social Security Administration 6

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- **What Causes Mental Illness?**

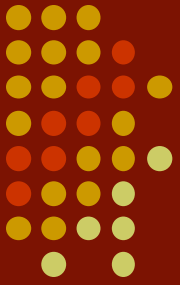
- People of all ages implementing “survival strategies” during periods of great physical and/or emotional pain , as determined by the FOFR, not the conscious



- Over time, we develop the ability to ignore the messages from the FOFR using techniques such as suppressing our feelings and emotions and/or becoming unaware of feelings, emotions and surroundings
- After a *threat* is present *long term* (years) and the subconscious experiences *fear*, *near-continuously*, the FOFR decides it is *powerless* to eliminate the threat using the conscious and experiences being *out-of-control*, the FOFR increases the number and severity of the *symptoms* the conscious experiences as the FOFR is working to get the conscious to take the right action to eliminate the threat(s) and be safe
- The FOFR/subconscious initiates taking over the conscious more frequently

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### ● What are the Consequences of Ignoring the Messages from the FOFR?

- By ignoring the fear, and other emotions, the FOFR causes the conscious to experience depression making life a little difficult.
- By continuing to ignore the constant messages from the FOFR, including the symptoms of depression, the FOFR makes life a lot more difficult with Major depression that adds more symptoms and more severity of existing symptoms
- Anxiety (subconscious fearing dying is possible) initiates physical pain in the chest area often mimicking the pain from a heart attack, along with sympathetic response from the digestive track-heartburn,
- When the FOFR causes Bi-Polar disorder, the chemistry of the brain has been altered, forcing wild swings in a person's mood to get the attention of the conscious, often altering the person's perception of reality intermittently and may be permanent and will require drugs to rebalance the brains chemistry
- Schizophrenia means the chemistry of the brain that makes up the subconscious, has been altered even more distorting the reality of the conscious and subconscious so much that the subconscious becomes unaware of the danger all around. The subconscious is removing the conscious as its interface to the world

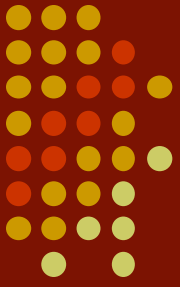


The FOFR has Limitations in its Ability to Communicate with the Conscious



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### ● Environment vs. Biology

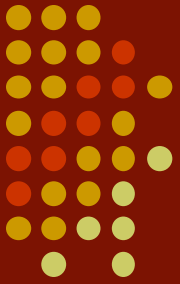
- The conscious is one of several interfaces with the world for the subconscious
  - All information flows from the senses to the subconscious first, its filtered and reduced in amount and sent to the conscious to create an individual's "reality", to increase the survivability
- So, mental illness occurs when the conscious ignores all the messages FOFR long-term which is detecting a serious threat(s) and initiating fear and releasing cortisol and adrenaline and experiences being "powerless" and "out of control".
  - This occurs frequently to children in a home life with major neglect and abuse occurs and "survival" behavior occurs and also adults for the same reasons
- Why does mental illness seem to run in families?
  - Parents or relatives with a emotional and/or mental illness are more likely to create an environment that caused their mental illness, passing on mental illness environmentally.
- What about mental illness is biologically driven ?
  - The subconscious' threshold for triggering depression, major depression, bi-polar disorder or schizophrenia
  - Whether a person will skip major depression and acquire bi-polar disorder or schizophrenia etc.
  - What features (psychotic, paranoia etc) develop along the path to mental illness



Is it Nature or Nurture?

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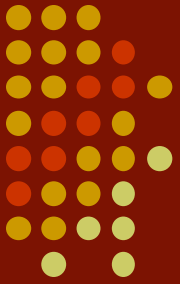
- **Stress (the release of cortisol and adrenaline) is the Body's Response to a Threat, Causes Accelerated Aging of the Body and the Brain**
  - Stress stops when the unconscious part of the FOFR determines the threat is gone
    - Beyond the ability of the conscious mind to handle
  - The long term activation of the FOFR and the many chemicals the body creates may be responsible for mental illness and 99% of all diseases
  - If we can turn off the FOFR artificially, the increase in premature aging and mental illness may be slowed or stopped.



Examples of U.S. Presidents that Aged Prematurely after Taking Office.

