

MEST

Muscle Enhancement Support Therapy

World's First - First in Class

Medical device for relieving knee pain from degenerative osteoarthritis through the muscles

Patents registered in 14 countries including the USA, Japan and European countries

Patent Registration No. 10-1878258

Product License No. 24-494

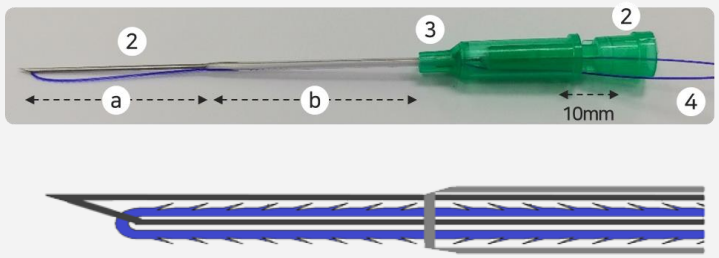
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MEST Advantages

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Muscle Enhancement Support Therapy

Muscle stimulation by PDO cog filaments



PDO Filament

PDO (polydioxanone; biodegradable polymer)



- Safe absorbent materials used in surgery
- Hydrolyzed and excreted from the body after months

A new-concept medical device for knee pain relief

Pain treatment through the muscles, not the knee joints

Excellent pain relief effect

Pain relief confirmed for up to 30 weeks through VAS (Visual Analogue Scale) pain indicator

Safe and simple procedure

Safety confirmed through clinical trials, with no serious adverse events

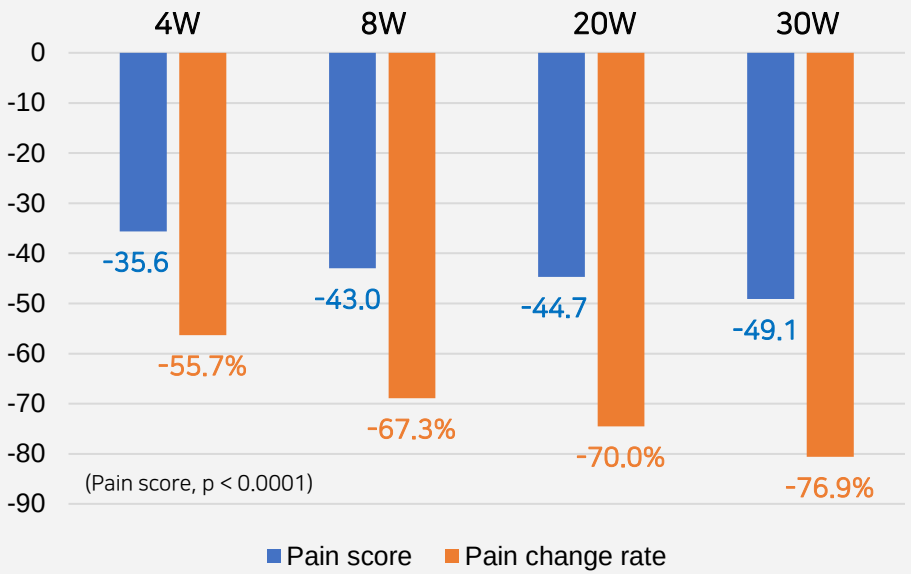
Combination therapy with existing treatments

Expected effect through combination therapy as the application area differs from existing degenerative arthritis knee treatments

