

Study Reference	Initial Sample Size	Animal Source	Housing Conditions
Viggiano,A et al.(2011)	Total: 15 rats Group 1: 5 rats (O ₂ evaluation) Group 2: 5 rats (H ₂ O ₂ evaluation) Group 3: 5 rats (SOD activity)	Not specified	• Temperature: 22±1°C;• Humidity: 70%;• Light-dark cycle: 12h/12h (7:00-19:00);• Caging: Paired housing;• Enrichment: Not specified
Grinberg,Y.Y et al.(2012)	Not specified	Charles River, Wilmington, MA, USA	Slice Culture Conditions:-Media: Serum-free neurobasal-based formula (detailed composition provided); Incubation: Standard lab conditions (37°C, 5% CO ₂); Maintenance:Electrophysiological validation of slice viability
Grinberg,Y.Y et al.(2013)	Total Live Pups: ~120 (12 dams × 10 pups/litter) Experimental Unit (Slice Cultures): Varies per experiment (e.g., Fig 4c: Control n=37slices, TNFα n=10slices)	Charles River (Wilmington, MA, USA)	• Temp/Humidity/Light Cycle/Pup Housing: Not specified; • Cage Type (Dams): Single-housed with Enviro-dri® paper bedding & Nestlets
Shatillo,A et al.(2013)	CSD experiments: Total animals: 11 Groups: CSD group (n=6), Sham control (n=5) Electrophysiology: n=4–6 hemiskull preparations	CSD experiments: National Laboratory Animal Center, University of Eastern Finland	Compliance with EU Directive 86/609/EEC (temperature/humidity/light cycle details Not specified)
Malkov,A et al.(2014)	In vitro: 40 slices (from multiple mice) In vivo: 5 mice	Not specified	Surgical: Isoflurane anesthesia In vivo: Heating pad (37°C)
Pusic,K.M et al.(2014)	Initial: EE= 12, NE= 12	Charles River Laboratories	EE: Group-housed in Marlau-style cages with running wheels and dynamic mazes (changed 3x/week) NE: Single-housed standard conditions Temperature/Humidity/Light Cycle: Not specified
Pusic,A.D et al.(2015a)	Pregnant females: 12 rats (10 pups/litter); In vivo groups: n = 3–4 animals/group	Charles River Laboratories	Pregnant rats: Single-housed with Enviro-dri paper bedding & Nestlets; Postnatal: Standard lab conditions (details Not specified)
Pusic,A.D et al.(2015b)	- In vitro (slices): n=3–17/group (e.g., Fig 1F control n=17) - In vivo: n=2–6/group (e.g., Fig 5D n=2–3)	Charles River Laboratories	- In vivo: Not specified (only prenatal dams described) - In vitro slices: 36°C, 95% humidity, 5% CO ₂ - Bedding: Enviro-dri + Nestlets (for dams)
Pusic,K.M et al.(2019)	1. Hippocampal slices: n=8/group 2. In vivo SD: Sham n=3, Unstim n=3, IFNy n=5 3. Protein carbonyl: Sham n=7, IFNy n=5	Charles River Laboratories	1. Standard housing (unspecified temp/humidity/light cycle);2. Bedding: Enviro-dri paper;3. Nesting: Nestlets;4. Adults: Double-housed; 5. Surgical: 37°C + 95-100% O ₂
Jiang, L et al.(2019)	Rats: 30;Mice: 36 Group Details (Based on Experimental Design): In Vivo Rat Study (i.c.v.perfusion & CSD): Anti-TRPA1 Ab group: n=10;Anti-IgG Ab (CSD control): n=8;Anti-IgG Ab (Sham control): n=7 IHC: Rats: n=3;Mice: n=3 In Vitro Mouse Study (Brain Slice): Series 1: Multiple groups (n=6-8 per group) ;Series 2: Multiple groups (n=6 per group)	Shanghai SLAC Laboratory Animal Corporation Ltd.	Temperature, humidity, light cycle, cage type, enrichment measures Not specified in the text.
Won,L et al.(2020)	Total n=90; Biological replicates: 5-8/group (Subject to the detection indicators)	Charles River Laboratories	• Static micro isolator cages;• Corn cob bedding;• Enviro-dri + nestlets;• 12h light-dark cycle ;• Controlled humidity/temperature
Araújo,A.D.O et al.(2023)	Total: 40 rats Per Group: 10 rats (4 groups: Intact, Vehicle, MLT-10, MLT-40)	Sigma Aldrich	Temperature: 23°C ± 1°C Light Cycle: 12-h light/dark (lights on at 7 PM) Cage Type: Polypropylene (51 × 35.5 × 18.5 cm) Enrichment: Standard bedding; no specific enrichment mentioned
Ackermann,M.A et al.(2024)	Total: 65 mice (typically 3–4 slices per brain)	Bred and maintained at the central animal facility of University Medical Center Göttingen	- Regular diet: V1124-0 (SSNIFF) - AO-enriched diet: 250 mg/kg α-lipoic acid, 2.5 g/kg NAC, 125 mg/kg vitamin E

Study Reference	Group Design	Final Sample Size	Intervention	Control Groups	Time Points	Ethical Approval (YES/POR)
Viggiano, A. et al. (2011)	Group 1: O ₂ evaluation via DHE fluorescence (n=5); Group 2: H ₂ O ₂ evaluation via microdialysis/HPLC (n=5); Group 3: SOD activity via histochemistry (n=5)	n=5 per group (Total N=15 rats)	Type: Chemical CSD induction Dose: 3M KCl (saturated filter paper) Duration: 20-min continuous application Route: Topical on exposed cortex	Type: Internal control (contralateral hemisphere) Matching: Same animal, homologous cortical region	Baseline: 2h pre-intervention stabilization Post-CSD: O ₂ /SOD at 1h post-KCl; H ₂ O ₂ at 0-15/15-30/30-45/45-60 min intervals	Yes (Ethical approval number: Not mentioned)
Grimberg, Y.Y. et al. (2012)	Control, Acute IGF-1 (15-30 min), 3-day IGF-1, 7-day IGF-1, Insulin (400 µg/mL), Ascorbate (2 mM), H ₂ O ₂ (50/200 µM), Menadione (50 µmol/L), IGF-1 + Ascorbate/H ₂ O ₂ co-treatment	Fig1d: Control n=6, Acute IGF-1 n=7; Fig1e: Control n=8, 3-day IGF-1 n=7; Fig3c: Control n=14, IGF-1 n=16, IGF-1+50µM H ₂ O ₂ n=5, IGF-1+200µM H ₂ O ₂ n=9; Statistical range: n=3-18/group	- Type: IGF-1 (40 ng/mL or 100 ng/mL), Insulin (400 µg/mL), Ascorbate (2 mM), H ₂ O ₂ (50/200 µM), Menadione (50 µmol/L) - Duration: Acute (15-30 min), 3 days, 7 days (phasic: day IGF-1/light normal media) - Route: Serum-free media supplementation	Sham controls: "sham control cultures only experienced normal media" (matched by same-day culture)	- SD induction: 6 times/hour for OS experiments - OS measurement: 24h post-SD - Bursting recording: During baseline (unstimulated)	Yes (Ethical approval number: Not mentioned)
Grimberg, Y.Y. et al. (2013)	1. Cell-specific OS: Sham vs SD (Fig2); 2. IGF-1 effect: SD vs SD+IGF-1 (Fig3); 3. TNF-α effect: Control vs TNF-α vs TNF-α+IGF-1 (Fig4b); 4. SD threshold: Baseline vs Post-SD ± tTNFR1 (Fig4d,e)	- Fig2 (OS): n=3-4 slices/group; - Fig4a (TNF-α): n=3-4 slices; - Fig4c (Threshold): Control n=37 (pooled), TNF-α n=10; C5- Fig4d (Post-SD): n=13-17	- IGF-1: 100 ng/mL (≈13.2 nM), 3d pretreatment, media - TNF-α: 100 ng/mL, 24h (OS) or 3d (threshold), media - tTNFR1: 200 ng/mL, 3d post-SD, media	1. Sham: Half-maximal stimulation 2. Untreated: No additives 3. Fixative control: No LPS (Fig1c) 4. Antibody/isolectin control: Omit primary antibody or isolectin	- OS/TNF-α: 24h/6h post-SD - SD threshold: Baseline & 3d post-SD - Microglial movement: 24h post-SD	Yes (Ethical approval number: Not mentioned)
Shatillo, A. et al. (2013)	Experimental group: KCl-induced CSD (n=6); Control group: Sham surgery + saline application (n=5)	- CSD group: n=6 rats (LFP/MDA); Sham control: n=5 rats; Ex vivo hemisect; n=4-6 preparations; CGRP assay; Not mentioned (cultured DRG neurons)	Intervention - Agent: 1M KCl - Volume: 5µl - Timing: After 5-min baseline recording - Site: Dura mater via cranial window	- Type: Sham + saline - Matching: Identical surgery and sampling procedures	- Tissue sampling: Post-CSD (after 1-h recording) - H ₂ O ₂ stimulation: Peak effect at 12 min - CGRP assay: 15-min exposure	Yes (Ethical approval number: Not mentioned)
