SA101Pro Treadmill Introduction

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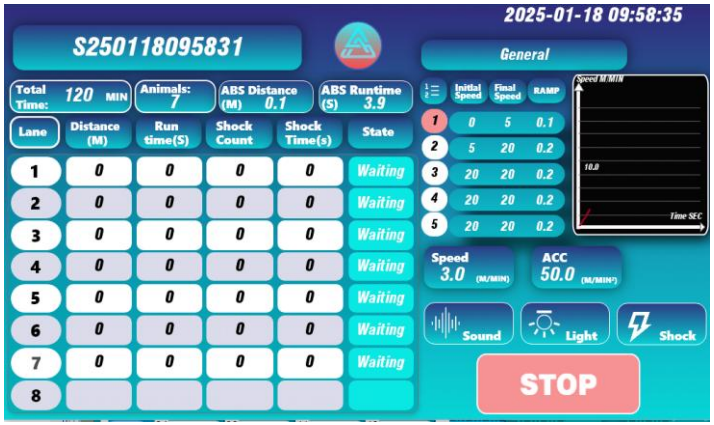
PARTENAIRE DE VOS RECHERCHES

SA101NCV2

SA101Pro Rodent Treadmill

1. Pictures



2.Description

Purpose

The Small Animal Treadmill is primarily used for the training and metabolic research of mice, rats, and other small animals, enabling more accurate quantification of exercise load. It is an essential experimental device for studies of animal physical fitness, endurance, exercise injury, exercise pharmacology, exercise physiology, and pathology.

Principle

The small animal treadmill consists of a running platform, stimulation module, running lanes, and a controller. The running platform can accommodate multiple lanes, allowing multiple test animals to run simultaneously. The lanes are equipped with a top-opening lid cover for convenient animal handling and to prevent escape.

The core component is a continuously rotating conveyor belt, with a surface designed for firm animal grip. The motor, controlled by the controller, drives the belt movement. When an animal stops running or falls below the set speed, a stimulus is delivered from the rear to prompt movement, thus achieving the training goal.

The system allows multiple stimulation modes(electric, air-puff, sound and light) and multi-stage protocols to be set, supporting uniform acceleration, constant speed, and uniform deceleration running modes.

SA101Pro Rodent Treadmill

2.Description

Applications

By using the treadmill, animal training can be quantified more precisely, making it ideal for animal training and metabolic studies.

- Animal physical fitness
- Animal endurance
- Exercise injury research
- Exercise pharmacology
- Exercise physiology
- Exercise pathology

Background

The treadmill is a popular exercise system used to force-train rodents. It is to evaluate the effects of exercise and different-intensity training on not just physical health but also cognitive and mental health. And it also widely used for assessment of motor and locomotion function post-recovery from injuries.

Treadmills are also a key tool for exploring the relationship between exercise and metabolism, cardiovascular, cerebrovascular, and neurological diseases.

SA101Pro Rodent Treadmill

2.Description

Design Features

- 7-inch IPS 1024*768 HD display, visible Angle 178°
- Independent lane design, with adjustable running lane length
- Variable speed mode setting, different speeds can be set in sections
- **Shock: 9 pole pulse electric shock, ensuring no blind zone, 0.1mA~10mA adjustable**
- Anti-pinch design to reduce animal injury
- Different lane widths for mice and rats to minimize turning-around
- **5 kinds of exhaustion mode (stop condition), Distance, Time & Shock**
- Open design for easier cleaning
- **Optional gas stimulation, more gentle and non-damaging**
- Supports upgrade to air-puff energy metabolism detection
- Larger volume of data store, more than 2000 data.

SA101Pro Rodent Treadmill

2. Details

Output Data

- Running distance
- Running time
- Number of shocks
- Shock time
- Exhaustion status
- Exhaustion duration
- Individual lane running status (speed, acceleration, running time etc.
- Current

System Components

- Main Control Unit 1ea
- Running Platform 1ea
- Electric Stimulation Module 1ea
- Mini Printer 1ea
- Electric goniometer 1ea

SA101Pro Rodent Treadmill

3. Details

Technical Specifications

High-Quality TFT LCD Display	7-inch IPS 1024*768 HD display, visible Angle 178° Intuitive interface design, bilingual Chinese/English switching. Well-organized layout, easy operation.
Capacitive Touch Screen	Up to 99% accuracy, <3ms response time. Smooth user experience, consistent with common touchscreen operation habits.
Silent Mode	Noise level below 60 dB
Motor Control	Closed-loop feedback control High precision and strong real-time performance
Speed Control	Range: 0–100 m/min, accuracy: 0.01 m/min
Acceleration	Adjustable from 0–100 m/min²
Number of Lanes	5 lanes for rats, 5 lanes for mice. Adjustable lane length (20–80 cm).
Running Platform Incline	Adjustable from ±25°
Multi-Stage Protocol Programming	Supports multiple exercise modes (constant speed, acceleration, deceleration, mixed modes) Speed and acceleration freely programmable for any time segment Software supports up to 8 programmable segment