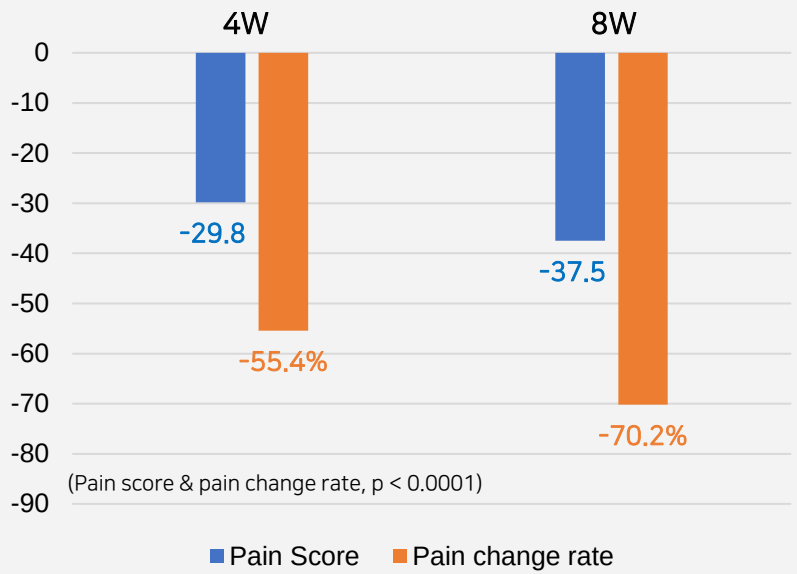
MEST Clinical Trial_Pain Relief (MEST Treatment Group)

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Pain Score Change (Rate)_Exploratory Clinical Trial[1](vs. Baseline)



Pain Score Change (Rate)_Confirmatory Clinical Trial[2](vs. Baseline)



Conclusion

Improvement in the VAS (visual analogue scale) score and its change rate, a representative pain measurement indicator

About 80% pain improvement for up to 30 weeks in MEST treatment group

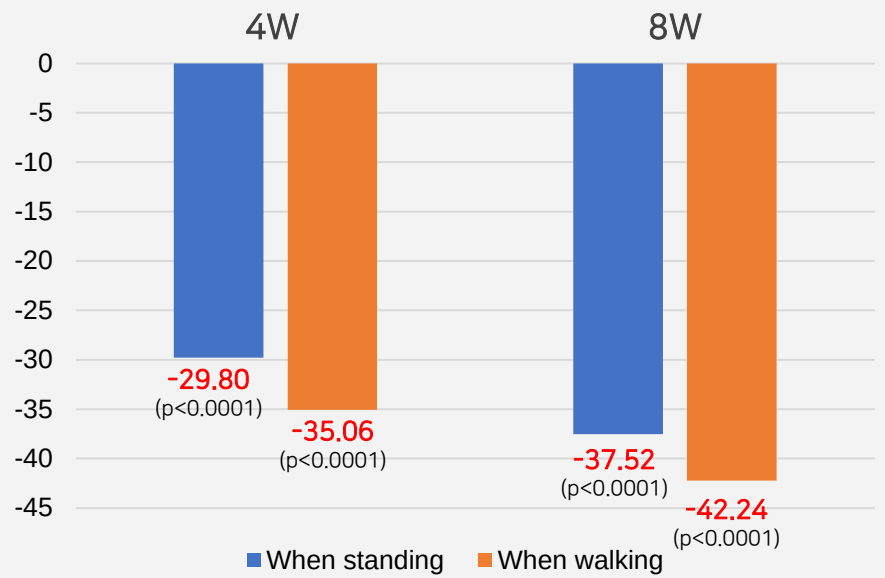
Source:

1) KC. K. et al. Clinical Pain.vol.20,No. 2,2021
2) OV_MEST_Confirmatory_Clinical_Study_Report