Malkov, A. et al. (2014)	1. Glucose-ACSF (control); 2. Pyruvate-ACSF; 3. Pyruvate-ACSF + IOA; 4. Pyruvate-ACSF + Tempol; 5. In vivo KCl (baseline); 6. In vivo KCl + Tempol	- In vitro: Glucose-ACSF: 43 slices; Pyruvate-ACSF: 40 slices (14/40 showed MC); Pyruvate+IOA: 17 slices (9 elec. stim. + 8 spont.); Pyruvate+Tempol: 11 slices - In vivo: 5 mice (self-controlled design)	- Tempol: - In vitro: 2 mM perfusion - In vivo: 1 M (0.4 µl ICV + topical 5 µl under KCl cotton) - IOA: Glycolysis inhibitor (conc. NR) - Stimulation: 100 Hz/1s (electrical) or 10 Hz/5s (glutamate puff)	- Glucose-ACSF (energy substrate control) - Pre-intervention baseline (in vivo self-control)	- In vitro: Pre-stim baseline → Stimulation (sec) → Recovery (20-30 min) - In vivo: CSD counts over 1 hr	Yes (No. 30-03102012)
Pusic, K.M. et al. (2014)	1. EE group: 12 male Wistar rats group-housed in Marfa-style enriched cages (running wheel + changed maze 3x/week) for 35 days; 2. NE group: 12 age-matched rats single-housed under standard conditions; 3. Intranasal IL-11 group: 1mg recombinant rat IL-11/4. Sham group: Sodium succinate buffer	- EE/NE electrophysiology: n=5-6; EE/NE biochemistry: n=3; Slice culture microglia ablation: n=8-12/group; In vitro IL-11: n=8; Intranasal IL-11: n=5 (electrophysiology), n=3 (biochemistry) microglia quantification n=9/group	- EE: Multilayer cage (58×88×65cm), running wheel + 6 maze variations changed 3x/week × 35d - In vitro: 2 mM perfusion - Drugs: In vitro IL-11 (100ng/mL × 3d); Minocycline (10µg/mL acute); Intranasal IL-11 (1mg/50µl over 20min via alternating nostrils)	- NE: Standard single housing - IL-11 Sham: Sodium succinate buffer - In vitro: Untreated + vehicle controls (Not mentioned)	- Post-EE: 35 days - Post-intranasal IL-11: 24hr - In vitro: Treatments: IL-11 (3d), Minocycline (acute)	Yes (Ethical approval number: Not mentioned)
Pusic, A.D. et al. (2015a)	In vitro: Hippocampal slice cultures from P9-P10 Wistar rat pups (either sex), maintained for 21–35 days in vitro (DIV). In vivo: Male Wistar rats (300–400 g). SD induced via electrical stimulation (slices: 1000 µA current) or KCl microinjection (neocortex). Slice vitality ≥95% (Sytox assay).	- Fig 1B: Control (n=14), SD 1d (n=5), SD 3d (n=4), SD 7d (n=18); - Fig 1E: Control (n=3 slices), SD 1d (n=3), SD 7d (n=3); - Fig 2C: Control (n=5), IFNγ (n=5); - Fig 2K: Control (n=12), IFNγ (n=9); - Fig 3C: Control (n=9), GW4869 (n=8), GW4869+SD (n=3), GW4869+IFNγ (n=5); - Fig 4D/E/N/Q: n=3–4 animals/group.	- SD in slices: 6 SDs via 1000 µA current (10 pulses, 10 Hz) every 7–9 min over 1 h. - IFNγ: 500 U/mL × 12–24 h (non-toxic per Sytox). - Anti-CD4: 10 µg/mL × 3 days (clone OX-38). - GW4869: 10 µM × 1 h pre-treatment + maintained. - In vivo SD: 6 neocortical SDs via KCl.	- Slices: Age-matched cultures with sham recording (evoked field potentials); In vivo: Contralateral neocortex (no SD); Antibody control: Mouse IgG2a isotype (#MG2a00).	- Acute: OS (3–7 h post-IFNγ). - Short-term: MBP loss (1d post-SD/IFNγ). - Recovery: MBP (3d/7d post-SD). - In vivo: All endpoints at 1d post-SD.	Yes (Ethical approval number: Not mentioned)
Pusic, A.D. et al. (2015b)	In vitro: (1) Untreated control; (2) Phasic IFNγ (500 U/mL, 12h/day + 7d); (3) Pulsed IFNγ (single 12h IFNγ); (4) Exosomes from IFNγ-stimulated slice cultures; (5) Exosomes from IFNγ-stimulated microglia; In vivo: (6) Sham (nasal buffer); (7) Nasal IFNγ (50,000 U single dose).	Representative examples - Phasic IFNγ MBP: n=6 (Fig 1A); - Pulsed IFNγ OS: n=11–17 (Fig 1F); - Exosome-treated SDT: n=8 (Fig 2D); - Nasal IFNγ FluoroMyelin: n=3–6 (Fig 5A); Note: n varies per experiment; values from figure legends.	Type: Recombinant rat IFNγ (R&D Systems) or exosomes. Dose: 500 U/mL (in vitro); 50,000 U (nasal, scaled from in vitro). Time: 12h pulses (in vitro); single dose (nasal). Route: Culture media (in vitro); nasal instillation (in vivo).	In vitro: Age-matched untreated slice cultures; In vivo: Nasal sodium succinate buffer; Matching: Identical age (e.g., slices at 21–35 DIV) and handling procedures.	In vitro: 3d & 7d post-IFNγ; 7d post-exosomes. In vivo: 1d & 3d post-nasal IFNγ. Rationale: Maximal effects at 7d (stated in Results).	Yes (Ethical approval number: Not mentioned)
Pusic, K.M. et al. (2019)	In vitro: Control (Untreated slices, n=8); - IFNγ-DC-Exos (100 µg, n=8) In vivo (SD threshold): Sham (Sodium succinate vehicle, n=3–5); - Unstim-DC-Exos (n=3–5); - IFNγ-DC-Exos (100 µg, n=3–5) In vivo (Oxidative stress): Sham (Vehicle, n=7); - IFNγ-DC-Exos (n=5)	- Slice cultures: Control (n=8), IFNγ-DC-Exos (n=8); - In vivo SD: Sham (n=3–5), Unstim-DC-Exos (n=3–5), IFNγ-DC-Exos (n=3–5); - Protein carbonyl: Sham (n=7), IFNγ-DC-Exos (n=5)	Type: IFNγ-stimulated dendritic cell exosomes (IFNγ-DC-Exos); Dose: 100 µg Time: Slice cultures: 3 days incubation; In vivo: Single dose, measured 1 day (SD) or 3 days (ROS) post-administration Route: Slice cultures: Added to culture media; In vivo: Intranasal (5 µL/2 min per nostril, total 50 µL over 20 min)	Types: Negative control: Untreated slices/rats or vehicle (sodium succinate); Activity control: Unstim-DC-Exos (in vivo SD) Matching: All controls age-matched; Slice cultures: Matched DIV (21–35 days)	- SD threshold: - Slice cultures: 3 days post-treatment - In vivo: 1 day post-administration - Oxidative stress: 3 days post-administration - Gene expression: 1 day post-administration	Yes (Ethical approval number: Not mentioned)
Jiang, L. et al. (2019)	In vivo (rat): Anti-TRPA1 Ab (i, n=10); Anti-IgG Ab (ii, n=8); Sham (iii, n=7) In vitro (mouse slice): Series 1: Krebs (i, n=6); Tempol 3mM (ii, n=7); H ₂ O ₂ 50µM (iii, n=7); Tempol + H ₂ O ₂ (iv, n=7); Tempol + UMB 15µM (v, n=6); H ₂ O ₂ + A967079 1µM (vi, n=6); Series 2: Anti-IgG Ab 0.025µM (xii, n=6); Anti-CGRP Ab 0.4µM (xii, n=6); Anti-CGRP Ab + AITC 50µM (xi, n=6); Anti-CGRP Ab + H ₂ O ₂ 50µM (x, n=6)	Rat: Anti-TRPA1 Ab: n=10; Anti-IgG Ab: n=8 Sham: n=7; Mouse slice: Series 1: n=6 7/group; Series 2: n=6/group; Contradiction: Total rats=29 ≠ Group sum=25 (10+8+7)	Type: Antibodies (anti-TRPA1, anti-CGRP), drugs (Tempol, H ₂ O ₂ , UMB, A967079, AITC) Dose: Anti-TRPA1 Ab: 0.8µg total; H ₂ O ₂ : 50µM Time: Antibody: 4 days pre-CSD (rat); Drugs: 30–45 min pre-incubation (mouse) Route: i.c.v. perfusion (rat); Slice perfusion (mouse)	Type: Active control: Anti-IgG Ab; Sham: No KCl induction; Matching: Same antibody dose (0.8µg); Identical surgical procedures	- MDA: Immediately after CSD induction - CSD: During 30-min KCl induction (rat) / Post-drug incubation (mouse slice)	Yes (Ethical approval number: Not mentioned)