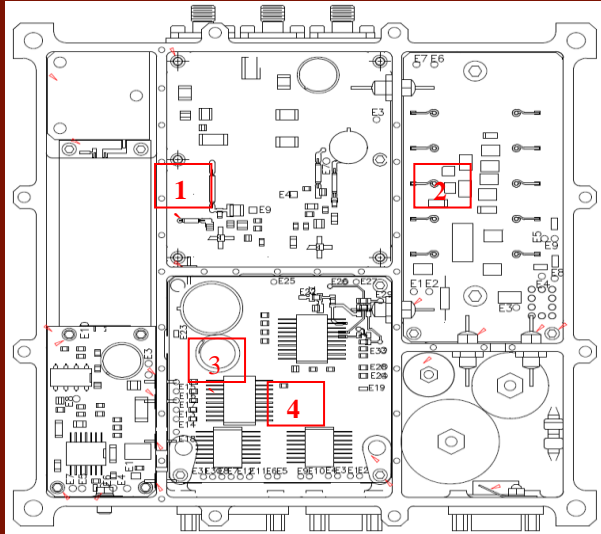
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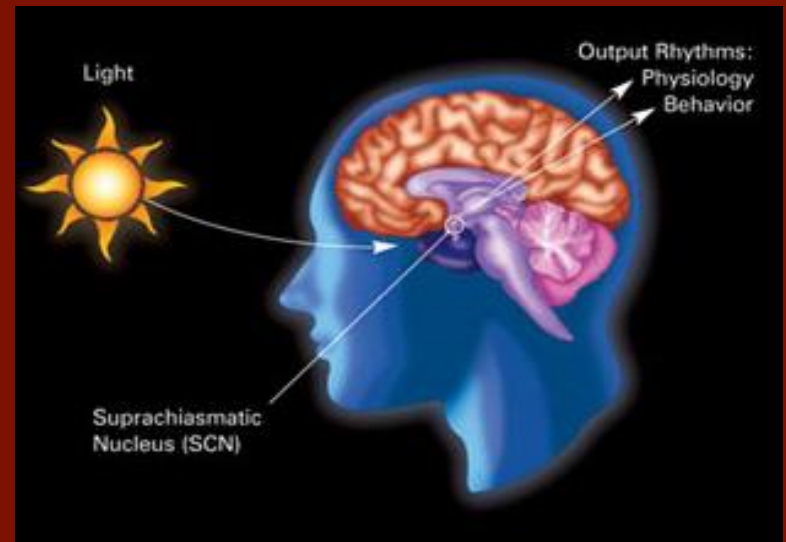


### ● We Propose to use PHM to Identify Accelerated Aging Caused from the Long Term Activation of the FOFR

- Generating the Data from Spacecraft Equipment for Illustrating Accelerated Aging using Predictive Algorithms
- Generate the biological data from the brain using data from the Circadian and Ultradian Rhythms



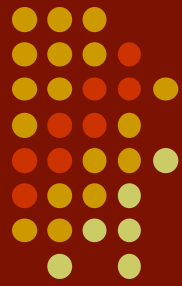
The NASA Ames LADEE Lunar Orbiting Satellite TT&C Receiver Section Analog Telemetry Measurements (Voltage, Temperature, Current, RF Output) Locations