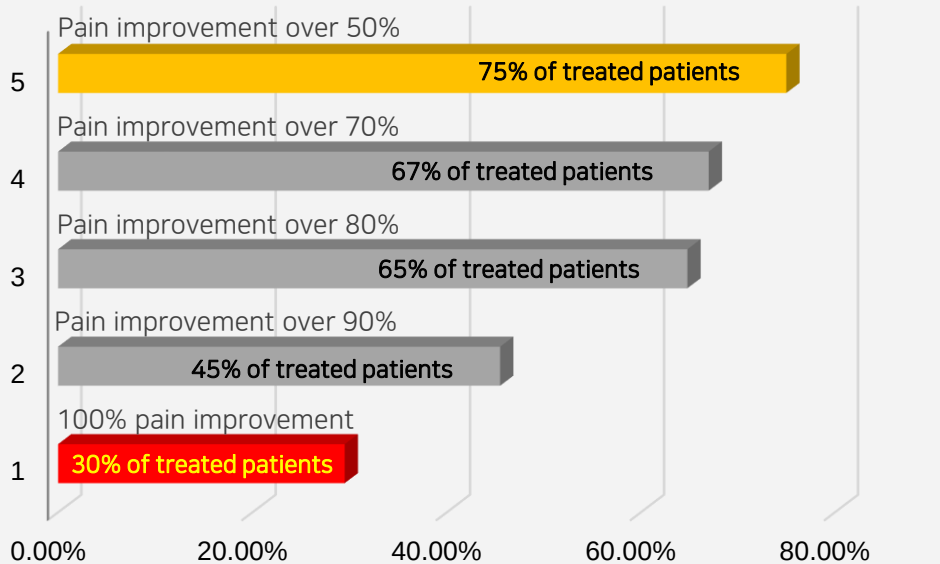
MEST Clinical Trial_Pain Relief (MEST Treatment Group)

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Pain Score Change (vs. Baseline)



Sectional Pain Score Change (vs. Baseline) 8 Weeks



Conclusion

Improvement confirmed in pain indicators both while standing and while walking

100% pain improvement at 8 weeks in 30% of treated patients

* This analysis result is a simple comparison of descriptive statistics

Source:

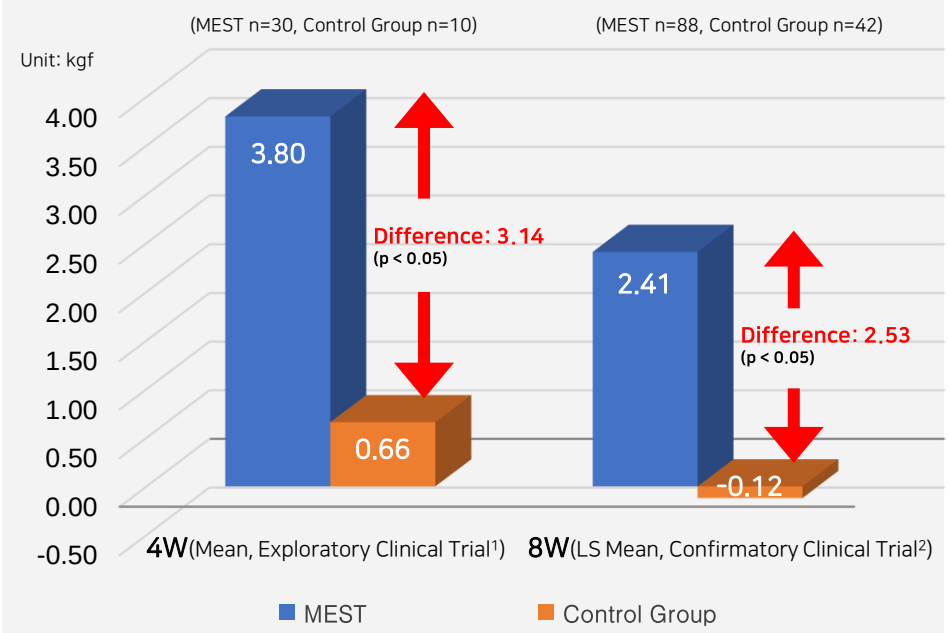
OV_MEST_Confirmatory_Clinical_Study_Report

MEST Clinical Trial_Muscle Strength Improvement

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Maximum Voluntary Isometric Contraction

Muscle Strength Improvement Indicator[1,2] (vs. Control Group)



Muscle Strength Improvement Indicator Maintenance[3] (vs. Baseline)