Won, L. et al. (2020)	1. Recurrent SD + IGF-1 pretreatment 2. Recurrent SD + Vehicle (succinate buffer) pretreatment 3. Sham (0.5M NaCl injection) + Vehicle 4. Naive animals (no SD) for baseline CGRP measurement	TG MDA/CGRP: n=5/group (Fig 1E,H) TCC c-fos: n=5-7/group (Fig 1K); Blood glucose: n=8/group (0h), n=4/group (other times); Naive CGRP: n=7/group (Fig 5)	Type: Human recombinant IGF-1 (R&D Systems #191-G1) Dose: 150 µg Time: 24 hrs before SD induction Route: Intranasal (50µl total, 5µl/alternating nostril every 2 min under isoflurane anesthesia)	1. Vehicle control: 50µl succinate buffer (identical volume/route); 2. Sham control: 0.5M NaCl microinjection instead of KCl; 3. Procedure control: Naive animals without surgery/SD	- Blood glucose: 0h (pre-IGF-1), 0.3h, 1h, 3h, 6h, 24h - Tissue harvest: After 90-min SD protocol (immediately post-SD)	Yes (Ethical approval number: Not mentioned)
Araújo, A.D.O. et al. (2023)	- Intact group: Not mentioned - Vehicle group: Saline + 5% ethanol solution - MLT-10 group: 10 mg/kg melatonin - MLT-40 group: 40 mg/kg melatonin	n = 10 per group (total 40 male rats)	Type: Melatonin (Sigma Aldrich); Dose: 10 mg/kg or 40 mg/kg; Time: Every other day from PND7–27 (11 administrations total); Route: Intraperitoneal injection Vehicle: 0.1 mL saline + 5% ethanol	Type: Dual controls (untreated + vehicle) (pups from 3–5 distinct litters per group)	Body weight: PND7, 14, 21, 28 Glycemia: PND27 (4h pre- & post-MLT) Behavior: PND30 (OF-anxiety), PND31 (position memory), PND32 (shape memory), PND34 (EPM) CSD: PND36–42 MDA/SOD: After CSD recording on PND36–42	Yes (approval protocol no. 0006/2020)
Ackermann, M.A. et al. (2024)	- Normoxic SD: K ⁺ microinjection (3M KCl) - Hypoxic SD (HSD): O ₂ withdrawal + 2mM Na ₂ SO ₃ - Chemically-induced SD: FCCP (2µM mitochondrial uncoupler) - Subgroups: Ca ²⁺ -free ACSF, DPI (20µM), allopurinol (200µM), AO-enriched diet	Total mice: 65 (explicitly stated)	- K ⁺ -SD: 3M KCl microinjection (1.5s, 0.25bar, stratum radiatum) - HSD: ACSF saturated with 95% N ₂ /5% CO ₂ + 2mM Na ₂ SO ₃ + FCCP-SD: 2µM in ACSF; Drug pretreatment: 15min (e.g., DPI)	- Wild-type slices: Autofluorescence control (Fig 1H); Solvent control: 0.2% DMSO (Fig 1G); Baseline control: Pre-treatment period for each slice	- Baseline: ≥90min post-slice recovery - SD quantification: At ΔV, nadir or 300s post-onset (if no peak) - Long-term: fEPSP recorded every 30s	Yes (Ethical approval number: Not mentioned)

Study Reference	CSD Induction Method + Site	Inducer Parameters	Induction Timepoint	Anesthesia (Type + Monitoring)	Model Success Rate + Exclusion Criteria	Model Validation
Viggiano A et al. (2011)	Chemical induction by continuous application of 3M KCl-soaked paper on cortical surface (0 mm anterior to lambda, 4 mm lateral to midline)	3M KCl solution (confirmed no contralateral CSD induction); 20-min continuous application on the exposed cortical surface	20 min continuous application	Pentobarbital (50 mg/kg, i.p.); Depth monitored by stable EEG/DC potential recording	Success: ≥6±2 CSD waves in treated cortex; Exclusion: Absence of CSD waves on EEG/DC recording	• EEG amplitude decrease + slow DC depolarization waves (8±2 mV amplitude, 2.3±0.4 min duration) • Contralateral cortex shows stable DC and normal EEG
Grinberg, Y.Y et al. (2012)	Electrical stimulation of dentate gyrus to induce SD in CA3 region of rat hippocampal slice cultures.	• Stimulus: 10 pulses at 10 Hz (100 μs/pulse) • Current: Incrementally increased (start: half-maximal field potential current; max: 10,000 nC) • Current adjustment interval: 1-2 minutes (current doubled and re-applied if inducer parameters) • Pulses: 10 × 100 μs pulses, frequency 10 Hz • Intensity: Initial current = half-maximal field potential-eliciting current, doubled gradually (reapplied after 1–2 min if SD)	SD induced after: • Acute agent exposure (15–30 min pre-test) • 3-day/7-day pretreatment • 30 min post-oxidant exposure (e.g., H ₂ O ₂)	Not mentioned (in vitro model)	Inclusion: CA3 field postsynaptic potential ≥3	• SD confirmed by depolarization waves (Fig 1b-c) • OS quantified via CellROX™ in CA3 (Fig 2) • Hyperexcitability graded: 1(normal)-3(SD) (Fig 4a)
Grinberg, Y.Y et al. (2013)	Electrical stimulation at dentate gyrus; recording at CA3 pyramidal layer.	Inducer Parameters • Pulses: 10 × 100 μs pulses, frequency 10 Hz • Intensity: Initial current = half-maximal field potential-eliciting current, doubled gradually (reapplied after 1–2 min if SD)	Experiments at 21–35 days in vitro (post-culture) • Total SD induction duration: 6 SDs completed within 1 hour	N/A (In vitro model)	Slices discarded if field potentials <3 mV (10–20 μA stimuli)	1. ↑ OS (CellROX™/protein carbonyls; Fig. 1d) 2. ↑ TNF-α (Fig. 4a) 3. ↓ SD threshold post-SD (Fig. 4d)
Shatilo, A et al. (2013)	Local application of 1 M KCl (5 μl) through cranial window to intact dura mater over right visual cortex.	1 M KCl solution, volume: 5 μl.	Applied after 5 min of baseline recording (LFP/fMRI).	Surgery: Isoflurane (4% induction, 2% maintenance) Recording: Urethane (1.25 g/kg i.p.) administered after 15-min recovery from isoflurane (to avoid cortical/subcortical function interference)	Success: 100% (6/6 KCl-treated rats showed CSD); Exclusion: Sham controls (saline, n=5) excluded from CSD group analysis.	Imaging: BOLD fMRI mapped CSD propagation toward trigeminal ganglia (Fig 1D) Electrophysiology: LFP quantified wave features (amplitude 31.2±6.2 mV, duration 48.7±6.4 s); H ₂ O ₂ -induced trigeminal nerve firing (blocked by TRPA1 antagonist TCS-5861528) Biochemical: ○ Ipsilateral cortex/meninges & bilateral
Malkov A et al. (2014)	Focal topical application of 3 mol/L KCl via cotton ball on pial surface	Parieto-occipital cortex (stereotaxic coordinates: posterior 3.8 mm, lateral 2 mm from bregma)	• KCl concentration: 3 mol/L • Application volume: < 50 μL per cotton ball • Replacement interval: Every 30 min	After surgical stabilization (craniotomy + electrode implantation + saline coverage)	• Type: Ketamine/Xylazine cocktail (Ket-Xyl-PB = 6:1:20, 10 mL/kg i.p.) • Depth monitoring: Not mentioned	100% acute induction (5/5 mice exhibited recurrent CSD)