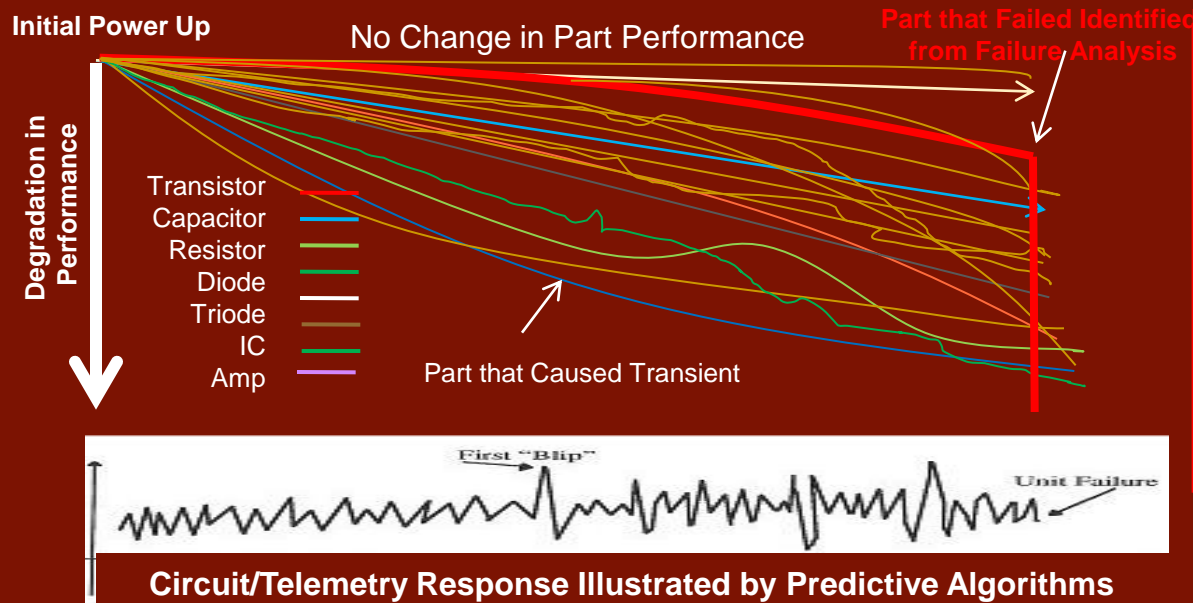
The Location in the Brain where FOFR and the Circadian and Ultradian Rhythms Originate, Near the Thalamus and Hypothalamus

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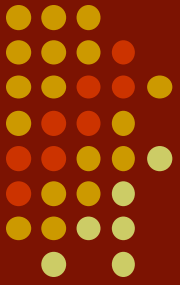
- Use the Same Prognostic Analysis that Illustrates Accelerated Aging in Equipment when one Part's Performance Degrades Faster than Expected Causing NRTEs
  - Telemetry provides direct access to the parts with accelerated aging?
  - The Circadian and Ultradian Rhythms provide direct access to the FOFR



Space Flight Assembly with Telemetry Available Failed from an Infant Mortality 12

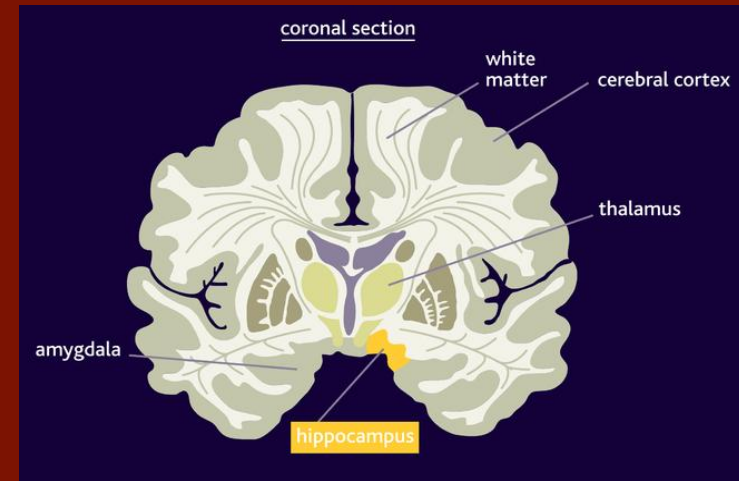
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- **The Brains Subsystems will Degrade that will be Identifiable using Data from the Circadian and Ultradian Rhythms that is Generated Near the Fight-or-Flight Response**

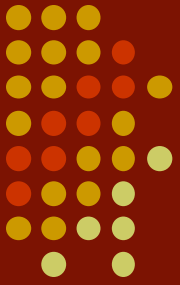
- A Circadian rhythm displays an oscillation of about 24 hours. Circadian rhythms detect day and night and works to be in sync with local day and night.
- An Ultradian rhythm displays an oscillation of less than 24 hours in the 90-120 minutes when we are awake and asleep.
- As the thalamus and hypothalamus experience accelerated aging, the part of the brain responsible for the Circadian and Ultradian rhythms will also age prematurely, disrupting a person's behavior in many measurably ways.