Conclusion

Improvement of **3.14 kgf** at 4 weeks (exploratory) and **2.53 kgf** at 8 weeks (confirmatory) compared to control group after treatment

Muscle strength improvement and maintenance up to 4 weeks, 8 weeks, and 1 year compared to baseline after treatment

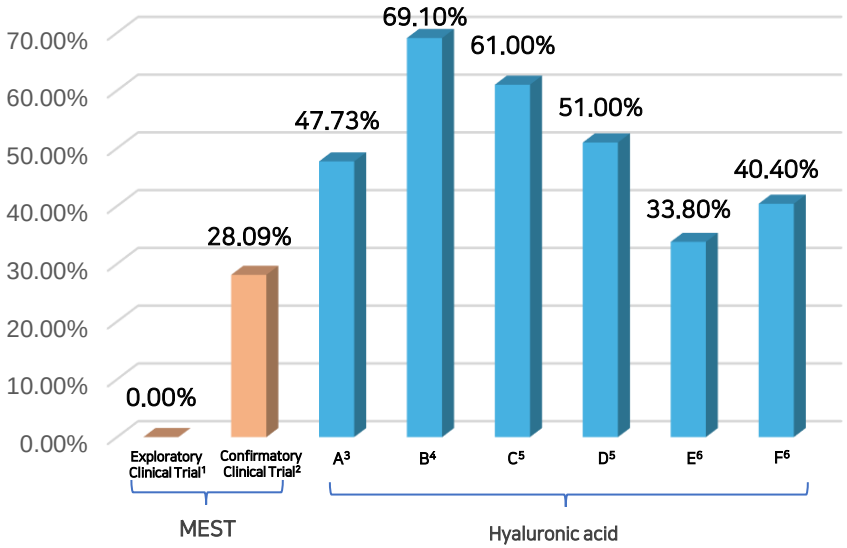
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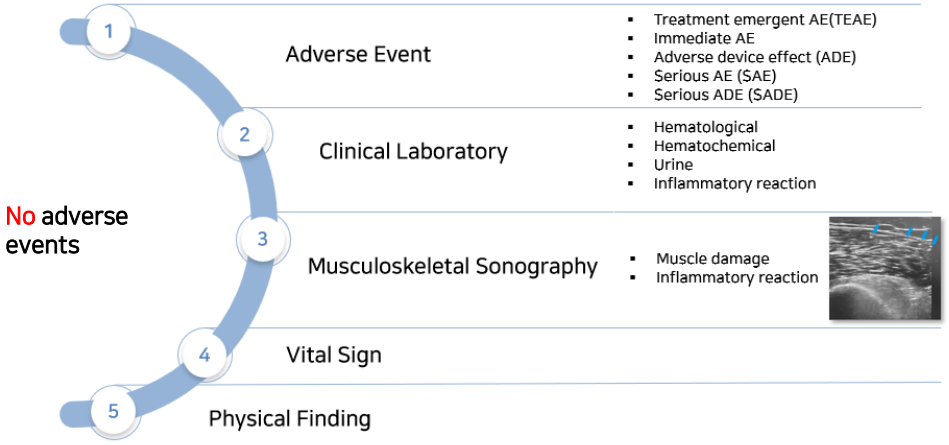
1) KC. K. et al. Clinical Pain.vol.20,No. 2,2021
2) OV_MEST_Confirmatory_Clinical_Study_Report
3) OV_MEST_Confirmatory_Clinical_Study_Report + 1yr follow up data

MEST Clinical Trial_Safety

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Incidence Rate of Adverse Events





*Safety set analysis of total 40 subjects

Confirmatory Clinical Trial Safety Results

- ✓ Incidence rate of adverse events in the treatment group: 28.09%
- ✓ Incidence rate of adverse device effects in the treatment group: 8.99%: **All mild (recovered or recovering)**
- ✓ Serious adverse device effects/serious adverse events: None