Pusic, K.M et al. (2014)	• In vitro (hippocampal slices): - Trans-synaptic induction: Bipolar stimulating electrode at dentate gyrus, DC recording electrode in CA3 stratum pyramidale - Chemical induction: KCl-agar wand (1M) applied to dentate gyrus • In vivo (whole animal): - KCl microinjection into neocortex via craniotomy (-2.0 mm posterior to Bregma, 1.5 mm lateral to sagittal suture)	• Electrical stimulation: - 10 pulses at 10 Hz (100 μs/pulse) - Starting current: 50% of maximal field potential-eliciting current; - Incremental increase per trial (3-min intervals) • KCl application (in vitro): 1M KCl in 3.5% agar; - 1-2 sec contact duration; KCl application (in vivo): - 0.5M KCl solution • Pressure injection (Picospritzer-II system); - Volume calibrated via oil displacement measurement; - Injection duration doubled every 4-5 min until SD triggered	• In vitro treatments (minocycline/IL-11/conditioned media): 3 days post-treatment (to allow protein synthesis-dependent effects) • Environmental enrichment (EE): After 35 days of EE exposure • Intranasal IL-11 administration: 24 hours post-administration (to match peak effect)	Slice preparation: Progressive anesthesia with 100% CO ₂ , followed by decapitation; In vivo surgery/recording - Isoflurane (5% induction, 3% during surgery, 2-3% during recording) - Volitional breathing - Depth confirmation: Absence of paw pinch withdrawal reflex; - Continuous arterial oxygen monitoring (95-100% saturation)	• Viability standard: Sytox staining exclusion of cultures with dead neurons in stratum pyramidale • Inclusion criteria: Field EPSP amplitude >3 mV in CA3 region • Exclusion criteria: - Cultures treated with penicillin/streptomycin (induces seizures) • Oxygen concentration >20% in recording chamber (induces seizures); - Cultures showing bursting/seizure activity upon stimulation	• SD confirmation: Characteristic DC potential shift with concomitant suppression of spontaneous neuronal activity • Microglia ablation: - >95% reduction in Iba1+ cells (immunohistochemistry); - No change in NeuN/GFAP/CNPase staining; - SD susceptibility restored by adding exogenous microglia (rescue experiment); - Polarization state: Immunohistochemistry (CD32 for M1, Arg-1 for M2a); - RT-qPCR with >2-fold change threshold for significance (e.g., iNOS ⁺ , TGFβ1, IL-10)
Pusic, A.D et al. (2015a)	In Vitro (Hippocampal Slice Cultures) • Electrical stimulation: 10 pulses/10 Hz (100 μs/pulse) • Site: CA3 pyramidal neuron interstitial area (pen of the CA3 interstitial pyramidal neuron area) In Vivo (Neocortex) • Chemical induction: Pressure microinjection of KCl (0.5 M) • Site: Neocortex (6.0 mm caudal to Bregma, 4.5 mm lateral to sagittal suture, 750 μm below pial surface)	In Vitro (Hippocampal Slice Cultures) • Current: 1000 μA (threshold-calibrated) • Pulse width: 100 μs In Vivo (Neocortex) • KCl volume: 2–3 μl baseline volume (baseline calculated via oil-displacement microscopy; value Not mentioned)	In Vitro (Hippocampal Slice Cultures) • Cultures aged 21–35 days (in vitro) In Vivo (Neocortex) • Adult male Wistar rats (300–400 g)	In Vitro (Hippocampal Slice Cultures) • Not mentioned (ex vivo tissue) In Vivo (Neocortex) • Isoflurane concentrations: - Induction: 5%; - Surgery: 3%; - Recording: 2–3%; Core temperature maintenance: 37°C ("kept warm with an overhead infrared lamp") • Depth monitoring: No physiological metrics (e.g., respiratory rate, reflexes) beyond gas concentration control.	In Vitro (Hippocampal Slice Cultures): Inclusion: CA3 field postsynaptic potential ≥3 mV (5–20 μA stimulation) + slice vitality ≥95% (Sytox staining); Method described as "highly reproducible"; No additional explicit exclusion criteria In Vivo (Neocortex): Not mentioned (no success rate criteria or quantitative exclusion data provided in text)	Electrophysiology: • DC potential shift (Fig 1A) • 6 SDs induced within 1 hour; Structural/Molecular: • MBP loss (Western blot, Fig 1B) • Myelin ultrastructural disruption (EM, Fig 1D); Oxidative stress (CellROX) + glutathione level (ThioTracker) detection (in vitro); In Vivo (Neocortex); Electrophysiology: • DC potential shift (Fig 4A); Functional/Cellular: • Increased nMase activity (Fig 4E); • T-cell infiltration (Fig 4N); • Reduced MBP immunostaining (Fig 4G,K) Protein carbonylation quantification (OS readout)
Pusic, A.D et al. (2015b)	- In vitro: Bipolar electrical stimulation at dentate gyrus (hippocampal slice cultures) - In vivo: Focal KCl microinjection in neocortex (750 μm below pial surface)	- Electrical: Stimulus protocol: 10 pulses at 10 Hz (100 μs/pulse), initial current based on half-maximal field potential, max 10,000 nC - Chemical: 0.5 M KCl, pressure injection via Picospritzer-II, volume calibrated post-hoc in oil	- In vitro: 3 or 7 days post-treatment (7 days for maximal effect) - In vivo: SDT measured at 1 day post-nasal IFNγ ("myelin markers at 1/3 days)	- In vivo: Isoflurane (5% induction, 1.5–3% maintenance in oxygen), core temperature 37°C (thermoregulator + IR lamp), no depth monitoring device described	Inclusion Criteria (in vitro): CA3 field postsynaptic potential ≥3 mV (5–20 μA stimulation) + slice vitality >95% (SYTOX staining) Exclusion Criteria (in vitro): Slices with >5% dead cells (SYTOX staining) SD Failure Definition: Threshold set to 10,000 nC if no SD evoked	Primary: Transient negative DC shift recorded by 2–4 μm tip microelectrode (CA3 in vivo neocortex) Secondary: Myelin markers: MBP (Western blot, in vitro) + FluoroMyelin staining (in vivo) Oxidative stress: Reduced protein carbonyls (Abcam kit #ab12687, in vivo) • CellROX Deep Red detection (in vitro)
Pusic, K.M et al. (2019)	In vitro: Hippocampal slice cultures - Bipolar electrical stimulation electrode positioned in slice DC recording in CA3 stratum pyramidale. In vivo: Rats - KCl microinjection at anterior craniotomy site: -2.0 mm from bregma, 1.5 mm left of sagittal suture. Recording at posterior site: -6.0 mm from bregma, 4.5 mm lateral, 750 μm below pial surface.	In vitro: Electrical Stimulus: 10 pulses, 10 Hz, 100 μs/pulse. Intensity started at half-maximal field potential and increased stepwise. In vivo: 0.5 M KCl solution. Pressure ejection via Picospritzer-II. Injection duration doubled every 4–5 min until SD triggered. Volume estimated by injection into oil.	In vitro (Slice Treatment): SD threshold measured 3 days after exosome application to culture media In vivo (Rat Treatment): SD threshold measured 1 day after intranasal administration of exosomes/vehicle.	In vivo recordings: Isoflurane in O ₂ (5% induction; 2-3% maintenance during recording). Depth monitored by: 1. Pulse oximetry (SpO ₂ , 95–100%); 2. Respiratory rate/depth; 3. Animal color; 4. Absence of withdrawal to hind paw pinch	Slice Cultures: Excluded if any Sytox-positive (dead) pyramidal cells observed. Specific induction success rate Not mentioned. In vivo: No explicit exclusion criteria or success rate provided for SD induction. All reported data are from successfully induced SD events.	1. Theoretical Basis: SD established as model for migraine aura/headache (Introduction, Page 1). 2. Consistency: Low, stable SD threshold in controls (Sham: 1.00 ± 0.14; Fig 1B). 3. Responsiveness: IFN-γ-DC-Exos induced >12-fold (in vitro) and 57-fold (in vivo) threshold increase (Fig 1A, B). 4. Mechanistic Plausibility: Reduced oxidative stress (iNOS ⁺ , carbonyls); Fig 2 aligns with known SD pathophysiology.
