

# 2016 ANNUAL NIH PAIN CONSORTIUM SYMPOSIUM ADVANCES IN PAIN RESEARCH



## Innovative Models and Methods

### Keynotes

- **Challenges in translational pain research**  
**David Clark, Stanford University**
- **Applying new technologies & approaches**  
**Rob Gereau, Washington University**
- **Complex disease models**
- **Junior Investigators**
- **Patient Perspective**
- **APS**

**NATCHER CONFERENCE CENTER,  
BETHESDA, MD  
MAY 31<sup>st</sup> – JUNE 1<sup>st</sup>, 2016**

# The NIH Pain Consortium



## Mission

- *To enhance pain research and promote collaboration among researchers across the NIH Institutes and Centers that have programs and activities addressing pain*

## Leadership

- *Dr. Walter Koroshetz, Director NINDS, NIH Pain Consortium Chair*
- *Dr. Josephine Briggs, Director NCCIH*
- *Dr. Patricia A. Grady, Director NINR*
- *Dr. Martha Somerman, Director NIDCR*
- *Dr. Nora Volkow, Director NIDA*

## Staff: Office of Pain Policy

- *Dr. Linda Porter, Director*
- *Dr. Cheryse Sankar, Dr. Leah Pogorzala, and Dr. Khara Ramos, Pain Policy Analysts*

# The NIH Pain Consortium



National Institutes  
of Health

## *Membership*

National Cancer Institute

National Eye Institute

National Institute on Aging

National Institute on Alcohol Abuse and Alcoholism

National Institute of Arthritis and Musculoskeletal and Skin  
Diseases

National Institute of Biomedical Imaging and Bioengineering

National Institute of Child Health and Human Development

National Institute on Deafness and Other Communication  
Disorders

National Institute of Dental and Craniofacial Research

National Institute of Diabetes and Digestive and Kidney  
Disorders

National Institute on Drug Abuse

National Institute of General Medical Sciences

National Institute of Mental Health

National Institute of Minority Health and Disparities

National Institute of Neurological Disorders and Stroke

National Institute of Nursing Research

National Heart Lung and Blood Institute

National Center for Advancing Translational Science

National Center for Complementary & Integrative Health

John E. Fogarty International Center

Warren Grant Magnuson Clinical Center

Office of Science Policy and Analysis

Office of Behavioral and Social Sciences Research

Office of Technology Transfer

Office of Research on Women's Health

Office of Rare Diseases

# Public Health: Chronic Pain

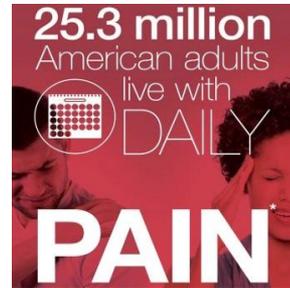
*100 million American adults report chronic pain*