Exploratory Clinical Trial Safety Results

- ✓ Safety indicators confirmed through ultrasound examination, clinical laboratory tests, vital signs, etc.
- ✓ Safety confirmed with no adverse events up to 30 weeks after MEST procedure

* Specific criteria for subjects may vary, and this is a simple comparison of descriptive statistics through an indirect comparison method for each product

Source:

1) Clinical Pain 2021 Dec:20(2):105-121
2) OV_MEST_Confirmatory_Clinical_Study_Report
3) Clinical Therapeutics vol 43,No 11,2021
4) Osteoarthritis and Cartilage 20 (2012) 350e356
5) Rheumatology 2002;41:1240–1248
6) OsteoArthritis and Cartilage (2006) 14, 154e162

Clinical Pain 2021 Dec:20(2):105-121

MEST Mechanism

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1 Muscle micro-damage and stimulation

2 Muscle regeneration: Satellite cells (REGENERATION)

- Recovery of muscle size and volume
- Increase in muscle fiber thickness
- Muscle remodeling: IGF-1, macrophages, collagen

3 Muscle strengthening - Pain relief

- Muscle Strength correlates with pain : Stronger muscle, less pain

4 Joint biomechanics improvement - Pain relief

- Inserted filament cogs → Holding weakened muscle fibers together (muscle fixation and support) → Mechanical Tension → Distribution and reduction of load on knee joint → Reduction of intra-articular damage → Pain relief

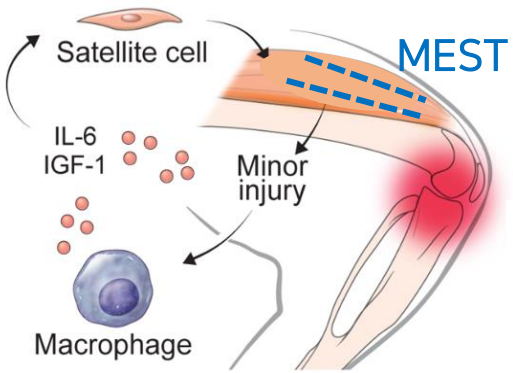
5 Pain relief

- Muscle fixation/support + Muscle strengthening and improved muscle strength (shock absorption) → Reduction of joint load and repetitive inflammation → Alleviation of the sensitization of peripheral nociceptive nerves
- Reduction of chronic joint pain → Alleviation of the sensitization of central nociceptive nerves

MEST Animal Test_Muscle Regeneration (Micro-damage & Muscle Stimuli)

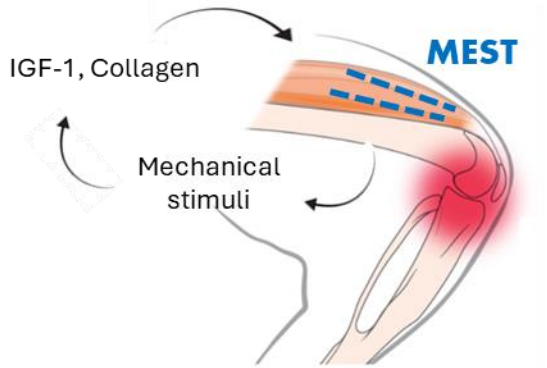
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Injury and over-recovery

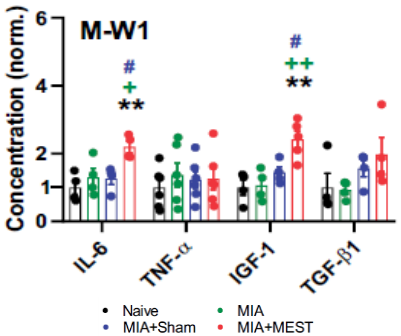


Mechano-transduction

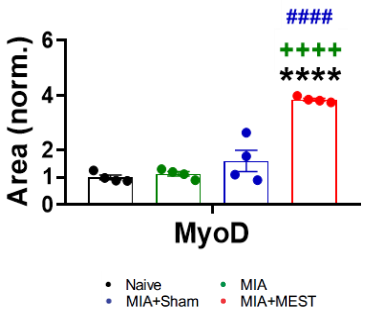
(mechanical pressure → chemical signal)