Jiang, L et al. (2019)	In vivo (rat): • K ⁺ application on parietal cerebral cortex • Coordinates: 5 mm posterior and 2 mm lateral to bregma with dura intact In vitro (mouse): • KCl ejection in somatosensory region of coronal brain slices	In vivo: • 2 M KCl, continuous perfusion for 30 min In vitro: • Submaximal CSD: 50 mM KCl (Series 1) • Full CSD: 260 mM KCl (Series 2)	In vivo: • Day 4 after antibody i.c.v. perfusion In vitro: • Submaximal CSD: 45-min interval between episodes • Full CSD: 2-h interval between episodes	In vivo: • Isoflurane (5% in O ₂ :N ₂ O (1:2)); Depth monitored via EEG, respiration, body reflexes In vitro: • Not mentioned (brain slices)	In vitro: Implicit exclusion criteria: Brain slices with poor viability or abnormal CSD signal (not explicitly stated but implied by experimental design); No explicit success rate provided In vivo: Not mentioned (no explicit success rate or exclusion criteria provided in text)	Electrophysiology: • Transient negative DC shifts (in vivo); Optical imaging: • IOS changes reflect cellular depolarization; • Quantified by gray level variations Biochemical: • MDA elevation post-CSD (p<0.001); Immunohistochemistry: • TRPA1 in cortical neurons & astrocytes (Figs 1–2)
Won, L et al. (2020)	Microinjection of 0.5M KCl into rostral neocortex (3 mm anterior to bregma, 2 mm lateral to midline)	- Concentration: 0.5M KCl - Volume: <10 nl (threshold, P3); 10–30 nl (actual operation, P11) - Frequency: Every 9–10 min - Total Events: 8–9 SDs over 90 min	SD induction performed 24 hours after intranasal IGF-1/vehicle pretreatment	- Type: Isoflurane (5% induction → 3% surgery → 1.5% SD recording) - Monitoring: D12-SpO ₂ : 95–100 mmHg (pulse oximeter); Temp: 37±0.5°C (rectal probe); Depth: Absence of hind paw pinch withdrawal + stable respiration + pink extremities	- Success Rate: 100% (7–9 SDs/animal confirmed by DC shift); Exclusion Criteria: Not mentioned (all animals included in analysis)	- Electrophysiology: DC shift (~10 mV negative, ~1 min duration, Fig 2) Biomarkers: • 1639% MDA in TG • 1395% CGRP in TG; • 1183% c-Fos in TCC at -4.5 mm from obex (vs. sham, *p<0.001);
Araújo, A.D.O et al. (2023)	Chemical stimulation: Topical application of 2% KCl on the exposed frontal cortical surface of the right hemisphere.	Solution: 2% KCl (~270 mM); Application: Cotton ball (1–2 mm diameter) applied for 1 min. Interval: Repeated every 20 min during the 4-hour recording session	Applied every 20 min during a 4-hour electrophysiological recording session (PND 36–42).	Type: Urethane (1 g/kg) + Chloralose (40 mg/kg), intraperitoneal injection. Depth Monitoring: Rectal temperature maintained at 37±1°C; animals breathed spontaneously.	Success Rate: 10–12 CSD episodes recorded per rat (n=10/group). Exclusion Criteria: Not mentioned, but likely excluded if CSD wave propagation failed or signal quality was poor.	Validation Method: Quantified CSD propagation velocity, amplitude, and duration. Key Evidence: Significant dose-dependent changes - Velocity: MLT-10: 2.86±0.14 mm/min vs. MLT-40: 3.96±0.16 mm/min (*p<0.01); Amplitude/Duration: Differential effects (Fig 5C,D).
Ackermann, M.A et al. (2024)	- K ⁺ microinjection: Stratum radiatum (~100 μm next to recording site in hippocampus) - O ₂ withdrawal: Whole slice (conditioning ACSF with 95% N ₂ /5% CO ₂ + 2 mM Na ₂ SO ₄) - Mitochondrial uncoupling: FCCP (2 μM) in ACSF	• Stimulus: 10 pulses at 10 Hz (100 μs/pulse) • Current: Incrementally increased (start: half-maximal field	- Hypoxia-induced SD: 3.96 ± 0.97 min after hypoxia onset - FCCP-induced SD: 7.0 ± 2.7 min after FCCP application - K ⁺ -induced SD: 3–7 s after microinjection	Decapitation under deep anesthesia (isoflurane or methoxyflurane). No depth monitoring described.	- Success rate: Not mentioned; Exclusion: Outlier slices via ROUT test (Q=1%) based on poor optical/electrophysiological data	Core marker: Negative DC shift (ΔV, amplitude: -3.5 to -4.6 mV, Table 1); noGFP oxidation (cytosolic/mitochondrial) Functional recovery: Reversible fEPSP suppression in K ⁺ -SD (Fig 3B) vs. irreversible in hypoxia-SD (Fig 3A) Redox dynamics: Oxidation wavefront propagation (2.11–2.61 mm/min for K ⁺ /hypoxia/FCCP-SD, Fig 2G) Specific validation: ○ noGFP calibration

Study Reference	CSD measurement details	ROS indicators	Detection Sites	Time Points	Standardization
Viggiano A et al (2011)	- Induction: Topical application of 3M KCl on cortical surface for 20 min; Sampling: Continuous EEG/DC recording; Microdialysis at 15-min intervals; Mean CSD waves: 6±2; Amplitude: 8±2 mV; Duration: 2.3±0.4 min	1. Superoxide; - Method: DHE oxidation to HEt fluorescence; Function: Direct O ₂ detection;2. Hydrogen Peroxide (H ₂ O ₂); - Method: Microdialysis + HPLC (2,3-DHBA derivatization); Function: Direct H ₂ O ₂ detection;3. SOD Activity; - Method: Cerium-DAB histochemistry; Function: Antioxidant enzyme activity	- Cerebral cortex (layers I-IV) - Ipsilateral (KCl-treated) vs. Contralateral side companion - Layer IV specified for O ₂ imaging	- All endpoints: 1h post-CSD induction; - H ₂ O ₂ : Dynamic monitoring (0-60 min post-KCl in 15-min bins); - O ₂ : SOD; Terminal measurement at 60 min	Internal Controls: Contralateral cortex for O ₂ & SOD; Pre-CSD basal H ₂ O ₂ level: 9.1±3.6 µM;Methods: Image analysis: Uniform thresholding (LabVIEW software);- SOD quantification: ROD = log ₁₀ (256/gray level);- Statistical: Paired t-test (ipsilateral vs. contralateral);- Sample size: n=5 per group
Grinberg Y.Y et al (2012)	Stimulus protocol: 10 pulses, 10 Hz (100 µs/pulse) Threshold determination: Progressive current increase (start: half-maximal fEPSP current); Sampling rate: ≥2 Hz (inferred from 1 Hz high-pass filter)	- Primary ROS probe: CellROX™ Deep Red Reagent (fixable fluorogenic probe, near-infrared fluorescence); -OS assessment method: Menadione challenge (50 µmol/L, 1 hour)	Electrophysiology: CA3 pyramidal neuron layer (genu of CA3); ROS measurement: Uniform CA3 area (1.70 mm² at 10× magnification)	IGF-1 exposure: Acute (15-30 min), 3-day, 7-day (phasic: day/night cycle); OS measurement: 24 hours post-SD	Inter-experiment control: Sham control data normalized to 1.0; Imaging calibration: Acridine orange (125 µmol/L, 480/527 nm); Statistical baseline: Same-day sham/control cultures Exclusion criteria: fEPSP <3 mV (at 10-20 µA stimulus)