An Image of the Brain where the FOFR Resides with Atrophy after Subjected to Long Term Exposure to Adrenaline and Cortisol causing Mental Illness

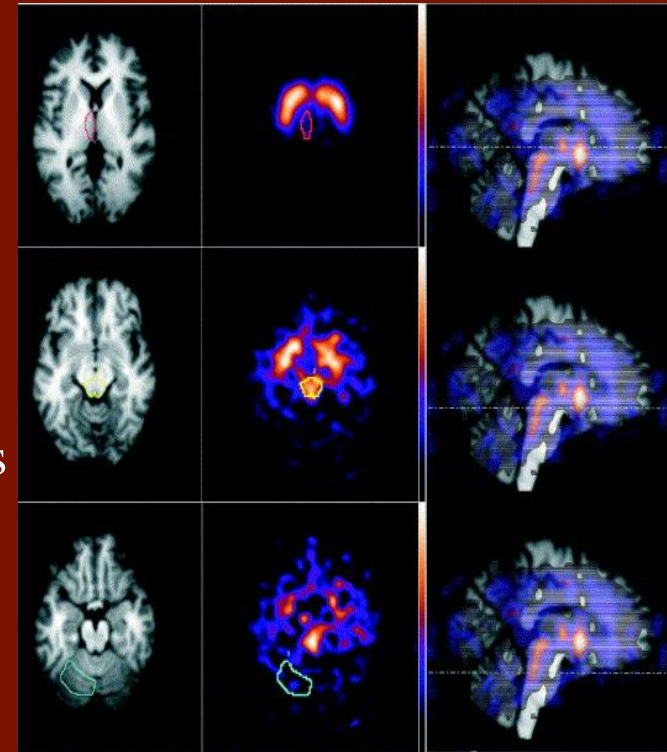
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### ● Changes to the Brain and Brain Stem from Long-Term Exposure to Cortisol and Adrenaline

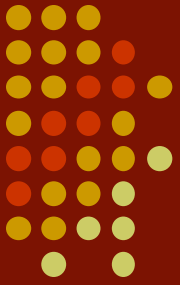
- Mental illness occurs from the degradation & degeneration of the central serotonergic neurotransmission, particularly changes in the presynaptically located serotonin transporter (SERT), which are the major mechanisms of neuropsychiatric symptoms.
- A prognostic analysis using predictive algorithms from a PHM program will illustrate the presence accelerated aging using data from the Circadian and Ultradian rhythms to predict mental illness
  - Predictive algorithms demodulate data behavior in the data in time, amplitude, frequency and phase to illustrate the presence of accelerated aging in normal appearing data from fully functional elements



Neuro-Imaging Techniques Illustrating the Degradation of Brain and Brain Stem from Chemical Damage by the FOFR.

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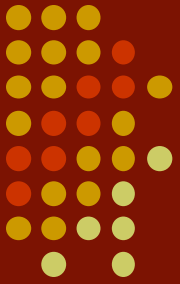


### ● Flight Proven Proprietary, Data Driven Predictive Algorithms

Predictive Algorithm	Purpose of Algorithm
Baseline Analysis	Identifies short and long term normal data behavior
Change Analysis	Determines change from normal behavior.
Comparison Analysis	Determines when a change in normal behavior is occurring
Day of Failure	Search large data sets for common behavior during the same time
<sup>1</sup> Digital Processing	Replaces outliers improving image accuracy and resolution
Discrimination Analysis	Identify behavior that has changed from normal baseline behavior
<sup>2</sup> Mathematical Modeling	Generates baseline behavior when little or no data is available
Multi-Variant Limit Analysis	Simultaneous analysis across several measurements
Rate Change Analysis	Identifies change in behavior from baseline based on rate of change
Remaining Usable Life	Determines remaining usable life
<sup>3</sup> Statistical Sampling	Reduces amount of data without eliminating desired behavior
State Change Analysis	Identifies data to be evaluated based on state change
Super Impositioning	Identifies data to be analyzed further for failure signature
<sup>1</sup> Super Precision	Improves data integrity
<sup>1</sup> Telemetry Authentication	Improves data integrity
<sup>2</sup> Virtual Telemetry	Creates normal data behavior when none is available
Data Integration	Creates demodulated image for analysis
Dataset Generation	Creates data set manually if necessary for completing prognostic analysis with incompatible data interfaces