SA101Pro Rodent Treadmill

3. Details

Technical Specifications

Exhaustion Mode	5 kinds of mode: single electrical stimulation duration, total electrical stimulation duration, number of electrical stimulations, running distance, running time.
Self-Protection	Based on the animal's stimulation response, the system automatically determines and records the exhaustion time while simultaneously stopping stimulation for that animal — effectively protecting the test subject.
Stimulation Modes	Pulse electric shock, sound, and light stimulation.
Electric Shock Intensity	Voltage: 110–240V Adjustable DC pulse current, range 0–10mA
Data Browsing	Built-in data browsing function, view any experiment group.
Data Processing	Data upload via control unit Export in Excel format.
Data Storage	Up to 2000 experimental datasets
Controller Dimensions	32x34x12cm, weight: 7.5 kg, power: 300W
System Dimensions	Mice：520×650×440mm，Rats：700×700×440mm
Weight	Mice: 35kg　Rats:42kg

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4.Features

Product Features & Advantages

Features	Advantages
Compatible with mice, rats, large rats, or custom models	Improves versatility, saves cost, expands experiment options
Exercise modes – Uniform speed, uniform acceleration, uniform deceleration, acceleration and deceleration mixed mode	Multiple exercise modes， for higher adaptability
Adjustable incline treadmill platform	Supports specialized experimental setups
Wide speed range (0–100 m/min, 0.01 m/min steps)	Suitable for regular and high-intensity experiments
Stand-alone controller with high-definition touchscreen	Stand-alone working
Multi-stage programming	**Up to 8 programmable segments with full acceleration control**
5 kinds of exhaustion mode	**Distance, Time & Shock**
Modular design	Easy disassembly, cleaning, maintenance, and integration with other systems
Animal protection mechanism	**Automatically detects fatigue and stops stimulation**
Pulse electric shock design	**No blind area**
Anti-pinch protection	Reduces animal injury
Data viewing, export, and delete functions	Convenient history management
Storage capacity	Supports more than **2000 historical data sets**

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5. Specifications

	Model	SA101B-C01	SA101 Pro-C01	SA101D-C01
Controller Main Unit	Control	Touch screen	Touch screen	Touch screen
	Power Supply	100-240VAC,50/60Hz；60W	100-240VAC,50/60Hz；60W	100-240VAC,50/60Hz；60W
	Weight	5.7kg	7.5kg	5.7kg
	Dimensions (L×H×D)	35cm*15*34cm	32x34x12cm	35cm*15*34cm
	Operating Environment	-15℃--45℃；	-15℃--45℃；	-15℃--45℃；
	Noise	<40 dB	<40 dB	<40 dB

Model	SA101BM	SA101BR	SA101Pro-M	SA101Pro-R	SA101DM	SA101DR
Lanes	Mouse 5-Channel	Rats 5-Channel	Mouse 5-Channel	Rats 5-Channel	Mouse 5-Channel	Rats 5-Channel
Features	Suitable for rehabilitation training experiment in low exercise intensity.		Suitable for fatigue experiment in high exercise intensity.		With air puff to be gentler in the animal motivation	
Weight	35kg	42kg	35kg	42kg	42kg	44kg

