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Addictions 101

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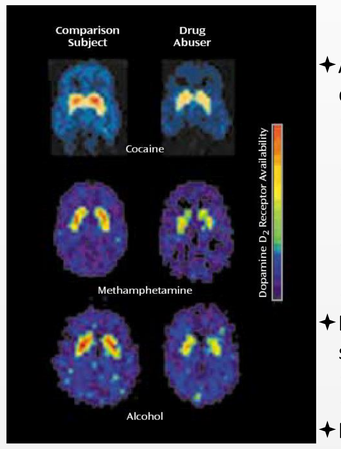
Introduction:
Neurophysiology of Addiction



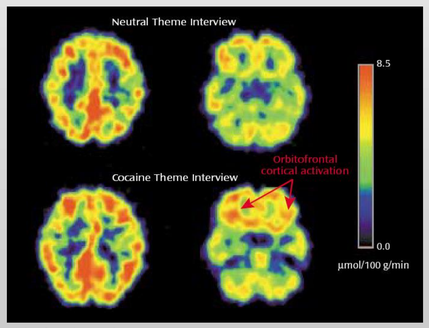
Lower Striatal Dopamine D2 Receptor Binding in Drug Users During Withdrawal From Cocaine, Meth-amphetamine, and Alcohol Than in Normal Comparison Subjects[1]

Dopamine: Incentive & Motivation

- All substances that can be abused raise dopamine levels[1]
  - Cues associated with previously pleasurable experiences increase dopamine
  - Addicts get high just by thinking about getting high
  - Ventral tegmental apparatus (VTA) powered by dopamine
  - VTA triggered by foraging for food, finding sexual partners – evolution necessitates these activities
  - VTA gives rise to desire, motivation and elation
- Dopamine receptor availability is reduced in substance abusers[2]
  - Brain sheds receptors due to excess dopamine
  - More substance needed to activate reduced receptors
- Pre-existing lack of receptors might be a base for addictive behaviours[3]

Endorphins: Attachment & Reward

- Powerful soothers of physical and emotional pain[1]
  - Opiates act on anterior cingulate cortex – subjective experience of pain
- Endorphins enable emotional bonding between mother and infant[4,5]
  - Opiate addiction arises from brain system that governs attachment and love
- Opioid receptor activity diminishes with alcoholism, increasing alcohol craving to "numb the pain"[6]
- Alcohol and marijuana also activate opiate receptors – this is part of the enjoyment[7]



Orbitofrontal Cortical Activation in Active Cocaine Abusers During a Cocaine Theme Interview and a Neutral Theme Interview, as Measured by FDG PET[1]

Frontal Cortex: Self-regulation

- Pre-frontal cortex inhibits reactionary responses[8]
  - Damage causes inability to stifle inappropriate responses[9]
- Orbito-frontal cortex (OFC) contributes to decision making and inhibiting impulsive action[1]
- OFC works abnormally in drug users
  - Overvalues substance, making it chief concern[1]
  - Undervalues other objectives – food or health[1]
  - Malfunctions in blood flow, energy use[10]
  - Drug addicts prone to maladaptive decisions[11]
  - OFC activated during craving, initiating craving itself[11]

All addictions, regardless of substance choice, seem to share similar neurophysiological pathways

Aesthetic Knowledge:
Spring/Summer Practicum Experience

- Simon House – Alcoholics Anonymous based treatment center
  - Clients had difficulty with spiritual aspects of 12 steps, and felt guilt for previous relapses
- Nursing student peers :
  - Identified lack of recognition for clients' own work towards abstinence, hindering client empowerment
  - Viewing relapse too harshly might prevent future attempts at treatment
  - CNA Code of Ethics: accounting for unique values and spiritual beliefs, while focusing on well-being[15]
  - AA counselors seem resistant to discuss harm reduction as a viable option
- "7 A's of healing" are addressed by 12-steps (Personal communication, Derek Luk, July 11, 2013)
  - Acceptance, awareness, anger, autonomy, attachment, assertion, affirmation[16]
- 12-steps helps nurses expand knowledge for addiction treatment (Personal communication, Craig Mueller, July 17, 2013)

"Addiction is a chronic brain disease. No one blames a rheumatoid arthritis patient for relapse. So why do we blame addicts for the same?"
–Gabor Mate

How is addiction treated? What is effective?

Research Approach:
Literature Review

- Focused on alcohol use disorder, as Alcoholics Anonymous is well-researched
- All addictions share similar neurochemical pathways, so this information may be applicable for other addictions
- Databases: PubMed, CINAHL Plus, MEDLINE, Nursing Consult (Mosby's), Nursing Reference Center
- Articles before 2002 were not included
- Search terms: "12 steps," "addiction," "harm reduction," "alcohol use disorder," "effectiveness," "efficacy," "treatment," "comparison," "alcoholics anonymous"
- Research goals:
  1. Find support for Alcoholics Anonymous as an intervention
  2. Find support for harm reduction at the individual level for alcohol use disorder
  3. Find studies that compare the effectiveness of the two approaches

Results:
12 Steps & Harm Reduction

Strengths of Alcoholics Anonymous

- One of the most endorsed forms of treatment for alcohol use disorder[12]
- Cochrane Review found no difference compared to other interventions[13]
  - However, experimental design for comparison was limited[14]
- Longer duration in AA program associated with reduced impulsive behavior and legal problems, and increased positive psychosocial outcomes[17]
- Continued participation protective against future alcohol use, even with concurrent use of illicit substances[18]
- Client use of self-help techniques stronger with 12-step compared to CBT alone[19]
- Greater alcohol addiction severity more likely to result in continued AA attendance and better outcomes[19]
- Develops social support network that promotes abstinence[20]
- Physicians who took AA counseling for their own use disorder reported less cravings if they had a spiritual awakening[21]

