

HCV/HIV Co-infection Research at NIDA

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HCV Panel

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Substance Abuse: 200-500 million

110 million life-time users, 19 million current

Cost to the US society: \$565 billion/yr

(Diabetes: \$162 b/yr; Cancer: \$210 b/yr)

Infections: ~2.5 billion worldwide

300 Hepatitis B

170 Hepatitis C

34 million HIV

2.3 billion TB

Other bacterial infections

- **CDC Estimates for HCV:**
 - - 4m Americans infected with HCV
 - - At least 60% HCV transmission occurs through IDU
 - - IDU accounts for a substantial proportion of prevalent cases
 - - HCV prevalence rate among populations of IDUs= 60%-95%
 - - After 5 yr of injecting, at least 90% IDUs are infected

- Hepatitis C: Natural history, pathogenesis, therapy and prevention
- Drug abuse aspects of HIV/AIDS and HCV
- Studies on the linkage of drug abuse treatment and medical care
- HIV/HCV-related therapeutics in drug abusers

- **FY 2004** **\$25.45 million**
- **FY 2005** **\$25.86 million**
- **FY 2006** **\$25.94 million**

- **NIH-FY2011=\$114 m (NIAID-\$51m, NIDDK-\$15m, NCI-\$11m, NIDA-\$20)**

- **EPIDEMIOLOGY:**

- Natural history of HCV infection in drug users
- Etiology and prevention of blood-borne viruses in IDUs
- HCV virus transmission in crack cocaine smokers
- HIV and HCV in young injectors: a community study
- Modeling HIV, STDs and others (HCV) in drug users and social networks
- HCV transmission: sex, violence, alcohol and drug abuse
- HCV co-infection in HIV-infected subjects
- HBV and HCV among homeless adults

- **PATHOGENESIS:**
- HCV variants and immune response in IDUs
- HCV pathogenesis & human genome
- HCV clearance and host genetic factors
- HIV, drug use and HCV pathogenesis
- Pathogenesis of hepatic injury with HCV/HIV co-infection
- Clinical and histologic spectrum of HCV liver disease in IDUs
- HCV virus transmission in crack cocaine smokers
- Cellular immunity to HCV in HIV
- HCV infection & diabetes in IDUs

- **CHILDREN:**
- **Biology of pediatric HCV infection**
- **Viral hepatitis (HCV) in young IDUs**
- **(Edlin, Page)**
- **WOMEN:**
- **Women's risk networks: resources, infection and change**
- **Women and infants transmission study**

- **INTERVENTIONS:**
- **HIV/HCV co-infection-antiviral therapy and fibrosis**
- **HCV in IDUs-epidemiology and prevention**
- **HCV in new IDUs: implications for HIV prevention**
- **A trial to reduce HCV among IDUs**
- **HCV service innovations in drug treatment programs**
- **Reduce transmission risks and improve HCV treatment access**
- **IDU access to HIV/HCV prevention**

- **INTERNATIONAL:**

- The epidemiology of HCV infection in Thailand
- Reducing youth drug related HIV/STD/HCV risk in Thailand
- HIV/HCV-Australia-Dore et al
- HIV/HCV clinical trial-India-Mehta et al

- **INTER-AGENCY COLLABORATIONS:**

- Women and Infants Transmission Study (WITS)
- Women's Inter-agency Study (WIHS)
- Hepatitis C Centers Initiative

- **HIV-HCV co-infected IDUs need medical evaluation for liver disease,**
- **HCV treatment possibly orthotopic liver transplant.**
- **Treatment complicated by medical and psychiatric comorbidity, HIV/AIDS, concurrent ART.**

- **Thomas, D** et al. (JHU). Genetic variant in *IL28B* & spontaneous clearance of HCV; *IL28B* shown to associate in response to HCV drug tx & role in resolution of HCV infection. (*Nature*, '09)
- **Thomas, D** et al (JHU). HCV re-infection & super infection are reported in actively IDUs & might complicate development of effective HCV vaccine. (*J of Hepatology*, '09)

