

**Analysis of the federal research portfolio for osteoarthritis (OA), chronic low back pain (CLBP), temporomandibular disorders (TMD) + orofacial pain (OFP), fibromyalgia (FM) and irritable bowel syndrome (IBS).**

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# Overview of the portfolio

- **OA:** There were 104 grants listed but eight did not have an abstract. 62 were categorized as clinical and 27 as basic or translational; the remainder were resource grants either administrative or research grants. Osteoarthritis, mainly of the knee, is a major chronic pain condition affecting 12 % of the U.S. population over 25 and 30% of the population over 60 years of age. The clinical grants (n=62) were mainly related to physical activity and strength following surgery (n=21) or morphological changes visualized with imaging techniques (n=20) whereas the remaining categories (1-4 grants in each) were related to surgery, biobehavioral therapy, central nervous system, sleep, acupuncture and biochemical treatments. The grants categorized as basic science/translational totaled 27 in three major categories: repair of peripheral tissues, cytokine local therapy and peripheral tissue changes (mainly cartilage).
- **CLBP:** 63 grants listed (basic, 11; translational, 5; clinical, 47. Effects about 40% of the adult population. The clinical grants were in three major categories: physical therapy, psychotherapeutic interventions or brain imaging. The basic science grants (with an n greater than 1) were related to spinal loading, cartilage proteins and CNS mechanisms).

# Overview of the portfolio

- **TMD + OFP:** 44 grants listed (basic, 29; translational, 1; clinical, 14). Effects about 10% of the population, twice as many women. The clinical grants were mainly biobehavioral risk factors and treatments. The basic science grants were peripheral (n=8) and CNS (n= 10) mechanisms, treatments (n=2), imaging (n=1) and regeneration and bioengineering (n= 7).
- **FM:** only 19 grants (basic, 3; translational, 1; clinical, 13). Effects about 6.5% of the population (5 % are women). Clinical grants are related to biobehavioral studies, treatments, risk factors and acupuncture studies. Very few basic science or translational grants.
- **IBS:** 49 grants listed (basic, 16; translational, 3; clinical, 30). Effects 10-15% of population in N.A.-Europe. Clinical grants are mainly related to treatment approaches, behavioral studies, and brain imaging. Translational studies on probiotics. Basic science studies are mainly studies of peripheral hypersensitivity and stress and a few on CNS mechanisms.

# Highlights of the portfolio

- **OA:** The grants were mainly clinical and involved the study of peripheral tissue changes associated with the local arthritis.
- **CLBP:** These grants were also mainly clinical with an emphasis on peripheral tissues.
- **TMD + OFP:** These grants were different from those of the above conditions with most related to basic mechanisms including neural mechanisms and tissue regeneration.
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- **FM:** Clinical grants are related to biobehavioral studies, treatments, risk factors and acupuncture studies. Very few basic science or translational grants.

**IBS:** Clinical grants are mainly related to treatment approaches, behavioral studies, and brain imaging. Translational studies on probiotics. Basic science studies are mainly studies of peripheral hypersensitivity and stress and a few on CNS mechanisms.

## Relevance to other pain conditions and opportunities to collaborate

- These pain conditions involve deep tissues: mainly muscle, joint and visceral tissues. They are often referred to as chronic overlapping pain conditions whose underlying mechanisms are poorly understood. There is a need for coordination of research efforts, particularly basic and translational studies, involving these conditions. Overlap among the conditions are prominent.
- There are many opportunities for collaboration: 1) relevant preclinical animal studies including the transition from acute to chronic pain; 2) studies of CNS mechanisms of pain amplification common to the conditions; 3) studies on forebrain central mechanisms that lead to modulatory influences on the sensory component of pain experience; 4) studies on common psychosocial traits that may be important risk factors for the conditions; 5) studies of the relationship of psychosocial risk factors to forebrain activity revealed by brain imaging; 6) gender, genetic and epigenetic risk factors common to these pain conditions. I recommend the preparation of RFAs and PAs as well as Common Fund initiatives that will foster the above research efforts.

## Potential overlap or shared interests among agencies or NIH institutes

- See previous slide

## Gaps & Opportunities: Research areas needed or untapped

- **OA:** There is a distinct lack of basic, translational or preclinical grants or studies of psychosocial traits or disease chronicity and CNS changes. There is a strong need for collaboration with researchers that focus on CBLP, TMD and FM.
- **CBLP:** There is a lack of preclinical studies and studies of psychosocial traits and CNS mechanisms. Interactions with studies on the overlapping conditions could lead to important findings.
- **TMD + OFP:** The few clinical grants were mostly biobehavioral grants. More studies of sensory mechanisms and the transition from acute to chronic pain are needed.
- **FM:** Very few basic science or translational grants. Understudied considering that it affects over 6% of the population. Collaboration with studies on the overlapping conditions is needed.
- **IBS:** Basic science studies are mainly studies of peripheral hypersensitivity and stress and a few on CNS mechanisms. Many of the grants focus on GI issues with little attention paid to the role of psychological factors and brain modulatory influences.