






Nature-Derived Pain Receptor Modulator YB-16 to Fight Opioid Crisis and Treat Chronic Pain



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Growing Problem of Treating Chronic Pain: High Cost & Opioid Crisis

Incidence of pain, compared to major conditions 2017

CONDITION	NUMBER OF SUFFERERS IN THE US
Chronic pain	100M 
Diabetes	30.3M 
Coronary Heart Disease	17.3M* 
Cancer	14.5M 
Stroke	7M 

Sources: American Diabetes Association; American Cancer Society; American Heart Association; American Academy of Pain Medicine

BUSINESS INSIDER

- ❑ Historically, opioid overdose deaths, opioid sales, and opioid treatment admissions related to prescription pain relievers increased in parallel
- ❑ In 2021, 9.2M people aged 12 years and older misused opioids in U.S., and 45 Americans die every day from a prescription opioid overdose, a rate that is five times higher than the number in 1999
- ❑ There is thus an urgent need for alternative pain treatments

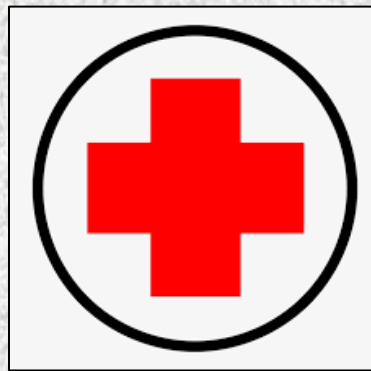
The People Getting New Knees and Hips in Their 40s



- ❑ Osteoarthritis not only affects older people, but also affects younger people more than ever
- ❑ As average life expectancy ticks up, many Americans are no longer willing to sacrifice decades doing their favorite activities, such as skiing, hiking or playing pickleball, to sit in pain, doctors say. And staying sporty into your 50s and 60s is good for your physical and mental health.
- ❑ The average age of hip- and knee-replacement patients is getting younger.
- ❑ The population of patients under 65 getting joint replacements grew by about 200% over the past two decades – Alex Janin. The Wall Street Journal, August 20, 2024.
- ❑ There is thus an urgent need for new knee and hip pain treatments

Focused Pain Conditions

Pain Conditions	Annual Number of Cases in U.S.
Moderate to Severe Osteoarthritis of the Knee	5 M
Total Knee Replacement	600,000



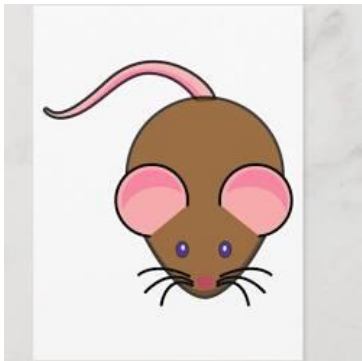
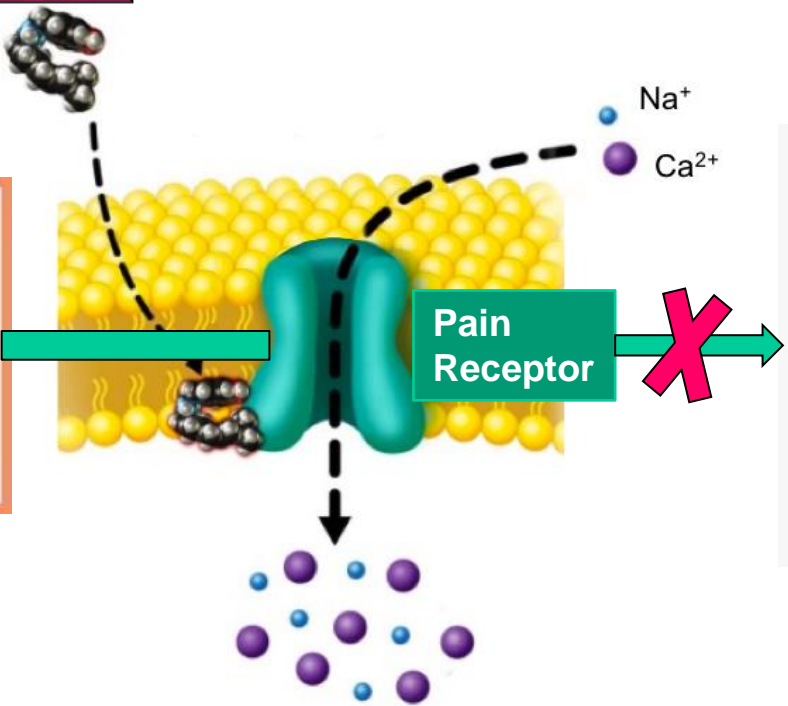
- Effectiveness and convenience of infrequent dosing**
- ✓ “One treatment can manage your pain for 3 to 6 months”

- Safety advantage especially with regulations on limiting opioid prescriptions**
- ✓ “Alternative non-opioid option for effective pain management”

- Long-lasting effect and low cost**
- ✓ “One affordable treatment can manage pain for 3 to 6 months”

Selective Pain Receptor Modulation

YB-16



**Proof-of-Principal:
Effective and low side-effects**

YB-16 Primary Indication: Osteoarthritis Knee Pain

Large patient population

- ❑ Osteoarthritis is a chronic disease mainly caused by damage to articular cartilage, and the main symptom is pain. There are more than 300 million patients worldwide, and China has close to 100 million patients. U.S. has over 5M moderate to severe knee OA patients.