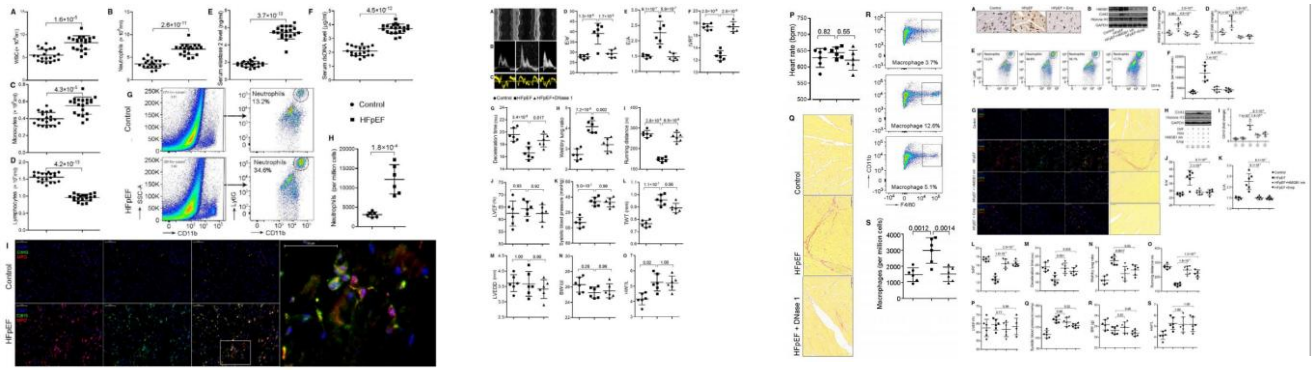
6.Papers

Experimental Method 1

Research Focus: Heart failure with preserved ejection fraction (HFpEF) is an increasingly severe public health issue with high morbidity and mortality rates, yet few effective treatments exist. A novel inflammatory mechanism has been proposed, but the inflammatory signals promoting HFpEF remain poorly understood.

Experimental Method: Following previously described protocols, all mice underwent treadmill endurance training the day before (SA101, SANS, China). On the experimental day, the treadmill was set under identical conditions. Running time was measured, and running distance was calculated.

Conclusion: NETs were found to participate in the pathogenesis of HFpEF. Inhibition of HMGB1 and SGLT2 inhibitors improved HFpEF outcomes. HMGB1 and NETs may thus represent novel therapeutic targets for HFpEF treatment.



Xin-Lin Zhang, MD*; Ting-Yu Wang, MS*; Zheng Chen, MS*; Hong-Wei Wang, MS; Yong Yin, MS; Lian Wang, MD; Yong Wang, PhD; Biao Xu, MD, PhD*; Wei Xu, MD

Experimental Method 2

Research Focus:

Cadmium (Cd) is a well-known highly toxic environmental pollutant. While numerous studies show that Cd exposure causes multi-organ damage, little is known about its impact on skeletal muscle injury. Exercise is a non-invasive, effective intervention that improves health and combats disease. This study aimed to evaluate the toxic effects of Cd exposure on skeletal muscle function and explore whether exercise could mitigate these effects.

Experimental Method:

Exercise was induced by treadmill running using a motorized rodent treadmill (SANS, Nanjing, Jiangsu). Mice in the Ex and Ex+Cd groups underwent a 5-day adaptation training: starting on Day 1 with 30 min at 10 m/min and finishing Day 5 at 54 m/min. Running speed and duration were increased daily by 1 m/min and 5 min respectively (Pynnetal., 2004).

From Week 1 to Week 8, mice trained 5 days per week at 15 m/min for 60 min, with a 2 min rest every 15 min. Control and Cd-exposed mice remained in cages without treadmill exercise.

After 8 weeks, all mice underwent a treadmill exhaustion test as described by S.A. Licandro et al. (Licandro et al., 2021). A motorized treadmill was used to measure time and distance to exhaustion. Briefly, the test consisted of horizontal running starting at 5 m/min for 5 min, followed by 1 m/min increments each minute until exhaustion. Exhaustion was defined as remaining in the shock zone for >10 seconds or reaching a maximum of 150 shocks.

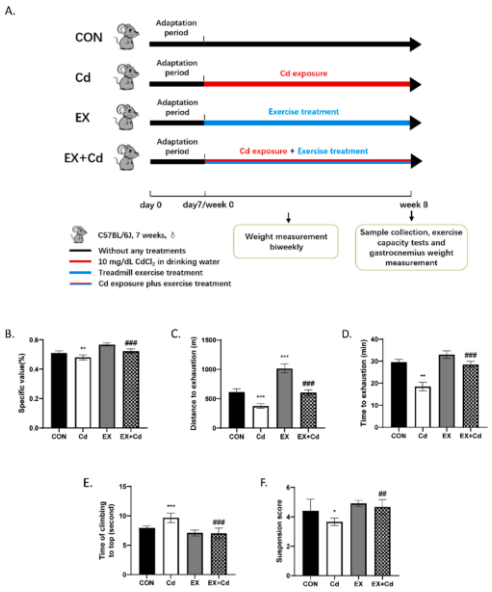
6. Papers

Experimental Method 2

Conclusion:

Chronic Cd exposure impaired skeletal muscle function, reducing muscle mass, exercise capacity, and muscle strength. Mechanistically, Cd-induced muscle injury was linked to disrupted lipid metabolism, elevated pro-inflammatory lipids, induced inflammation, and upregulated pro-apoptotic genes. These findings provide new evidence for the adverse health effects of Cd exposure, support the hypothesis linking Cd exposure to musculoskeletal disease etiology, and highlight the importance of controlling chronic Cd exposure at the population level.