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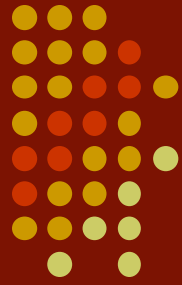
- **Examples of the Measurements Needed from an Astronaut  
Circadian and Ultradian Rhythms to Predict Mental Illness**

BIOLOGICAL MEASUREMENT NAME	ACRONYM	DATA SAMPLE RATE	LSB VALUE	RANGE
Systolic BP (Wide)	SBPW	At least once/day	0.01 (mm Hg)	30 - 200
Systolic BP (Narrow)	SBPN	At least once/day	0.01 mm Hg	50-150
Diastolic BP (Wide)	DBPW	At least once/day	0.01 (mm Hg)	30- 200
Diastolic BP (Narrow)	DBPN	At least once/day	0.01 mm Hg	75-150
Heart Rate Wide Range	HRW	At least once/day	0.1 (bpm)	0 - 300
Heart Rate Narrow Range	HRN	At least once/day	0.1 bpm	50-100
Body Temperature	BT	At least once/day	0.01 (°C)	95-105
Melatonin Level	ML	At least once/day	1.0 pg/ml	0-100
Cortisol Level	CL	At least once/day	0.1 mcg/dl	0-60
Subjective Alertness	SAL	At least once/day	1.0 mm	0-100
Desired Liquid Intake	DLI	At least once/day	1.0 ml	0-2 L
Desired Solid Food Intake	DSFI	At least once/day	1.0 g	0-5 kg
Required Solid Food Intake	RSFI	At least once/day	1.0 g	0-3 kg
Required Liquid Intake	RLI	At least once/day	1.0 g	0-2 L
Actual Liquid Intake	ALI	At least once/day	1.0 g	0-2 L
Actual Solid Food Intake	ASFI	At least once/day	1.0 g	0-3 kg
Actual Liquid Waste	ALW	At least once/day	1.0 g	0-2 L
Actual Solid Waste	ASW	At least once/day	1.0 g	0-3 kg
Duration of Sleep/Day	DSD	At least once/day	5 min	0-1500
Duration of Rest/Day	DRD	At least once/day	5 min	0-1500
Duration of Recreational Activities/day	DRAD	At least once/day	5 min	0-1500
Duration of Work/Day	DOWD	At least once/day	5 min	0-1500

