From Science to Serenity:
An experienced addictionist discusses recent developments in addiction research

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FROM SCIENCE TO SERENITY:

An experienced addictionist reflects on alcoholism and recovery

1. Review critical addiction knowledge
2. Highlight 5 most important recent addiction research directions
3. Challenges to finding solutions to the addiction epidemic
Three most important enduring principles of addiction knowledge

1. Drugs of addiction
2. Tolerance & dependence
3. Commercialization of science
Addiction 101: Drugs of addiction
Addiction 101: Drugs of addiction

Stimulants
(Dopamine)

Narcotics
(Endorphin)

Other
Alcohol effect on brain

< 0.05% Prefrontal Cortex - disinhibition

0.05% Limbic System - emotional

>0.20% RAS hypnosis (sleep)

>0.30% Medulla - Respiratory depression and death

>0.10% Cerebellum – ataxia
Addiction 101: Tolerance and dependence
Tolerance and dependence

CNS Activity vs. Time
Tolerance and dependence
Tolerance and dependence vs. addiction
Consequences of commercializing science

• Flaws from overreliance on an “evidence based” approach
  • Always retrospective, so evidence serves best as the foundation of good practice
  • Evidence can support practices based on untruths (antibacterials, allergies)
  • Inaccurate observations may reflect the truth
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  - Inaccurate observations may reflect the truth
  - Under control of those with money and power
- Market model of recurring revenues (vaccines vs life style Rxs)
- Historical cycle of drug solutions to drug problem
Willingway tranquillizer rule

• There are old drugs
• And there are new drugs
• The old drugs are addicting
• And the new drugs are non-addicting
• When the new drugs become old drugs
• They become addicting and are replaced by new non-addicting drugs
Disease facts – #1 health problem

• Fatal illness
  • One alcohol related death every 10 seconds (globally)
  • 100,000 deaths annually
  • 170 deaths/day from overdose alone (USA)
  • YPLL (2.3 Million) = Cancer, Heart Disease
• >80% unanticipated deaths in community mental health

• Most important Health problem
  • $466 billion annual cost of NOT treating
  • No claims data to use for policy formulation

• 7% U.S. population afflicted
  • ¼ of hospital admissions (#1 diagnosis of military admissions)
• Family morbidity 43% (76,000,000)
• 100% increase in healthcare costs
• Primary cause of preventable birth defects
• Treatment yield of $7 for $1 expense
• $39 Yield for each $1 spent in medical settings
• Treatment success >90% (FAA HIMS)
• Prevention reduces risk by 75%
Disease facts – #1 health problem

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• 7% U.S. population afflicted
• ¼ of hospital admissions (#1 diagnosis of military admissions)
• 4% of NICU admission are for neonatal abstinence syndrome
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>42,000 in 2016
Global annual reported polio cases, 1974-2002
Figure 19.—Death Rates for Measles: Death-registration States, 1900–32, and United States, 1933–60

(Rates per 100,000 population).
Infection Death Rates

- Males
- Females

Year:
- 1911
- 1921
- 1931
- 1941
- 1951
- 1961
- 1971
- 1981
- 1991
- 2001
Stroke Death Rates, 1979-2005

Rates per 100,000 population, age-adjusted to the 2000 U.S. standard population.
Data Source: Compressed Mortality File, CDC WONDER.
Age Adjusted Mortality Rate For Heart Disease (per 100,000)
Social Security disabled beneficiaries

Annual Statistical Supplement to the Social Security Bulletin
HIV Mortality with more access to treatment

Mortality and HAART Utilization Over Time

- Patients on HAART (%)
- Deaths/100 Person-Years

Year:
- 1996
- 1997
- 1998
- 1999
- 2000
- 2001
- 2002
- 2003
- 2004

Deaths/100 Person-Years:
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

Patients on HAART (%):
- 0
- 10
- 20
- 30
- 40
- 50
- 60
- 70
- 80
- 90

*P = .008 for trend
A Flood of Opioids, a Rising Tide of Deaths; Okie; NEJM November 18 2010; p1982

Source: SAMHSA Treatment Episode Data Set (TEDS), 2000 to 2010.
How to be “blinded by the evidence” in a “post-truth” era