Increase in satellite cell activating substances



Increase in satellite cells (muscle regeneration)



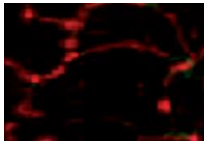


Fig.1. MIA

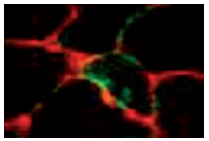


Fig.2. MIA+MEST

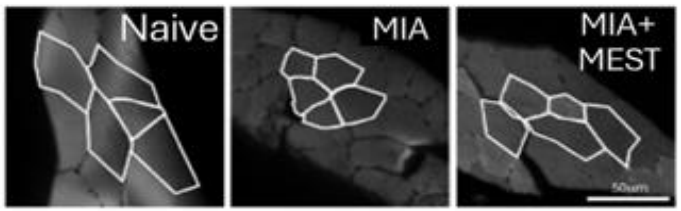
Source:

1) Appl. Sci. 2021, 11, 10534.
2) Regenerative Biomaterials, 2024, 11, rbae077

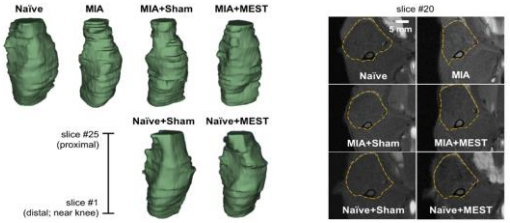
MEST Animal Test_Muscle Regeneration (Muscle Recovery & Strength Enhancement)

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Increase in muscle fiber thickness



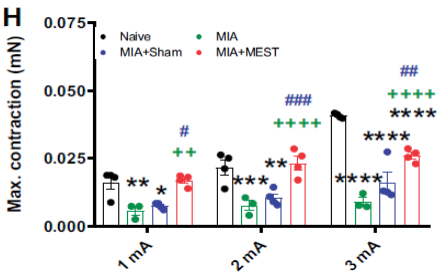
Increase in muscle size



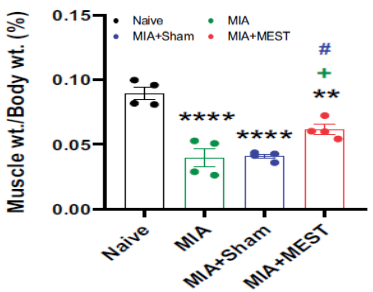
"Muscle Regeneration"

(Not Fibrosis)