*25 million people report daily pain*

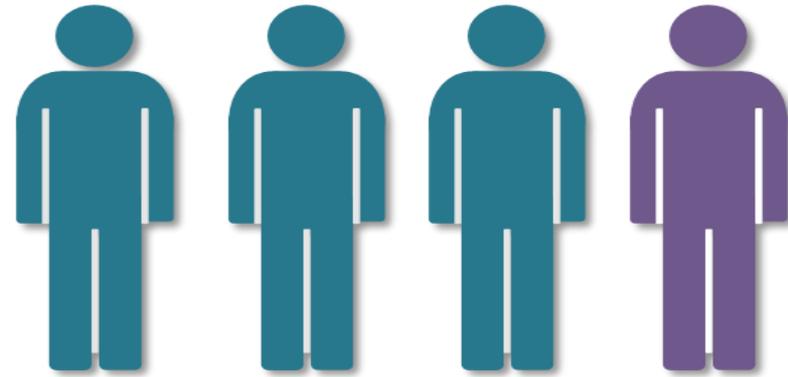
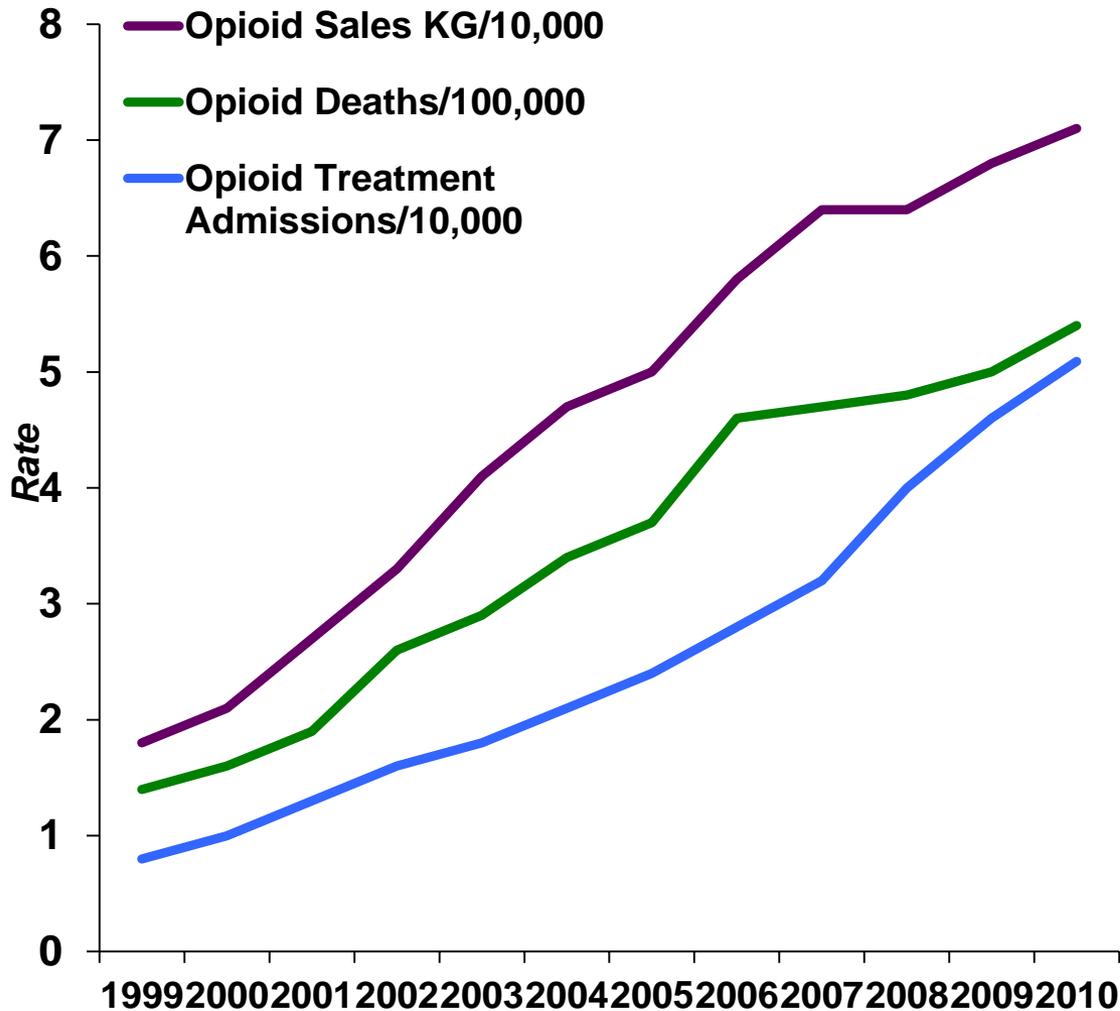
*6 million people report that pain interferes with lifestyle*