• Scientific methods can be used in ways that corrupt measurement of meaningful outcomes

  1. Length of study misrepresents outcomes of practice usage (Xanax, FDA)
  2. Measure effects to justify use of the medication (Ambien, methadone)
  3. Ignore illness criteria which don’t support intended study outcomes (DSM V exclusion for SUD)
  4. Avoid measurement of side effects (atypicals, antidepressants)
  5. Emphasize statistical endpoints irrelevant to efficacy (acamprosate) (Drug Court)
  6. Pay researchers to publish positive outcomes (Bankole Johnson)
  7. Don’t report negative results (Irving Kirsh FOIA discoveries)
  8. Overemphasize positive results (Acamprosate NNT)
  9. Publish research ghostwritten by marketing staff under physician bylines
  10. Avoid comparison with effective alternatives (Phenob, Suboxone, abstinence)
  11. Generalize data to populations excluded from study (alcoholics)
  12. Infer efficacy by ignoring oscillations in illness severity
  13. Only count results that look good (look for “response rate”) (Naloxone)
  14. Define a disease by an anticipated drug effect (“Serotonin deficiency”, SWSD)
Fines and Settlements for illegal or unethical drug marketing practices

<table>
<thead>
<tr>
<th>Company</th>
<th>Amount</th>
<th>Product(s)</th>
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<tbody>
<tr>
<td>Astra Zeneca</td>
<td>$520,000,000</td>
<td>Seroquel</td>
</tr>
<tr>
<td>Pfizer</td>
<td>$2,300,000,000</td>
<td>Geodon, Lyrica ...</td>
</tr>
<tr>
<td>Purdue Pharma</td>
<td>$634,500,000</td>
<td>Oxycontin</td>
</tr>
<tr>
<td>Lilly</td>
<td>$1,400,000,000</td>
<td>Zyprexa</td>
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<tr>
<td>Glaxo-Smith-Kline</td>
<td>$3,000,000,000</td>
<td>Paxil, Welbutrin, ...</td>
</tr>
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<td>Abbott</td>
<td>$1,600,000,000</td>
<td>Depakote</td>
</tr>
<tr>
<td>Johnson and Johnson</td>
<td>$2,200,000,000</td>
<td>Risperdal</td>
</tr>
<tr>
<td>Bristol-Myers Squibb</td>
<td>$515,000,000</td>
<td>Abilify</td>
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Most important recent addiction research directions

1. **What causes it?** - Allergy: “New” theory explains addiction insanity
2. **What keeps it going?** - Denial: Neuroscience of cognitive dissonance
3. **Why can’t we stop it?** - Motivation: The science of readiness to change
4. **Why is healing from it so slow?** - Lifting the Fog: Neuroplasticity
5. **What keeps it away forever?** - Lifetime Healing: Recovery Zone System
1. Allergy & Immunity
Insanity

• Doing the same thing over and over again expecting a different result.

Addiction Insanity

• Continuing to drink or use drugs in spite of awareness that one should not.
“The doctor’s theory of an allergy interests us”

Alcoholics Anonymous – The Doctor’s Opinion (1939)
Non-alcoholic rat
Alcoholic rat
Non-alcoholic rat
Alcoholic rat
Binge Ethanol treated animals have persistent reversal learning deficits.

Ethanol binge treatment of adolescent mice or rats results in persistent reductions in reversal learning, an indicator of disrupted frontal cortical and learning networks. Adolescent ethanol results in adult relearning deficits in both Morris water maze and Barnes spatial learning maze.

Search path of rats. Open circle original platform-red circle new location. Binge ethanol treated rats perseverate on old location.