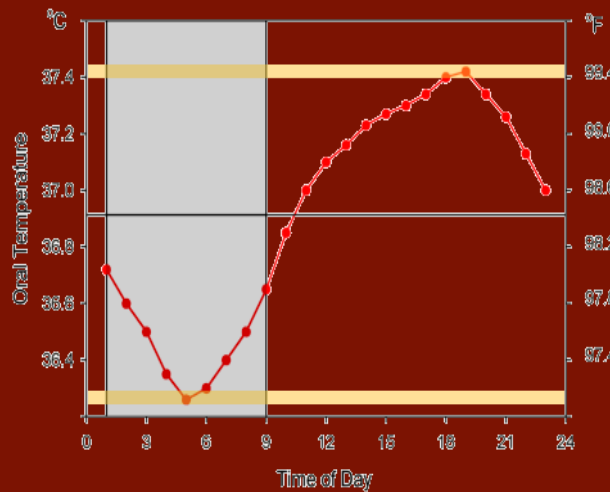


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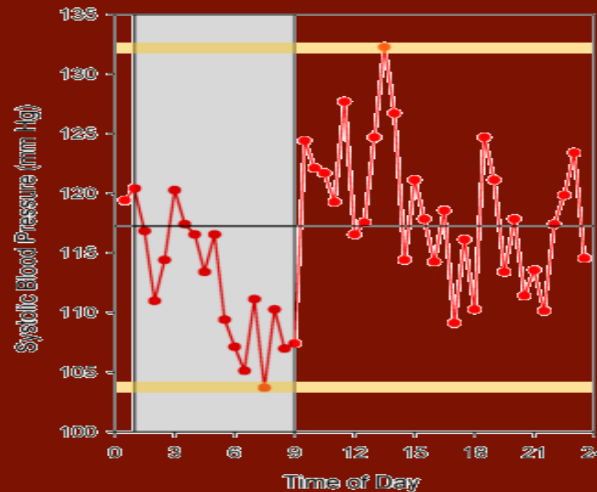
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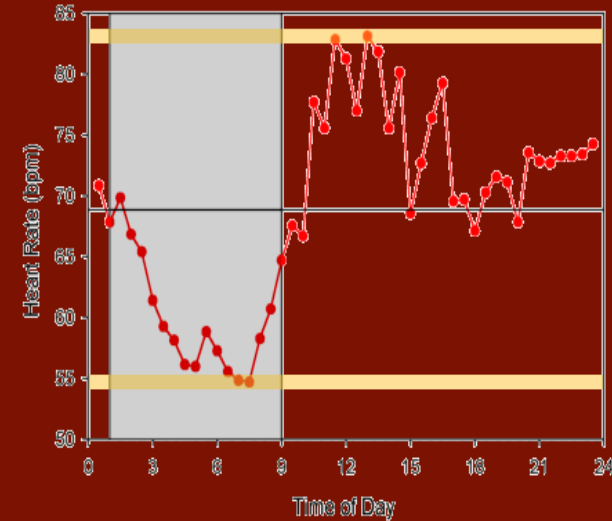
- **Examples of Short-Term (24 hr) Body Temperature, Blood Pressure and Heart Rate**



Normal Short Term Body Temperature



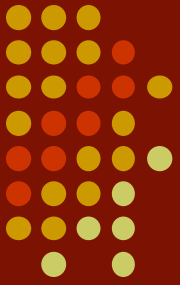
Normal short Term Systolic Blood Pressure



Normal Short Term Heart Rate

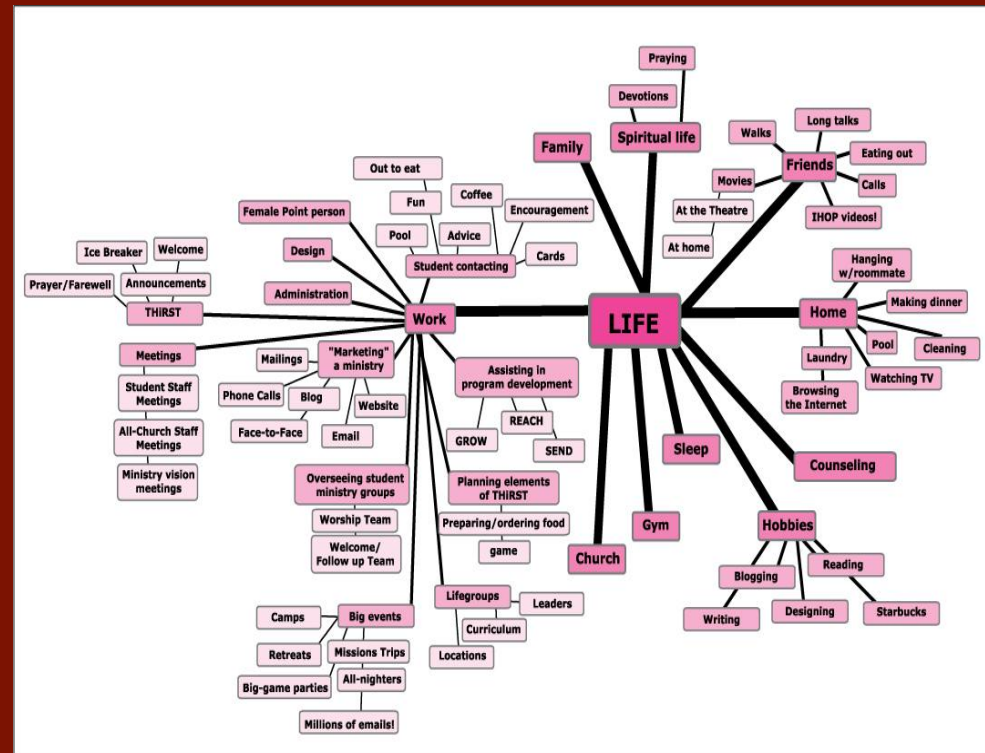
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### ● A Diagram for an Unbalanced Life that Develops Mental Illness from Ignoring the Messages from the FOFR to make Changes