*635 billion dollars*

*Access to quality care is limited*



# Public Health: Opioid Abuse



3 of 4 people who used heroin in the past year took Rx opioids first

*Jones, C.M., 2002–2004 and 2008–2010. Drug Alcohol Depend. (2013).*

# Federal Pain Research Strategy

Fulfill the IPRCC mandate

*Identify critical gaps in basic and clinical research on the symptoms and causes of pain*

*Make recommendations to ensure that the activities of the National Institutes of Health and other Federal agencies are free of unnecessary duplication of effort*

Complete the research recommendations of the IOM

*Include an agenda for developing physiological, clinical, behavioral, psychological, outcomes, and health services research and appropriate links across these domains that align with the NPS.*

 *The* Interagency Pain Research Coordinating Committee



# Federal Pain Research Strategy

The CONTINUUM of PAIN: the characterization of pain as a temporal process, beginning with an acute stage, which may progress to a chronic state of variable duration. Chronic pain may start early after injury or surgery, because of an individual's susceptibility, through mechanisms activated in the acute setting.

PREVENTION OF  
ACUTE &  
CHRONIC PAIN

ACUTE PAIN &  
ACUTE PAIN  
MANAGEMENT

TRANSITION FROM  
ACUTE TO  
CHRONIC PAIN

CHRONIC PAIN  
& CHRONIC PAIN  
MANAGEMENT

DISPARITIES

WHAT HAPPENS AND  
TO WHOM?

WHY AND HOW DOES  
IT HAPPEN?

HOW TO MANAGE?

BASIC SCIENCE

CLINICAL  
SCIENCE

UNDERSTAND  
MECHANISMS

TRANSLATE/  
TREAT



National Institutes  
of Health

Pathways to Prevention: OFFICE of DISEASE PREVENTION September 29–30, 2014  
The Role of Opioids in the Treatment of Chronic Pain

**The panel noted there are no long-term studies on the effectiveness of opioids for pain, function, or quality of life, nor on the long-term safety of opioid use. There are documented adverse outcomes.**

**The challenge is to identify the conditions for which opioid use is most appropriate, the alternatives for those who are unlikely to benefit from opioids, and the best approach to ensuring that individual needs are met by a patient-centered health care system.**



National Institutes  
of Health

Pathways to Prevention:

The Role of Opioids in the Treatment of Chronic Pain

September 29–30, 2014

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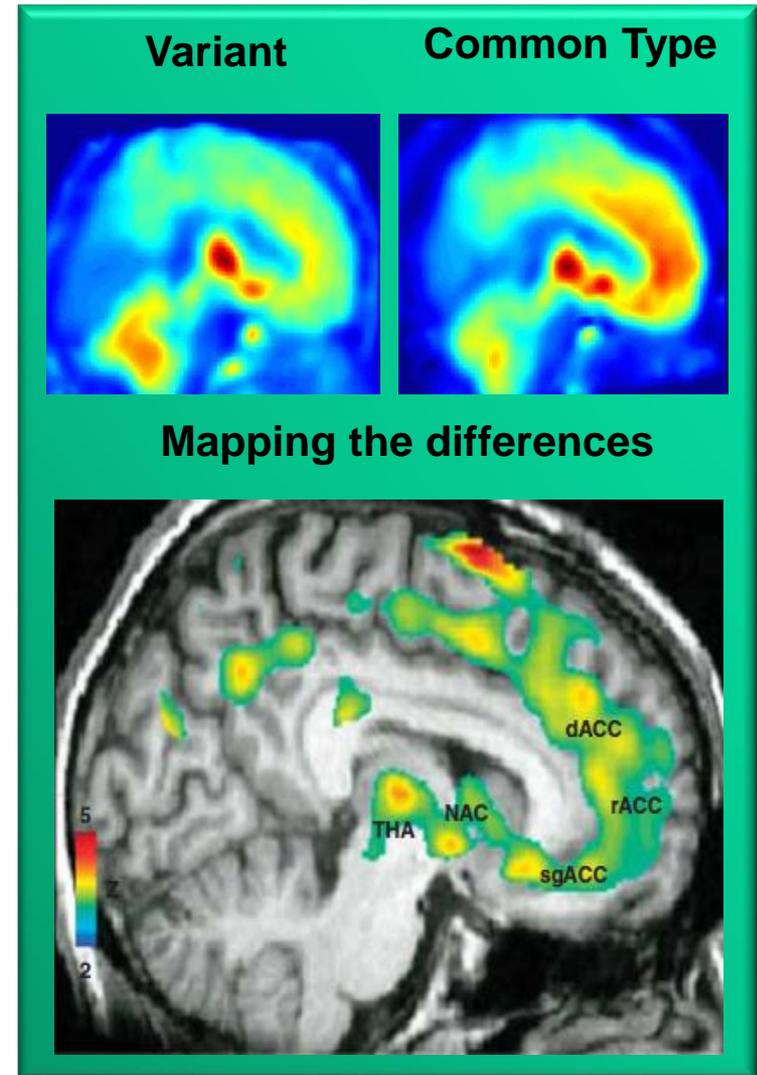
## Partners Meeting Research Recommendations

