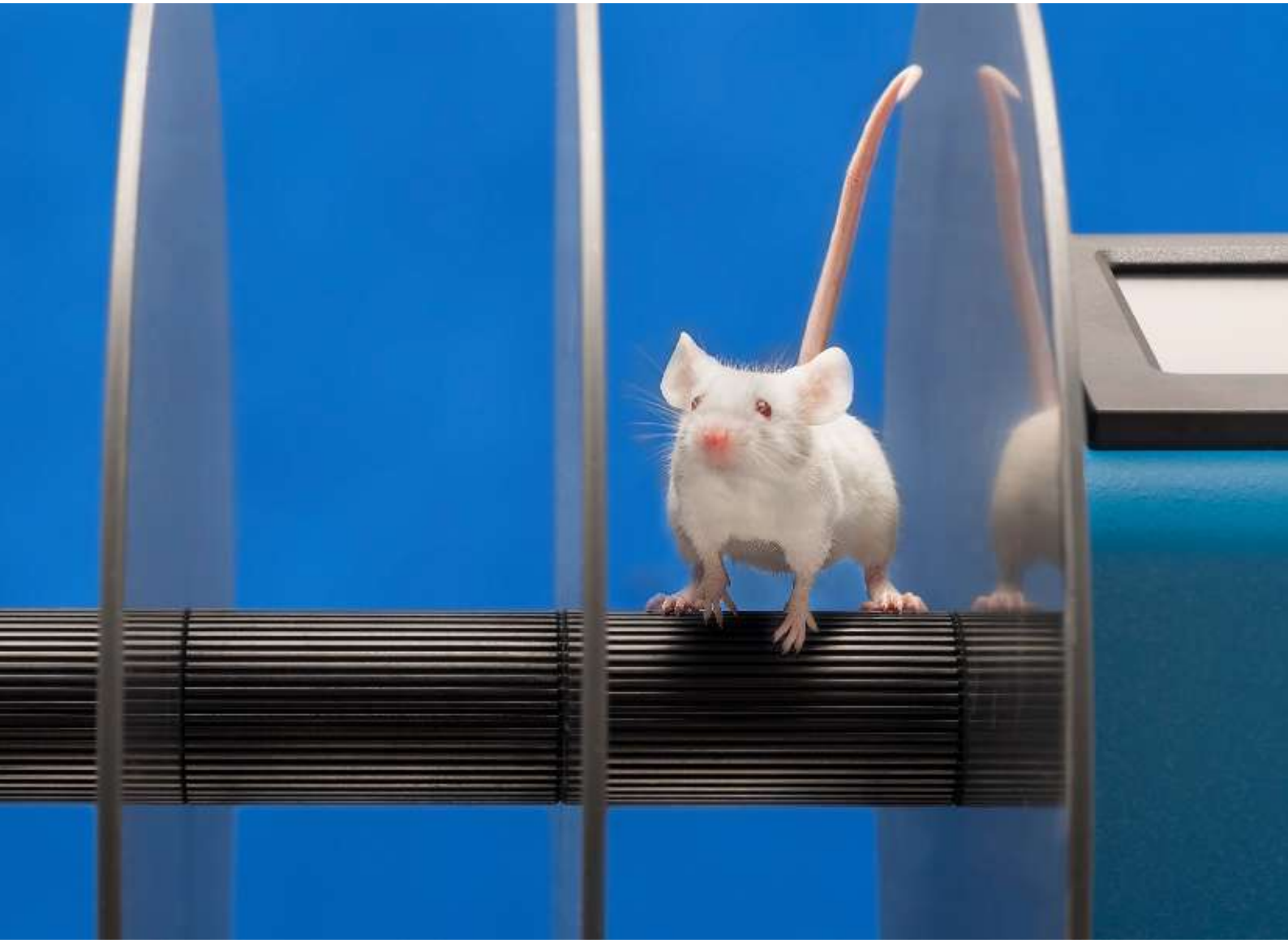
RotaRod Family

The gold standard for motor coordination studies



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RotaRod Family

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The “RotaRod” technique, originated by a 1957 paper of N.W. Dunham and T.S. Miya, has proved to be of great value in research involving phenotyping and screening of drugs which are potentially active on motor coordination and function.

Background

The rotarod test, invented by Dunham and Miya (1957) and transformed into a science-grade device by Ugo Basile, is one of the classic devices used in assessing the effects of a drug on animal behavior. Today it is obviously used in phenotyping and not only in drug screening.

