Advancing the science and evidence

DTM™ SCS endurance therapy:
3-month clinical results and preclinical understanding
Institute into DTM™ waveform variations

DTM™ SCS therapy has shown superior back pain relief to traditional SCS. DTM™ SCS was inspired from preclinical research demonstrating that different target multiplexed signals can differentially modulate neurons and glial cells to balance interactions perturbed by neuropathic pain. Expanding on the foundational DTM™ research, DTM™ SCS endurance therapy is an energy modified variation designed to offer additional treatment options to personalize care for more patients. Here, we summarize results presented at recent conferences.

DTM™ SCS endurance therapy clinical results

**Purpose**
To evaluate the long-term efficacy and energy use of DTM™ SCS endurance therapy.

**Design**
On-label, prospective, multicenter, single arm, de novo study with 3-, 6-, and 12-month follow-up.

- Characterize therapies and study parameters associated with energy use
- Characterize changes in functional disability as measured by Oswestry Disability Index (ODI)
- Characterize patient satisfaction
- Characterize therapy safety data

**Patient Population**
- Patients with chronic intractable overall pain (≥6) and moderate to severe back or leg pain (≥6)

**Sample size**
- 35 subjects implanted with a rechargeable device
- 32 subjects with 3-month follow-up (per protocol)

**Results**
- Successful in trial: 88% trial success rate (≥50% success)
- Meaningful pain relief: Patients were able to achieve a 3.9 reduction in VAS for overall pain from baseline to 3 months (Figure 1)
- Therapy satisfaction: 75% of patients were very satisfied or somewhat satisfied with DTM™ SCS endurance therapy
- Quality of life improvements: 63% of patients had minimal to moderate disability at 3 months compared to only 16% at baseline (Figure 2)
- The frequency, type, seriousness, and severity of adverse events demonstrated a risk profile in line with the commercial product

**Contents**
- 12 sites in the United States

**Figure 1**
Meaningful pain relief achieved at 3 months

**Figure 2**
Changes in Oswestry Disability Index (n = 32)

**Figure 3**
Validated longevity estimates for Vanta™ recharge-free INS at 3 months (n = 32)

**Figure 4**
Mechanical hypersensitivity

**Long-lasting recharge-free**
- Therapy offers 5½–7½ years of longevity on Vanta™ INS based on real programming data (Figure 3)
- Exceeds longevity expectations of +4 years

**Rapid recharge**
- 5-minute daily recharge on Intellis™ INS
- Recharge less often – about 1 hour every 12 days

**Preclinical data**

**Objective**
To compare reduced energy differential target multiplexed programming (DTMP) with low-rate programming in rodents after a spared nerve injury (SNI).

**Methods**
- General: Excluding the naïve group, the rodents underwent SNI surgery.
- SCS: At 5 days post-surgery, DTMP E1, DTMP E2, or LR spinal cord stimulation (SCS) was delivered continuously for 48 hours.

**Behavior**
- Pain-related responses to mechanical (von Frey filaments) stimuli were collected preinjury and at 48 hours of stimulation.

**Genetic analysis**
- After the behavioral measures, the spinal cord (dorsal quadrant ipsilateral to injury) was removed for genetic analysis. RNA sequencing was used to determine changes in gene expression as a result of injury (No-SCS vs. Naïve) and as a result of SCS (SCS vs. No-SCS). Bioinformatics tools (Weighted Gene Co-expression Network Analysis [WGCNA] and Gene Ontology Enrichment Analysis [GOEA]) were used to analyze the results. WGCNA ranks the gene expression patterns into modules and then normalizes each module to an eigengene; whereas GOEA groups genes into modules based on relevant biological processes.

**Results**

**Behavioral studies**
- All three therapies (DTMP E1, DTMP2, LR) significantly reduced mechanical hypersensitivity (p < 0.001 vs. No SCS), although DTMP E1 and DTMP E2 provided a statistically significant improvement compared to LR (p < 0.05 vs. LR SCS) (Figure 4).

**Figure 4**
Mechanical hypersensitivity

<table>
<thead>
<tr>
<th>Group</th>
<th>N (%)</th>
<th>Pre-SCS</th>
<th>Baseline</th>
<th>24h SCS</th>
<th>48h SCS</th>
<th>3-day Post SCS</th>
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</tbody>
</table>

**Data labels:** LR: low-rate stimulation; DTMP E1 and DTMP E2: DTM™ derivatives

**Conclusions**
- DTMP derivatives showed statistically significant reversal of pain behaviors when compared low-rate SCS stimulation in mechanical sensitivity testing
- DTMP derivatives modulated neuro-inflammatory processes more than low-rate SCS
- DTMP derivatives showed statistically significant reversal of gene expression in glial cells toward the naïve state compared to low-rate stimulation

**Note:** Data obtained from animal studies should not be extrapolated to clinical/human results.
References:
7. Compared to average daily recharge of ~1 hour every day on higher dose therapies.