- Identify the types of pain, diseases, and patients most likely to benefit and incur harm from opioids
- Develop and evaluate multidisciplinary pain interventions
- Develop and validate research measurement tools for identification of risk and outcomes related to long-term opioid use, which can be adapted for clinical settings



# Limiting Abuse by Predicting Addiction

- *OPRM1* encodes for the target of opioids
- Can variants predict likelihood addiction?
- *OPRM1* gene variant
  - Affects receptor levels in brain
  - Associated with increased risk for addiction, overdose severity



*Hancock et al., Biol Psychiatry 2015; 78.*

*Manini et al., J Med Toxicol 2013; 9.*

*Peciña et al., Neuropsychopharmacology 2015; 40.*

# NINR Pain Research Activities

- Mechanisms Underlying Pain Associated with Spinal Cord Injury (BDNF/trkB system)
- Posterior Hypothalamic Modulation of Pain ( $\alpha$ -AR system)
- Daily Pain in Patients with Dementia (delirium and function)



# The NIH Pain Consortium



## **Mechanisms, Models, Measurement, & Management in Pain Research (R01, R21) ([PA-16-188](#), [PA-16-187](#))**

The purpose of this Funding Opportunity Announcement (FOA) is to inform the scientific community of the pain research interests of the various Institutes and Centers (ICs) at the National Institutes of Health (NIH) and to stimulate and foster a wide range of basic, clinical, and translational studies on pain as they relate to the missions of these ICs.

# The NIH Pain Consortium



- Categorizing the severity of **pain** using questions from National **Health** Interview Survey.
- The Prevalence and Characteristics of Fibromyalgia in the 2012 National Health Interview Survey.
- Out-Of-Pocket Expenditures on Complementary Health Approaches Associated With Painful Health Conditions in a Nationally Representative Adult Sample.
- Limited Health Knowledge as a Reason for Non-Use of Four Common Complementary Health Practices.
- Estimates of **pain** prevalence and severity in adults: United States
- Use of complementary health approaches among children aged 4-17 years in the United States: National Health Interview Survey