Grinberg Y.Y et al (2013)	- Stimulation: 10x100 µs pulses at 10 Hz, ~1000 µA - Frequency: 6 SDO/hour (every 7.9 min); - Baseline sampling: 50.2 Hz; - SD continuous sampling rate: Not mentioned	- Primary: CellROX™ Deep Red; Targets: Superoxide, OH•, ONOO•; weak Not mentioned; - Validation: Protein carbonyl quantification	- Region: Hippocampal CA3; - Cells: Neurons (NeuN), astrocytes (GFAP), oligodendrocytes (RIP), microglia (isolectin GS-IB4)	- OS: 24h post-SD; - TNF-α: 6h post-SD; - SD threshold: Baseline + 3d post-SD	- Viability: Sytox Green (21 DIV); - Controls: Antibody/lectin omission; - Thresholding: Equal for sham/SD; - Normalization: OS/TNF-α: Sham/1.0; - TNF-α: Total protein (MicroBCA)
Shatilo A et al (2013)	- Sampling rate: 50 kHz (spike recording); - fMRI TR: 2 s (1800 volumes in 1 h); - Induction: 5 µl of 1 M KCl applied to dura mater; - CSD wave duration: 46.7 ± 4.8 s (fEPSP); - Total recording duration: 1 h	- Primary marker: Malondialdehyde (MDA); - Function: Lipid peroxidation end-product; - Detection method: TBARS assay; - Standard curve range: 0–100 µM (tetramethoxypropane)	- Cortex (ipsilateral, fMRI-mapped); - Meninges (dura mater) - Bilateral trigeminal ganglia; - Functional tests: Isolated hemisul (trigeminal nerves)	- Biochemical sampling: After 1-h CSD recording + cardiac perfusion; - Stimulation duration: 15 min (H ₂ O ₂ /capsaicin for CGRP release)	- Protein normalization: µmol MDA/mg protein (BioRad assay, Lowry method) - Controls: Sham surgery (saline instead of KCl) + contralateral tissues - Baseline electrical activity: Pre-stimulus spike rate - Baseline CGRP: Unstimulated neurons (25±5.9 pg/ml) - Spike detection criteria: Duration 0.3–3 ms, amplitude >4 SD
Malkov A et al (2014)	Induction: Topical 3M KCl on parieto-occipital cortex; Recording: DC field potentials via ACSF-filled glass microelectrode (depth 0.5 mm) in frontal cortex; Sampling rate: ≥100 Hz (implied by 0.1 Hz high-pass filtering); Quantification: CSD event frequency (events/hour); KCl replacement: every 30 minutes	CellROX® Orange (5 µmol/L); Function: General cytoplasmic ROS sensor; Detection: Fluorescence intensity (ex 548 nm / em 632 nm LP); Loading: 45 min incubation with 0.05% pluronic acid	Hippocampal slices (stratum pyramidal/granular, 350 µm thickness); In vivo: Parieto-occipital cortex (KCl application), frontal cortex (recording), lateral ventricle (Tempol injection coordinates: 0.7 mm posterior to bregma, 1 mm lateral)	Baseline: Pre-stimulation after 2 hr ACSF recovery; ROS baseline: ≥45 min post-dye loading; Post-stimulus: 0-30 min (reversible MC) or >30 min (irreversible MC); Irreversible MC proportion: 50% of cases	ROS: ΔF/F% = [(F-F ₀)/F ₀] × 100 (F ₀ : 2,000–3,000 intensity units); O ₂ : Two-point calibration at 33°C (95% O ₂ solution = 714 Torr; ambient air = 155 Torr); K: Pre-experiment calibration (±2 mV/decade sensitivity)
Puac K.M et al (2014)	- Sampling rate: Not mentioned (Digidata 1322A ADC board used; typical capability 250 kHz) - Stimulation: - Synaptic: 10 pulses at 10 Hz (100 µs/pulse) - KCl: 1M KCl-agar ward (1–2 s contact) - Recording: Interstitial DC potentials	CellROX Deep Red; General oxidative stress probe (fluorogenic) - ThioTracker: Reduced thiols (primarily glutathione) - Protein carbonyl content: Spectrophotometric assay (ROS-mediated protein damage) - iNOS mRNA: RT-PCR (M1 marker, produces RNS)	- Location: - Electrophysiology/ROS: CA3 stratum pyramidal - Protein carbonyl: Neocortex (whole animal)	- Time points: - Baseline: Untreated controls - Post-treatment: Clofazone, 7 days - IL-1β/Minoxidil: 3 days; Post-SD: Immediate (electrophysiology), 2h (CellROX + menadione)	- Immunostaining - Quantification: Fixed thresholding via MetaMorph v7.5.4.0 - RT-PCR: Endogenous control Rpl13a (delta-delta Ct method) - Protein carbonyl: Normalized to total protein (BCA assay) - ROS imaging: Identical CA3 region, standardized optical intensity
Puac A.D et al (2015a)	Stimulation: 10 pulses at 10 Hz (100 µs/pulse), 1000 µA current Recording system: Axoprobe A1 + Digidata 1440A	CellROX Deep Red (fluorogenic OS probe) Protein carbonyl content (Abcam kit #ab126287) ThioTracker (reduced thiols/GSH probe)	In vitro: CA3 pyramidal neuron layer In vivo: Paramedian neocortex (gray matter) & Lateral corpus callosum (white)	SD effects: 1, 3, 7 days post-SD; Acute OS: 1h after iFNy + CellROX incubation; T cell iFNy in vivo: 1 day post-SD	Western blot: β-actin/qPCR: Ribosomal protein L13a (Rpl13a)/IHC Quantification: Integrated optical density; aMase2 Activity: Unit/mg protein; In vivo control: Contralateral neocortex
Puac A.D et al (2015b)	Stimulation Protocol: - In vitro: 10 pulses at 10 Hz (100 µs/pulse), current from 10 to 10,000 nC - In vivo: KCl microinjection (0.5 M, 8–12 µm tip) Recording Method: DC potential shift recorded via 2–4 µm microelectrode (750 µm depth) Threshold Definition: Minimal charge (nC) to induce SD in CA3 pyramidal layer; 10,000 nC set as max threshold	1. CellROX Deep Red; Total ROS (co-incubated with nucleoside 8.6 µg/mL); 2. Protein Carbonyls (Abcam #ab12687); Oxidized proteins: 3. ThioTracker; Total reduced thiols (mainly GSH)	In Vitro: Hippocampal slice cultures: Standardized CA3 stratum pyramidal area Exosome Source: Microglia (confirmed by isolectin GS-IB4 staining)	- iFNy effects: 3 & 7 days post-treatment (optimal at 7d); - Exosome effects: 3h (OS) & 7d (MBP/SDT/GSH); - Nasal iFNy: 1 & 3 days	- Age-matched untreated cultures; - Sham nasal administration (succinate buffer); - Exosomes from unstimulated microglia; - qPCR: ΔΔCt with Rpl13a; - FluoroMyelin intensity: Integrated optical density; - Protein quantification: β-actin for WB; qPCR significance: Fold-change >2; ANOVA with Holm-Sidak post hoc; Power (1-β) >0.8
Puac K.M et al (2019)	- Stimulation protocol: 10 pulses at 10 Hz (100 µs/pulse) starting at half-maximal field potential current, increased every 3 min - Sampling rate: Not mentioned (Digidata 1423A used)	- Protein carbonyl: Direct marker of protein oxidation (measured by DNPH assay); - iNOS mRNA: Marker of M1 microglial polarization (indirect ROS source via Not mentioned)	- In vitro: Hippocampal slice cultures (CA region) - In vivo: Neocortex (SD threshold & protein carbonyl); Whole brain (iNOS mRNA)	- SD threshold (in vitro): 3 days post-exosome treatment; - SD threshold (in vivo): 1 day post-nasal administration; - iNOS mRNA: 1 day post-administration; - Protein carbonyl: 3 days post-administration	- Protein carbonyl: Quantified by BCA assay with streptozotocin pre-treatment (remove nucleic acids); - RT-qPCR: Normalized to Rpl13a using ΔCt method; - Electrophysiology: Threshold values normalized to sham group = 1.0