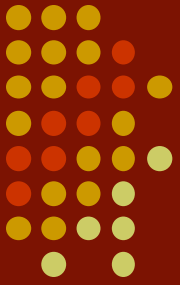
- Most people are unaware they live an unbalanced lifestyle
- Most people are unaware an unbalanced lifestyle can lead to mental illness later in life
- In middle age, some people decide that there is something missing from their life and look to eastern philosophy (male menopause)
  - What they find is the grey's that exist between the black & whites of the western lifestyle
- Male menopause is caused from a person living a life that was chosen by others



The Unbalanced Life

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### ● For Stopping the Progression of Mental Illness

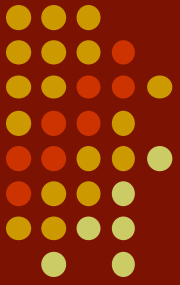
- Mental illness results from living a severely high stress, unbalanced lifestyle for a long period as determined by the person's subconscious
  - By helping the mentally ill live a balanced life, it is possible to stop the progress of mental illness and to cure mental illness from major lifestyle changes
    - Unfortunately, mental illness is not reversible and the cured will behave differently than before acquiring mental illness
      - Reversing the damage to the brain from the FOFR necessary to return to their previous behavior
  - Living a balanced lifestyle will eliminate the need to take psychotropic medications for a lifetime
  - By the manned space program proving that a cure for mental illness exists, pharmaceutical companies may develop drugs to reverse the damage to the brain and long term treatment of the symptoms is no longer necessary



One Example of a Balanced Lifestyle used to Treat and Cure Mental Illness

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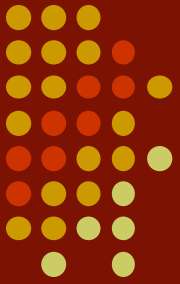


### ● Summary

- Mental illness has been reported on manned space missions at LEO and more severe mental illnesses will occur during future planned deep space missions
- Mental illness can be predicted using predictive algorithms and measurements from astronaut's Circadian and Ultradian rhythms
- The risk of acquiring mental illness is much higher for astronauts due to the dangerous environment of space that exists during launch readiness, launch and working and living in space
- Using predictive algorithms from a PHM and biological measurements from the astronauts Circadian and Ultradian rhythms, a prognostic analysis will be able to predict, prevent and cure mental illness during future deep space missions
  - The prognostic analysis is a scientific analysis that doesn't allow speculation or conjecture in its conclusions and so we do not call it an engineering analysis



International Group of Astronauts in the NASA Space Shuttle that are Susceptible to Mental Illness



# FA

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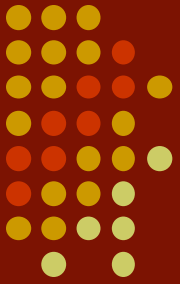
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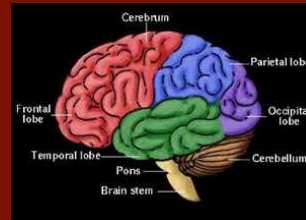
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### The Brain has an Exo-skeleton



- Components of the brain
  - 70% Water
  - Fat
  - Proteins
- Structures of the brain
  - Cerebral cortex – frontal lobes and parietal lobes, temporal lobes, Occipital lobe
  - Cerebellum - Mid-brain includes hypothalamus, thalamus, amygdala & hippocampus, pituitary gland, pineal gland
  - Inner layers
  - Brain stem – Pons, Medulla Oblongata
  - Nervous system

#### Cause of Injuries

- Ignoring messages from subconscious/FOFR resulting in self-induced chemical imbalance

#### Treatment for psychological injuries

- Converting to a balanced lifestyle
  - Removing threats/triggers/stress
- Psychotropic drugs for symptoms

#### Treatment for physical injuries caused from psychological injuries

- Psychotropic drugs
- Talk therapy



### The Body has an Endo Skeleton



- Components of the body
  - Fat
  - Muscle
  - Bone/skeleton
  - Bone marrow
  - Skin
- Structure of the Body
  - Fat
  - Skeleton
  - Bone marrow
  - Muscle
  - Cartilage and connective tissues
  - Skin
- Causes of Injuries
  - Blunt force
  - Over work/under work
- Treatment for injuries
  - Self-healing