Comparing 12-Step and Harm Reduction

- Cochrane review evaluating managed alcohol programs concluded more research is required[22]
  - No studies included in review as none addressed comparison with other interventions
- More research needs to be done to compare the two
- Difficult to compare – AA seeks total abstinence, where harm reduction does not

Harm Reduction for Alcohol Use Disorder

- Reduced-risk drinking has received limited acceptance[23]
  - Assumption that dependent drinkers are at loss of control
- Literature review shows harm reduction approaches are at least as effective as abstinence-based approaches[24]
- Most of the research on harm reduction benefits are done on community-level interventions for illicit substances
  - Lack of literature on harm reduction in alcohol use may stem from focus by policy makers on harm of illicit drugs[25]

Support for Complimentary Treatment

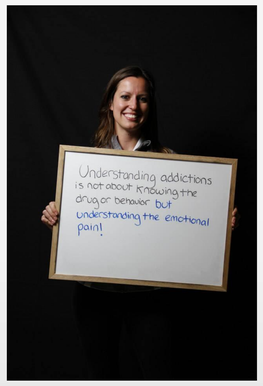
- Access to a variety of approaches individualizes treatment, and client engagement more likely if options are available[23]
- AA participation associated with higher retention in other treatment forms[26]
- Greater early AA participation associated with decreased alcohol abuse in long term[27]
  - AA itself can be used as a harm reduction tool
- Reduced-risk program may result in willingness to try AA in future[23]
  - Conversely, initial abstinence and relapse may result in overall decreased consumption[23]
- Healthcare workers applying harm-reduction report they believe it can compliment 12-step approaches[28]
- Programs currently exist that combine the two principles, including 16 Steps[29] and SMART Recovery[30]

Conclusions:
Moving Forward

- Further research on managed alcohol use programs
- Further evaluation of harm reduction approaches for alcohol use disorder at an individual level
  - Harm reduction at any level for alcohol use seems to be the least studied, possibly due to its status as a licit substance
- Establish common outcome measures for comparison of treatment modalities
  - Complete abstinence is not a shared goal
  - Look at other health outcome measures, or decreased usage over time
- Further research of the above with regards to illicit substances and behavioral addictions
  - Alcoholics anonymous research abundant as most-known 12-step program
- **Generating awareness about addiction may change attitudes towards addictions**
  - General public
  - Healthcare professionals
  - Researchers
  - Policy-makers

Taking Action:
Addictions 101 Campaigns

- Addiction is a stigmatized health condition amongst health care professionals and the general public
- Bringing awareness to public may result in decreased stigma and increased awareness
- Bringing awareness to researchers and scholars may generate interest in novel research and proliferation of previous research
- Began as a series of awareness campaigns for the general public in Mac Hall
  - Student-led open forums in July, October, and November 2013
  - Partnership with University of Calgary SU Wellness Center
  - Booths addressing different factors contributing to addiction at individual, institutional, societal levels
  - Photo booth campaign and Facebook link
  - "Addictions 101" leaflets for portability of information
  - Surveys for evaluation of effectiveness and impact made
  - **Purpose:**
    1. Present information to university students and faculty
    2. Foster dialogue, answer questions, and provide resources
    3. Consolidate learning for participating students



Trial 1: July 2013

Participating Student Feedback

- Surprised with support for addiction awareness
- Surprised also with the misinformation people have
- Hoped to engage more of the nursing faculty
  - Other students would benefit from the information
  - Creating a "united nursing front"
- Comfortable, open environment helped to create impact

What Worked

- Open area with lots of traffic
- Set up drew people in and maintained their attention

What Didn't Work

- Pre/Post survey too long
  - People reluctant to complete it
- The timing
  - Less impact due to less traffic in Summer semester

Survey Data

- Results not statistically significant due to low numbers
- However, in a 2-hour time frame…
  - Showed a change in attitude towards perception of stigma
  - Showed an increase in willingness to seek help for own addiction…

Trial 2: October 2013

What Changed

- Part of broader "Mental Health Awareness Week"
- Shorter "yes/no" survey and more foot traffic
  - Not statistically significant due to "yes/no" format
  - However, significant increase in survey participation
  - Results showed a trend of audience gaining new knowledge
  - Used results for "in-house" evaluation of campaign initiative

Trial 3: November 2013

What Changed

- Short survey that is statistically significant
- New group of nursing students taking on the project
- Currently awaiting survey results… stay tuned!

Benefits: Education & Practice

- Greater retention of material by participating students
  - Brain-based learning[31]
- Increased outreach to other healthcare professionals
  - Inter-professional collaboration: medicine, social work
- Unique intervention in registered nursing practice
  - Education, program implementation, community health
- Creating initial considerations for addiction clients
  - Impact on care in all nursing specialties

Ultimate goals…

- Creating strong foundation of addiction knowledge for current and future clinicians
- Promoting further research and proliferation of existing research on addiction
- Developing client-centered, individualized addiction treatments based on the strongest evidence
- Decreasing the stigma surrounding addictions in all areas of healthcare practice
- Changing institutional and societal attitudes towards individuals with addiction

Wellness Centre
UNIVERSITY OF CALGARY

Bikram Sekhon, BKin RK BN (2013)

- Special thanks to Aaron Li and Derek Luk for their support and mentorship
- Thanks to Sander Deeth for helping create surveys for the awareness campaigns

Images Reference: 1. Goldstein & Volkow (2002)
Full References: See attached documents
Email bikram.sekhon@gmail.com for a digital copy of reference list