- **Batki et al. (UCLA). Untreated HCV pts (n=100, 61% m, 81% white, 43 yr old) in methadone-maintenance tx (MMT) had lower quality of life including depression than HCV pts not in MMT; psychiatric eval and intervention prior to the start of HCV tx may improve overall QOL and could influence HCV tx outcomes in MMT pts (Drug Alcohol Depend, 2009).**
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- **Mosbrugger et al. (JHU)**. 1536 SNPs in 343 pts with natural HCV clearance and 547 persons with HCV persistence were genotyped; In AfrAms, 18 SNPs on 11 gene regions, and 20 SNPs on 8 gene regions in Euro Caucasians were assoc with HCV outcome. Overall, of 1426 genotyped SNPs in 112 candidate genes, **4 gene regions important for HCV clearance or persistence in both AfrAm and Caucasians.** (J.Inf Dis 2010).

- **Lum** (UCSF). 88% of young (<30 yrs) IDU surveyed in SF definitely or probably would participate in HCV vaccine efficacy RCT, 67% willing if RCT one yr, only 43% if longer. HCV vaccine RCT w/young hi-risk IDU is feasible. (*Vaccine* '10).

- **Wood** (UBC Vancouver). Among 364 youth 14-24 yrs injecting 3 yrs, baseline HCV prevalence 51%. Youth involved in survival sex significantly more likely HCV+ (60% vs 44%, $p=.002$). Survival sex strongest predictor HCV incidence (adjusted RH, 2.30; 95% CI, 1.27-4.15). (*Arch Pediatr Adolesc Med* '10).

- **Characterize those populations at elevated risk of both infections among IDUs**
- **Determine the incidence and prevalence of both HIV and HCV infections co-occurring in IDUs, with emphasis on IDUs who use a single illicit drug, such as opiates, stimulants (amphetamines, cocaine), or marijuana**
- **Study the impact of drug abuse on disease progression**
- **Determine the biomarkers of HCV infection that are especially suited for IDUs**
- **Develop noninvasive (e.g., imaging techniques) to diagnose acute/chronic HCV infection**

- **Develop methods to prevent recurrence of infection**
- **Develop pharmacotherapeutic as well as alternative therapy modalities for the treatment of coinfections in IDUs**
- **Determine drug-drug interactions among pharmacotherapeutics used in the treatment of infections and drug addiction**
- **Develop therapeutics that would interfere with viral replication and translation**
- **Develop therapeutic as well as preventive vaccines that would not be adversely affected by substance abuse**
- **Evaluate strategies designed to increase adherence to treatment protocols.**

National Institute on Drug Abuse (NIDA)

- **NIDA AIDS Research Program (ARP) Priorities**
<http://www.nida.nih.gov/about/organization/arp/arp-current.htm>
- **FOAs:** <http://www.nida.nih.gov/about/organization/arp/arp-pa&rfa.htm>
- **NIDA spends ~\$25m on research on HIV and Liver Disease (see below)**
- **PA-10-129: Drug Abuse Aspects of HIV/AIDS (& Other Infections)**
- **PAR-12-122: Cohort Studies of HIV/AIDS and Substance**
- **PA-12-XXX: HIV/AIDS, Drug Use, and Vulnerable Populations in the US (R01)-Being re-issued**
- **PA-12-042: International Research Collaboration on Drug Abuse and Addiction Research (R01/R21/R03)**
- **RFA-12-033: IUS-India Bilateral Collaborative Research Partnerships on the Prevention of HIV/AIDS and Co-morbidities (R21)**
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Program Announcements/FOAs

- **NIDA AIDS Research Program (ARP) Priorities FOAs: e** (see below)
- **PA-10-129: Drug Abuse Aspects of HIV/AIDS (& Other Infections)**
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