Haotian He [a], Xiqin Lin [a], Tong Tong [a], Yudong Xu [a], Huihui Hong [a], Jingjing Zhang [a], Yongjin Xu [b], Cong Huang [b,c,*], Zhou Zhou [a,d,**]



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7. Papers (some)

No.	Treadmill Papers (Item No. SA101)	Published in	IF
1	Dietary timing enhances exercise by modulating fat muscle crosstalk via adipocyte AMPKa2 signaling	Cell Metabolism	31.3
2	Elimination of senescent cells byβ-galactosidase-target edprodrug attenuates inflammation and restores physical function in aged mice	CELL RESEARCH	28.1
3	Daytime-restricted feeding enhances running endurance without prior exercise in miceDaytime-restricted feeding enhances running endurance without prior exercise in mice	Nature Metabolism	20.8
4	Classification of distinct tendinopathy subtypes for precision therapeutics	Nature Communications	14.7
5	Piezo1-mediated M2 macrophage mechano transduction enhances bone formation through secretion and activation of transforming growth factor-β1	Cell Proliferation	8.5
6	Cadmium exposure impairs skeletal muscle function by altering lipid signature and inducing inflammation in C57BL/6J mice	Ecotoxicology and Environmental Safety	6.2
7	Piezo1-mediated M2 macrophage mechanotransduction enhances bone formation through secretion and activation of transforming growth factor-β1	Cell Proliferation	5.9

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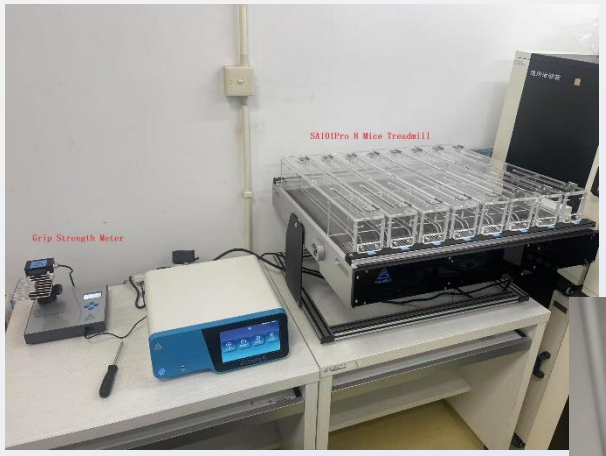
8. Cases (some)

MUST (Macau)



Oujiang Lab

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8. Cases （some）

HK Poly U

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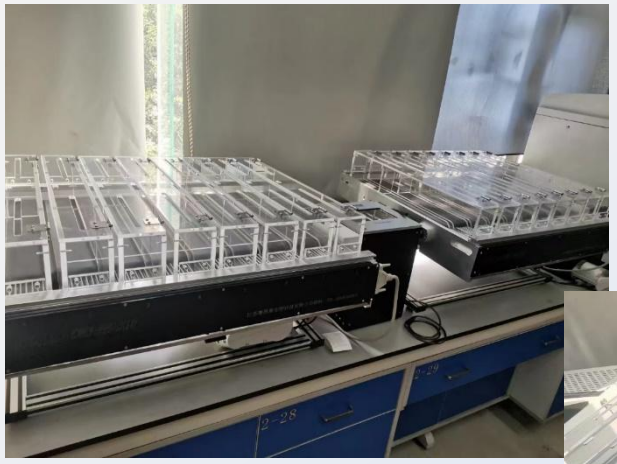
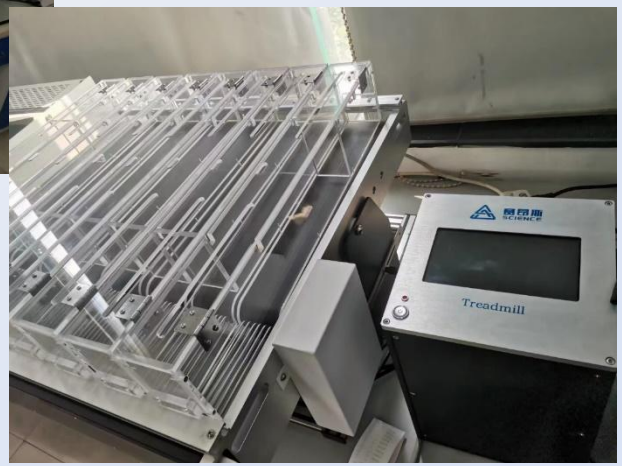
8. Cases (some)

Tsinghua Univ.





Chongqing Arm Univ.

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8. Cases (some)

Zhejiang Univ.

GIST Korea.

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8. Cases (some)

Univ. of Macau

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9. Video