Obernier and Crews, 2001
Coleman and Crews, 2009
Immune theory of addiction: Induction of innate immunity

Genetics (DNA) → Allergen → Transcription → Innate immune proteins → Innate immune reaction → Impaired function: prefrontal cortex → Alcoholic insanity
2. Neuroscience of cognitive dissonance
Formula of mature human behavior

\[ F \ (\text{Feelings}) + T \ (\text{Thoughts}) = A \ (\text{Actions}) \]
Denial & cognitive dissonance

“Mistakes were made, but not by me: Why we justify foolish beliefs, bad decisions, and hurtful acts”

Carol Tavris and Elliot Aronson
Hierarchy of human behavior
Alcoholic denial resolves conflict caused by drinking too much
Addiction Cascade

- Drink
- Drunk
- "Trouble"
- Abstain
- Urge to use
- Use again
- Switch Chemical or beverage
Addiction Cascade

- Conflict between values and behavior
  - Drinking and drug use is causing harm
  - BUT
  - Drinking (or using drugs) is a need that must be satisfied

- Cognitive dissonance
  - an uncomfortable feeling or stress caused by holding two contradictory ideas simultaneously
Addiction Cascade

- Drink
- Drunk
- Abstain
- "Trouble"
- Use again
- Switch Chemical or beverage
- Abandon values
- Self-deception (Denial)
- Urge to use
3. Science of readiness
Identifying the problem: Drinking in America
Motivational Readiness

- Precontemplation
- Contemplation
- Preparation (Steps 1, 2 & 3)
- Action (Steps 4-9)
- Maintenance (Steps 10-12)

85%
4. Neuroplasticity
Neuroplasticity:

- The capacity of neuronal substance to change in response to environment and experience

- “Psychic change”
Types of neuroplasticity

• Negative (brain impairment)
• Positive (brain healing)
• Adding connections
• Removing connections (pruning)
• Sensitizing connections
• Desensitizing connections
• Adding neurons (neurogenesis)
Heal Your Brain

• Thoughts & actions remold brain:
  • Spur new neurons
  • Create new connections; prune old
  • Restore neurotransmitter function
  • Restore frontal lobe (exec brain) relationship with limbic brain (primitive) -> better decisions, behavior
Drain the Swamp and see the stumps: Clinical correlation of recent addiction neuroscience and psychiatric co-morbidity
Stress, fatigue, sleep and sensory deprivation etc. lower threshold for latent emotional symptoms

- Depression
- Mood Swings
- Suicidal Risk
- Irritability
- Anxiety
- Insomnia
- Hallucinations
- Thought Disturbances
Impact of threshold changes of addiction on mental co-morbidity

(binge drinking and induction of innate immune genes create co-morbidity}
(and neuroplasticity of recovery helps resolve it)
DSM5 exclusionary criteria

➤ **Major Depressive Disorder:**
  C. The episode is not attributable to the physiological effects of a substance or to another medical condition.

➤ **Bipolar I Disorder:**
  D. The episode is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication, other treatment) or to another medical condition.
  Note: A full manic episode that emerges during antidepressant treatment (e.g., medication, electroconvulsive therapy) but persists at a fully syndromal level beyond the physiological effect of that treatment is sufficient evidence for a manic episode and, therefore, a bipolar I diagnosis.

➤ **Bipolar II Disorder:**
  F. The episode is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication or other treatment).
DSM5 exclusionary criteria

• Obsessive Compulsive Disorder:
  
  C. The obsessive-compulsive symptoms are not attributable to the physiological effect of a substance (e.g., a drug of abuse, a medication) or another medical condition.

• Anxiety Disorder:

  E. The disturbance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or another medical condition (e.g., hyperthyroidism).

• Schizophrenia

  E. The disturbance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or another medical condition.

• Personality Disorder:

  F. The enduring pattern is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or another medical condition (e.g., head trauma).
5. Recovery Zone System

The Recovery Zone System

• Three Recovery Zones; blueprint for life

1) **Red Zone: Stop.**
   Activate your recovery.

2) **Yellow Zone: Proceed with caution.**
   Build or rebuild your life.

3) **Green Zone: Go.**
   Celebrate your life.
Recovery Zone System

• The Recovery Zones
  • Red - Activate
  • Yellow - Build
  • Green - Celebrate

• Recovery Zone ReCheck

• TAMERS
Zones in the recovery timeline

Activate recovery

Build life to capacity

Years

Terminal illness
TAMERS

• Think about recovery, Talk about recovery
• Act on recovery, connect with others
• Meditate and Minimize stress
• Exercise and Eat well
• Relax
• Sleep
Overcoming Barriers to Scientific Progress
THE RECOVERY BOOK

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