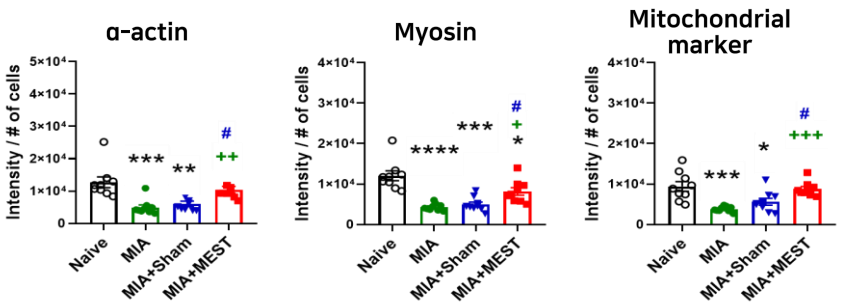
Increase in muscle contractile force



Increase in muscle weight



Increase in muscle components



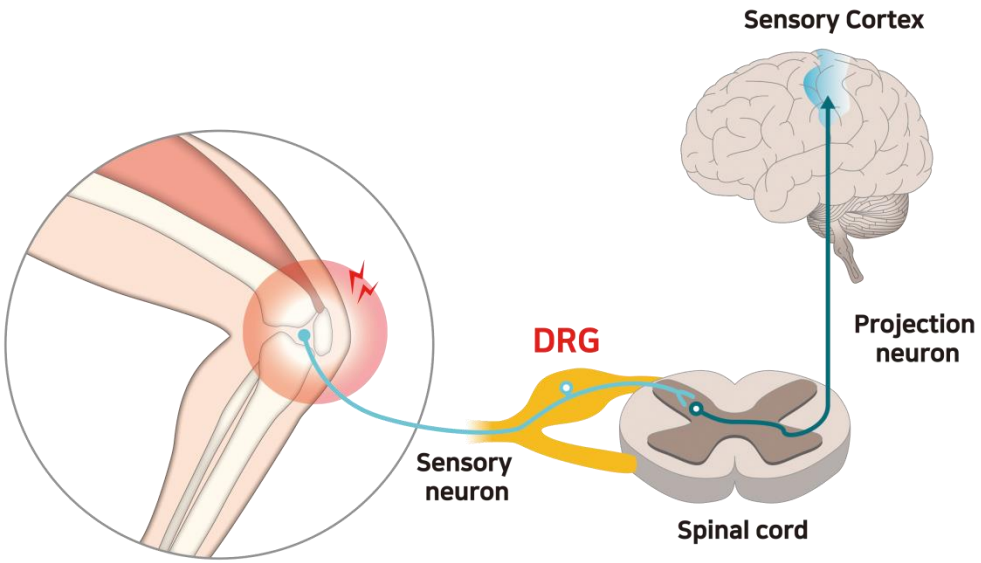
Source:

1) Appl. Sci. 2021, 11, 10534.
2) Regenerative Biomaterials, 2024, 11, rbae077
3) MEST Animal Test Results Report

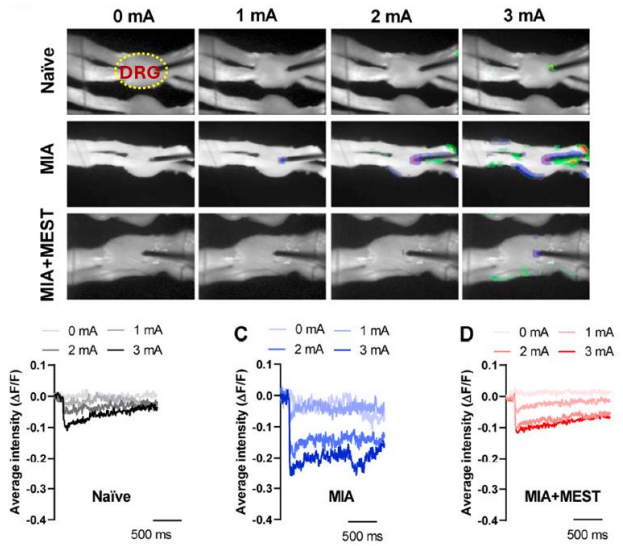
MEST Animal Test_Pain Relief

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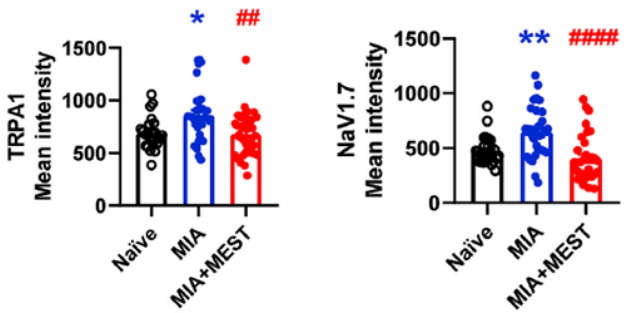
Alleviation of sensitization in sensitized nociceptive cells after MEST treatment in a chronic pain state



Alleviation of DRG pain sensitization



Alleviation of pain receptor overexpression



Source:

Biochemical and Biophysical Research Communications 698 (2024) 149549

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