Novel solution for a significant unmet medical need

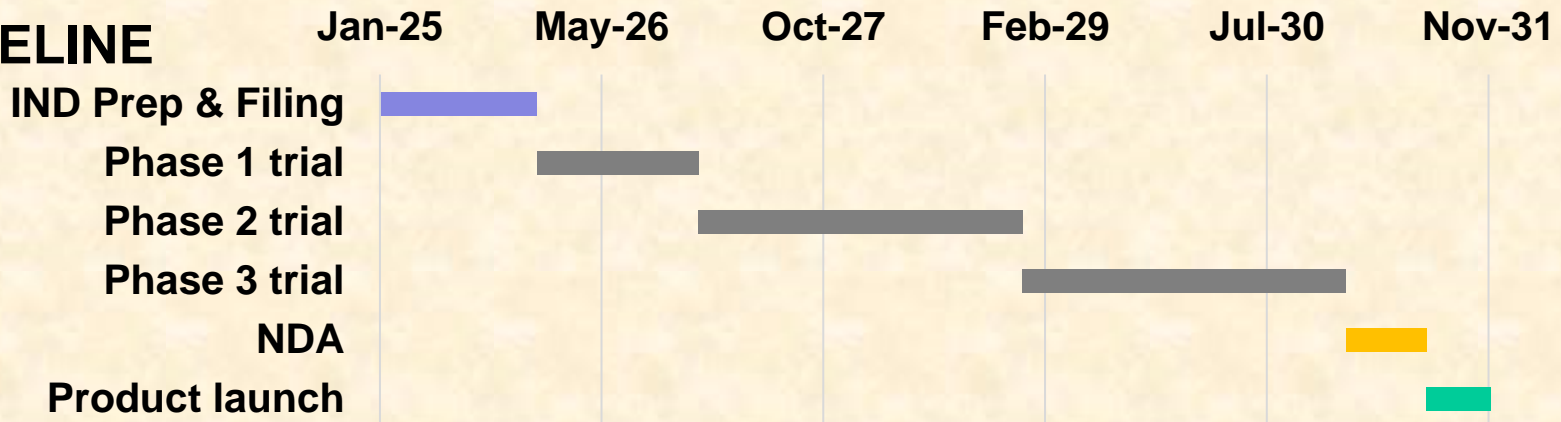
- ❑ Common medications for osteoarthritis pain include acetaminophen (Tylenol), duloxetine, nonsteroidal anti-inflammatory drugs (NSAIDs), COX-2 inhibitors, anti-inflammatory steroids, and opioids. These drugs have serious side effects and often lack efficacy. Frequent dosing and long-term systemic exposure increase safety risks.
- ❑ YB-16 is expected to provide long-term pain relief after a single injection into the knee, with an elimination half-life in the order of hours, thus circumventing the need for long-term exposure. Successful relief of pain may delay the need for a total joint replacement (total knee arthroplasty) to prevent an artificial joint from later wearing out.
 - ✓ Agonists of TRPV1 such as YB-16 can cause long-term effects in sensory nerve fibers through a combination of mechanisms including desensitization, nociceptor dysfunction, neuropeptide depletion, and reversible nerve fiber degeneration.
- ❑ There is an urgent need for safe, effective analgesics to treat OA knee pain. YB-16 is qualified to receive FDA fast track designation to accelerate the development.

YB-16 will be gradually expanded into additional pain indications in the future

Hip osteoarthritis Spinal stenosis Post-surgical pain Cancer pain Neuropathic pain



TIMELINE



Study Costs: \$7-10M to complete IND, Phase-1, and Phase-2a trials

Phase 1	Phase 2	Phase 3	NDA Review
1.4M USD	17M USD	52.9M USD	2M USD

U.S. Penetration & Value	Year 1	Year 5	Year 10
U.S. Patient Population	5M	5.2M	5.4M
Increase in Patient Population	0	3.4%	7.3%
Our product treatment rate	2%	10%	20%
Patients treated	100,000	520,000	1,080,000
Sales: Annual treatment @ \$1,800	180M	936M	1.9B

- ❖ Not counting international sales
- ❖ After Year 5, annual sales will surpass \$1B, reaching blockbuster level

Summary of YB-16

- **New generation modality-selective TRPV1 modulator**
- **Powerful analgesia**
- **Single treatment provides pain relief for 3-6 months**
- **Rapid onset of action**
- **Safe and non-addictive**
- **Analgesia does not affect body temperature, motor skills or sensation**
- **Readily available from in-house developed chemical synthesis**
- **Low cost and affordable treatment**