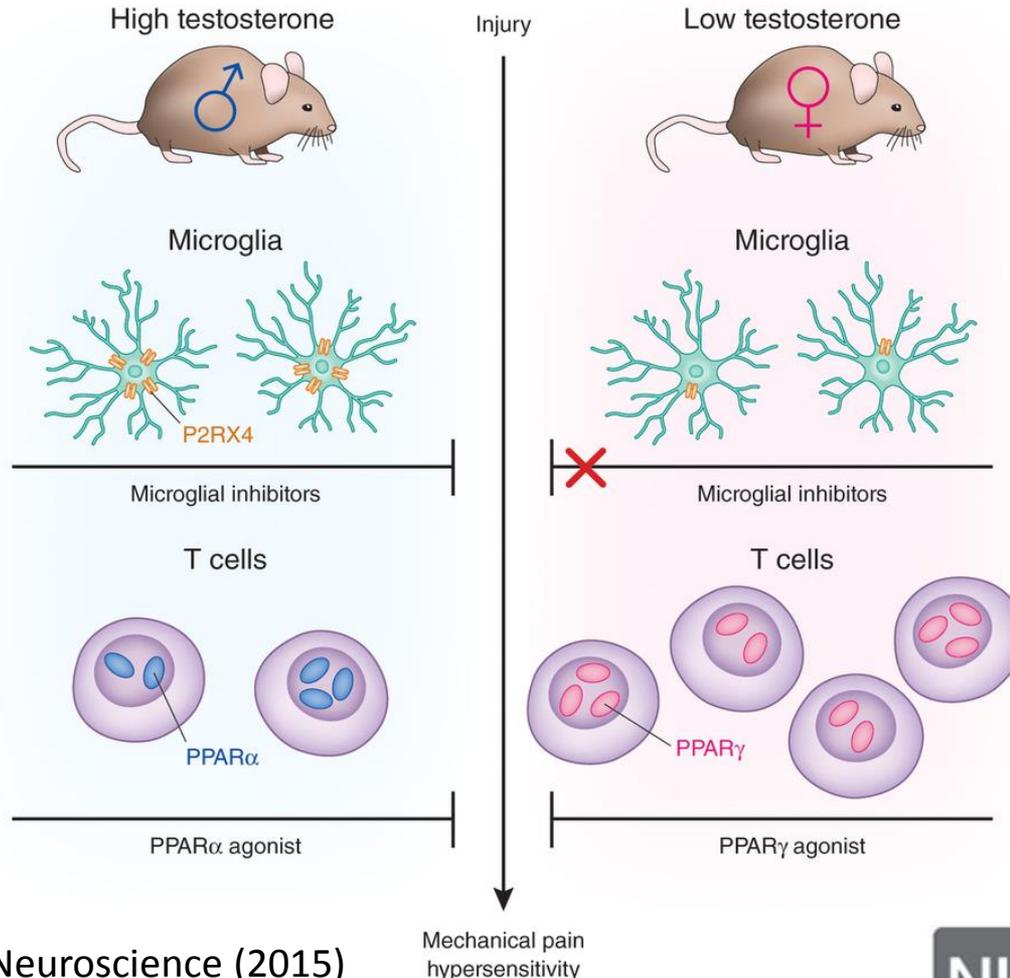
# NIDCR Pain Research



- Pain pharmacogenomics research (SOPPRANO study)  
COMT alleles and response to propranolol
- Orofacial Pain: Prospective Evaluation and Risk Assessment (OPPERA)
  - Exciting results on:
    - Genetic risk factors for TMD based on GWAS studies
    - Psychological risk factors for TMD including heightened somatic awareness and stress
    - Sleep complaints associated with chronic pain
    - Differences in clinical pain perception between different ethnic groups
  - Women are more likely to transition from acute to chronic pain

# Sex-based Differences in Pain Hypersensitivity

Different immune cells mediate mechanical pain hypersensitivity in male and female mice



Sorge RE et al. *Nature Neuroscience* (2015)  
Brings VE and Zylka MJ. *Nature Neuroscience* (2015)

# Practice-Based Research Network: Opioids and Pain

## National Dental Practice-Based Research Network

*Engaging practitioners to generate the evidence base to improve precision health care*



- Study to evaluate the opioid prescribing practices of dentists
- Prospective study to identify predictive factors related to pain from root canal treatment

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**Innovative Models and Methods**

**Dr. David Clark, Stanford University**

**Challenges of Translational Pain Research  
What Makes a Good Model?**

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