Jiang L et al (2019)	Sampling rate: 10 Hz (EEG & DC potentials); CSD parameters: latency, magnitude (AUC), number of waves	Malondialdehyde (MDA)	Ipsilateral cerebral cortex (rat); Somatosensory cortex layers 4–6 (mouse)	Immediately after CSD induction (rat MDA); 45-min interval between CSD episodes (mouse)	Total protein normalization (BCA kit) for MDA; Baseline normalization: 2nd vs 1st CSD in slices
Woon L et al (2020)	Induction: 0.5 M KCl microinjection (8–30 nL, 20 psi, every 9–10 min) - Recording: Extracellular DC shift via micropipette (4 µm tip) - Sampling rate: Not specified (equipment: Axoprobe A1 amplifier + Axon 1440A ADC)	Malondialdehyde (MDA) - Function: Lipid peroxidation end product (sole oxidative stress marker quantified)	1. Trigeminal ganglion (V1 ophthalmic division) 2. Trigeminooculocardiac complex (laminæ I–II, ~4.5 mm from obex) 3. Blood plasma (CGRP only)	Immediately after last SD (90-min induction protocol)	- Paired processing: Sham/experimental sections stained together; - Image analysis: Fixed camera gain/threshold, integrated optical intensity - Normalization: Natural log-ratios (Exp/Sham) - Internal control: Sham-operated animals (no housekeeping protein)
Araujo A.D.O et al (2023)	Velocity: Calculated from time for CSD wave to propagate between two parietal electrodes - Amplitude/Duration: Measured from negative component of DC slow potential shift - Stimulus: 2% KCl applied topically to frontal cortex (1 min every 20 min) - Recording: Ag-AgCl-Agar-Ringer electrodes at parietal cortex	- MDA: Malondialdehyde (lipid peroxidation marker; nmol/mg protein) - SOD: Superoxide dismutase (antioxidant enzyme activity; U SOD min ⁻¹ /mg protein)	- Behavior: Open field (80cm diameter) & elevated plus maze (49x10cm arms) - Electrophysiology: Frontal cortex (stimulus), Parietal cortex (recording) - Biochemistry: Cerebral cortex tissue homogenate	- MLT administration: PND7-27 (alternate days; 11 doses); - Behavioral tests: PND30-34; - CSD recording: PND36-42; - Biochemistry: Immediately post-CSD (PND36-42)	- Biochemistry: BCA protein assay (MDA/SOD per mg protein); - Behavior: ANY-maze™ video tracking software (v4.99m); - CSD velocity: Fixed inter-electrode distance (implicit spatial normalization)
Ackermann M.A et al (2024)	- Sampling rate: - DC potential: 100 Hz - fEPSPs: 20 kHz - Electrode: Glass microelectrode (~5 MΩ) in CA1 stratum radiatum	- Name: roGFP1 (cytosolic/mitochondrial) - Function: - Excitation-ratiometric (395 nm/475 nm) - Reversible redox reporter	- Primary: CA1 stratum pyramidal (some layer) - ROI size: ~20x40 µm (multi-neuron level)	Baseline Stabilization: ≥15 min in oxygenated ACSF; Drug Pre-treatment: 15 min (e.g. DPI, allopurinol); Optical Sampling: Standard: Every 10 s (0.1 Hz); Validation: Every 3 s (0.33 Hz) SD Onset Definition: ΔCt <0 = Negative DC deflection (ΔVΔs/Vs) - Oxidation Analysis: At peak oxidation OR 300 s post-SD onset; Wash-out Start: Hypoxia/FCCP: 3 min post-SD; K ⁺ -SD: After ΔVΔs recovery; H ₂ O ₂ /DTT Calibration: 7 min exposure (each)	- Calibration: E14 Full oxidation: 5 mM H ₂ O ₂ (7 min); - Full reduction: 10 mM DTT (7 min) - Controls: - Autofluorescence: 25× lower vs. roGFP (Fig. 1H); - DMSO: ≤ 0.2% (no redox effect) F5; Illumination: 1,000 cycles (ΔOΔ = 2.43±2.44%)

Study Reference	CSD Results	ROS Results	CSD-ROS correlation	Correlation Coefficient
Viggiano A et al. (2011)	Number of CSD waves: 6±2; Mean amplitude of CSD waves: 8±2 mV; Mean duration of CSD waves: 2.3±0.4 min. No CSD waves were observed in the contralateral cortex, with stable DC potential and normal EEG activity maintained.	1. Superoxide anion (O ₂ ⁻): The concentration of O ₂ ⁻ in the ipsilateral cerebral cortex was significantly decreased at 1 h after CSD induction (compared with the contralateral side: number of O ₂ ⁻ positive neurons, t=2.73, P<0.05; above-threshold proportional area of fluorescence, t=2.79, P<0.05). 2. Hydrogen peroxide (H ₂ O ₂): The basal level of H ₂ O ₂ was 9.1±3.6 μM. The H ₂ O ₂ level in the ipsilateral cortex increased significantly at 15 min after KCl application for CSD induction and remained elevated up to 60 min post-induction. Repeated measures ANOVA revealed significant effects of time [F(4,50)=10.3, P<0.01], treatment [F(1,50)=27.99, P<0.01], and time × treatment interaction [F(4,50)=8.22, P<0.01], with no obvious changes in the contralateral cortex. 3. Superoxide dismutase (SOD) activity: SOD activity in the ipsilateral cerebral cortex was significantly increased at 1 h after CSD induction (compared with the contralateral side, t=7.43, P<0.01).	N/A	Not mentioned
Grinberg, Y.Y et al. (2012)	Acute IGF-1: 24-fold ↑ vs control (p=0.001) 3-day IGF-1: 75-fold ↑ (p<0.001) 7-day IGF-1: 22-fold ↑ (p<0.001)	Acute IGF-1: 20% ↓ in SD-induced OS vs SD-only 3-day IGF-1: 30% ↓ 7-day IGF-1: 73% ↓ (p<0.001 vs SD-only)	Not statistically tested Indirect evidence: H ₂ O ₂ ↓ SD threshold, Ascorbate ↑ SD threshold, IGF-1 reverses oxidant effects	Not mentioned
Shatilo A et al. (2013)	Number of CSD waves: 3.8 ± 1.6 per animal (mean ± SEM) Duration of CSD: 46.7 ± 6.4 s (mean ± SEM) Amplitude of CSD: 31.2 ± 6.2 mV (mean ± SEM) Latency to first wave: 114.2 ± 60.8 s (mean ± SEM) Inter-wave interval: 427.6 ± 302.8 s (mean ± SEM)	Cortical MDA (ipsilateral): Significantly elevated vs. contralateral/sham Meningeal MDA (ipsilateral): Significantly elevated vs. contralateral/sham Trigeminal ganglia MDA: Bilateral elevation vs. sham controls	Not mentioned	Not mentioned
Grinberg, Y.Y et al. (2013)	-TNF-α effect: Control: 1.00 ± 0.10; TNF-α: 0.52 ± 0.03 (p=0.002) -SD self-priming: Baseline: 1.00 ± 0.10; Post-SD: 0.15 ± 0.03 (p=0.001; p<0.001)	-Astrocytes (SD vs. Sham): Sham: 1.00 ± 0.28; SD: 7.55 ± 1.70 (p=0.019; p=0.019); -Astrocytes (SD + IGF-1): SD: 1.00 ± 0.11; SD+IGF-1: 0.85 ± 0.28 (p=0.65; p=0.65); -Microglia (SD vs. Sham): Sham: 1.00 ± 0.22; SD: 16.27 ± 1.34 (p=0.018; p=0.018); -Microglia (SD + IGF-1): SD: 1.00 ± 0.24; SD+IGF-1: 0.08 ± 0.02 (p=0.018; p=0.018); -Microglia (TNF-α effect): Control: 1.00 ± 0.19; TNF-α: 18.25 ± 6.22 (p=0.005; p=0.005); -Microglia (TNF-α + IGF-1): TNF-α+IGF-1: 1.92 ± 0.49 (vs. TNF-α alone)	-TNF-α protein after SD: Sham: 1.00 ± 0.04; SD: 1.62 ± 0.20; SD+IGF-1: 0.71 ± 0.13 (p=0.01; p=0.01); -Microglial OS + sTNFR1SD: 1.00 ± 0.27; SD+sTNFR1: 0.13 ± 0.03 (p=0.036; p=0.036); -SD threshold + sTNFR1SD control: 1.00 ± 0.10; SD+sTNFR1: 345 ± 29 (p<0.001; p<0.001); -Oxidized proteins (SD): Sham: 1.00 ± 0.08; SD: 1.38 ± 0.17 (p=0.039; p=0.039); -Oligodendrocyte OS: No significant change (p=0.96; p=0.96)	Not mentioned
Malkov A et al. (2014)	KCl-induced SD frequency: Control: 0.68 events/min Tempot: 0.14 events/min	ROS transient amplitude: Pyruvate-ACSF: 0.80 ± 0.19% ΔF/F; Glucose-ACSF: 0.30 ± 0.07% ΔF/F	Not mentioned	Not mentioned
Pusic, K.M et al. (2014)	EE: 9.82 ± SEM; NE: 1.00 ± SEM; IL-11 (in vitro): 120.00 ± SEM; Control: 1.00 ± SEM; IL-11 (nasal): 24.40 ± SEM; Sham: 1.00 ± SEM; Oxidant: 0% SD induction Control: 100% SD induction; M2a-CM: 349.50 ± SEM; M1-CM: 1.03 ± SEM	EE: 7.10 ± SEM nmol/mg; NE: 11.90 ± SEM nmol/mg; IL-11: 7.29 ± SEM nmol/mg; Sham: 13.89 ± SEM nmol/mg; M1-CM: 1.33 ± SEM; M2a-CM: 1.10 ± SEM; Control: 1.00 ± SEM	N/A	Not mentioned
Pusic, A.D et al. (2015a)	Myelin basic protein levels (Western blot): Control: 1.00 ± 0.05 (n=14); 1d post-SD: 0.54 ± 0.05 (n=5); 7d post-SD: 1.00 ± 0.04 (n=18); Myelin disruption (Electron microscopy): Control: 1.00 ± 0.22; 1d post-SD: 2.53 ± 0.02; 7d post-SD: 1.14 ± 0.11	• ROS (CellROX) Control: 1.00 ± 0.07; IFNγ-treated: 1.50 ± 0.27 (n=5); • Glutathione (ThioTracker) Control: 1.00 ± 0.08 (n=12); IFNγ-exposed: 0.66 ± 0.07 (n=9)	-T cell lymphocyte depletion vs. Loss of myelin basic protein: Anti-CD4 + SD: MBP = 0.87±0.08; vs SD alone: 0.54±0.05 -nsMase2 inhibition vs MBP protection: GW4869 + SD: MBP=1.30±0.11; vs SD alone: 0.54±0.05 -cooperative effect of IFNγ and TNFα: IFNγ: 0.70±0.10; IFNγ +TNFα: 0.32±0.05	Not mentioned
Pusic, A.D et al. (2015b)	In Vitro Control (pulsed IFNγ): 1.00 ± 0.65 nC; In Vitro 7-day phasic IFNγ: 605 ± 121 (relative to control); In Vivo Nasal IFNγ (1-day): 63.4 ± 4.58 (relative to sham)	In Vitro Control: 1.00 ± 0.03 (relative fluorescence); In Vitro Pulsed IFNγ (7-day): 0.69 ± 0.02 (relative); In Vivo Protein Carbonyl (Sham): 12.96 ± 0.96 nmol/mg; In Vivo Protein Carbonyl (IFNγ): 8.68 ± 1.73 nmol/mg; Glutathione (GSH): In Vitro Control: 1.00 ± 0.06 (relative ThioTracker); In Vitro Exosome-treated: 1.82 ± 0.09 (relative)	Not mentioned	"- Hypothesis Testing t-test, ANOVA + Holm-Sidak post hoc - Non-parametric Alternatives Mann-Whitney U / Kruskal-Wallis - Data Transformation Fold change (controls = 1.0)"
Pusic, K.M et al. (2019)	In vitro (Slice cultures): Control: 1.00 ± 0.45 (n=8) IFNγ-DC-Exos: 12.5 ± 1.52 (n=8); In vivo (Rats): Sham (Vehicle): 1.00 ± 0.14 (n=3-5); IFNγ-DC-Exos: 57.0 ± 4.27 (n=3-5)	Protein carbonyl content: Sham: 7.25 ± 0.83 (n=7); IFNγ-DC-Exos: 4.58 ± 0.55 (n=5); iNOS mRNA: Sham: 1.00 (reference); IFNγ-DC-Exos: 4.37-fold decrease (no SEM/p-value)	No (no statistical correlation between CSD and ROS analyzed)	In vitro CSD: p ≤ 0.001 (Holm-Sidak) - In vivo CSD: p ≤ 0.001 (Holm-Sidak) - Protein carbonyl: *p = 0.035 (Holm-Sidak) - iNOS: No p-value (significance by >2-fold change) Statistical Methods - Normality test: p<0.05 reject (method unspecified) - Group comparison: ANOVA + Holm-Sidak post hoc - Data expression: Mean ± SEM - No data transformation mentioned
Jiang, L et al. (2019)	- In vivo (rats) CSD number: 6 [3] (median [range]) Latency: 2.4 (1.2) min (median (range)) Magnitude: 6.5 (9.5) mV/min (median (range)) In vitro (mouse slices) Submaximal CSD latency: 18.3 [15] s (median [range]) Magnitude: 61.5% (range: 55.48%) (median (range), vs 1st episode)	- MDA level (rats) Sham group: 0.64 (0.29) μmol/mg (median (range)) CSD group: 1.07 (0.7) μmol/mg (median (range))	Yes (CSD magnitude vs MDA level)	r = 0.5135 (95% CI Not mentioned)
Won, L et al. (2020)	Mean number of SD events: 8.4 ± 0.4 SDs (mean ± SEM) CSD-induced MDA increase (Ln ratio): Ln(SD/sham) = 2.00 ± 0.190 → 639% increase vs ND (p<0.001, power=1.00) CSD-induced CGRP increase (Ln ratio): Ln(SD/sham) = 1.60 ± 0.31 → 395% increase vs ND (p<0.001, power=1.00) CSD-induced c-fos increase (Ln ratio): Ln(SD/sham) = 1.04 ± 0.20 → 183% increase vs ND (p<0.001, power=1.00)	Naive IGF-1 effect on CGRP (Ln ratio): Ln(IGF-1/sham) = -1.66 ± 0.32 → 81% decrease vs ND (p<0.001, power=1.00) SD+IGF-1 effect on MDA (Ln ratio): Ln(IGF-1/sham) = -1.76 ± 0.62 → 83% decrease in MDA (p<0.001, power=1.00) SD+IGF-1 effect on CGRP (Ln ratio): Ln(IGF-1/sham) = -0.90 ± 0.15 → 59% decrease in CGRP (p<0.001, power=1.00) SD+IGF-1 effect on c-fos (Ln ratio): Ln(IGF-1/sham) = -0.60 ± 0.06 → 45% reduction in c-fos (p<0.001, power=0.97)	Reported correlation? No direct correlation analysis between CSD and ROS parameters Statistical Method: Ln(ratio) vs 0 by t-test (two-tailed) Data Transformation: All immunostaining data as Ln(experimental/sham ratio)	Not mentioned
Araújo, A.D.O et al. (2023)	- Velocity: Intact: 3.31±0.10 mm/min; Vehicle: 3.25±0.11 mm/min; MLT-10: 2.86±0.14 mm/min; MLT-40: 3.96±0.16 mm/min - Amplitude: Intact: 8.9±2.4 mV; Vehicle: 9.0±1.7 mV; MLT-10: 6.8±1.2 mV; MLT-40: 13.2±2.3 mV - Duration: Intact: 83.9±5.4 s; Vehicle: 82.1±4.0 s; MLT-10: 96.5±9.1 s; MLT-40: 70.7±4.0 s	- MDA: Intact: 6.21±0.58 nmol/mg protein; Vehicle: 6.93±2.53 nmol/mg protein; MLT-10: 3.34±1.24 nmol/mg protein; MLT-40: 4.32±0.82 nmol/mg protein - SOD: Intact: 7.39±3.88 AU/min/mg protein; Vehicle: 7.59±3.71 AU/min/mg protein; MLT-10: 19.49±4.57 AU/min/mg protein; MLT-40: 11.00±3.33 AU/min/mg protein	Not mentioned. Mechanistic link implied: MLT-10 showed ↓MDA + ↓SOD → decelerated CSD + reduced anxiety	Not mentioned
Ackermann, M.A et al. (2024)	-Normoxic K ⁺ -induced SD: ΔV _i = -4.60 ± 2.35 mV; t _{1/2} = 91.52 ± 72.38 s; Hypoxia-induced SD (HSD): ΔV _i = -3.54 ± 1.21 mV; Δt = 3.96 ± 0.97 min; FCCP-induced SD: ΔV _i = -4.55 ± 1.76 mV; Δt = 7.01 ± 2.65 min; Ca ²⁺ -free + K ⁺ -SD: ΔV _i = -3.13 ± 1.51 mV; t _{1/2} = 40.14 ± 19.61 s; DPI + K ⁺ -SD: ΔV _i = -5.02 ± 2.32 mV; Mitochondrial oxidation (HSD): N/A	-Normoxic K ⁺ -induced SD: ΔOxΔ_{roGFPc} = +5.6% ± 2.5%; Wavefront velocity = 2.52 ± 0.47 mm/min; Hypoxia-induced SD (HSD): ΔOxΔ_{roGFPc} = +9.8% ± 1.1%; Wavefront velocity = 2.61 ± 0.41 mm/min; FCCP-induced SD: ΔOxΔ_{roGFPc} = +5.4% ± 0.6%; Wavefront velocity = 2.11 ± 0.47 mm/min; Ca ²⁺ -free + K ⁺ -SD: ΔOxΔ_{roGFPc} = +2.13% ± 0.73%; Wavefront velocity = 1.74 ± 0.37 mm/min; DPI + K ⁺ -SD: ΔOxΔ_{roGFPc} = +8.30% ± 1.72%; Mitochondrial oxidation (HSD): Baseline OxΔ_{roGFPc} = 67.3% ± 6.7%; ΔOxΔ_{roGFPc} = +1.42% ± 1.50%	Not mentioned	Not mentioned