Drugs (e.g. benzodiazepines) or specific phenotypes alter neuromuscular coordination and hence the time that the mouse or rat stay on the rotating rod.

Product Description

The RotaRod is a simple test to assess motor function and coordination in rodents.

Motor coordination or fatigue can be evaluated by measuring the time the animal stays on a rotating rod before falling. When the animal falls off its cylinder section onto the trip-box below, the switch is activated and time and rounds per minute are recorded.

The Rod can rotate at constant, accelerating, rocking (back and forth) or through complex acceleration/deceleration ramps, thanks to the included PC software XPad.

The experiment can be set up and the results can be monitored, via the 4.3” touch-screen. The operation is surprisingly quiet and the learning curve to learn navigating through the menus and options is very short.

A provided software is used to populate the animal vivarium and to create custom ramps. Result data can be exported by the provided USB storage key into CSV readable by excel.

Ugo Basile RotaRod comes in a Mouse 5-lane version, in a Rat 4-lane version and in a “Large Rat” 4-lane version, plus Rod Adapters to enlarge the diameter of the rod and Complex Wheels for an additional complexity element of the task.

Multiple animals can be tested at the same time and several protocols exist to train and assess the motory coordination through the falling time.

The output results include for each lane: Time elapsed, Revolutions, Distance, Speed and Rotating mode.

Application

The RotaRod test is commonly used in combination with other motor tests, such as grip strength and others to measure, motor function, coordination force and balance.

The test starts with a training trial with the animals placed on the rod rotating at the lowest speed. A time threshold (e.g. 1 minute) is set, below which the animal is immediately put back on the RotaRod until it stays on the rod for the threshold time.

After training, the real trials start and the latency to fall as well as the other parameters (see above) are recorded.

The classic test was run at constant speed, but already in the ‘60s (Jones and Roberts, 1968), the advantages of using accelerating modes were shown, such as training reduction, increased sensitivity and statistical significance improvement.

The test is used to test motor deficits in the most common animal models of Parkinson’s, ALS, Huntington’s disease, multiple sclerosis, brain injury and all models where motor coordination and function is to be investigated.

RotaRod Family

Our models keep on being cited in thousands of scientific articles and even the RotaRod name, that Ugo Basile coined for the device, is nowadays one of the most popular and widely used in behavioral neuroscience worldwide.

RotaRod for Mice

Assesses motor coordination using the natural fear of falling response as motivation. Especially for Parkinson's, ALS and other motor diseases.
Simple touch-screen for experiment control and data display. Customizable, uploadable protocols (speeds, acceleration, multi-step ramps) for efficiency and repeatability. Records up to 5 mice simultaneously. Removable, stainless-steel easy to clean boxes for confining falling mice.
Height to fall is 16cm

RotaRod for Rats

The RotaRod for Rats, is an evolution of the original model and the result of many years of research in cooperation with the latest development in behavioral and pharmacological research.
The instrument combines the same functionality of the previous version, now considered the standard, with additional new features: surprisingly silent operation, much easier experimental organization and data management.
Height to fall is 30 cm

RotaRod for Large Rats

The Ugo Basile RotaRod for obese rats consists of a 6 cm diameter rod, suitably machined to provide adequate (but not excessive) grip. Five flanges divide the four 8.7 cm lanes, enabling 4 rats to be simultaneously on test.
When a rat falls off its rod section into the trip-box below, its endurance in time and RPMs is recorded.
Height to fall is 40 cm.

Features	Benefits
Constant, rocking, accelerating and complex accelerating ramps	Flexibility for performing virtually all types of motor function and coordination behavioral experiments
Mouse-Rat combination package	The same device cannot be used effectively (think of cleaning) on rats and mice without risk of confounding factors, so a highly discounted package is available for those that buy the two models
Optional Rod enlarger	It allows to test different animal models and also to vary the test difficulty without acting on the speed or mode
Optional Complex Wheels	Thanks to the possibility of irregular rung patternsand adjustable pattern, the test gains in complexity and sensitivity
Speed adjustable from 3 to 80 RPMs and multiple modes (constant, rocking, accelerating, complex accelerating ramps)	Allows for a very broad range of animal models and experimental settings
Control unit and USB key saving	No need to connect a PC
Automatic conversion of data into CSV files for the USB stick	Possibility to open files in Excel

Complex Wheel for RotaRod

Increased sensitivity for testing motor coordination in rodents

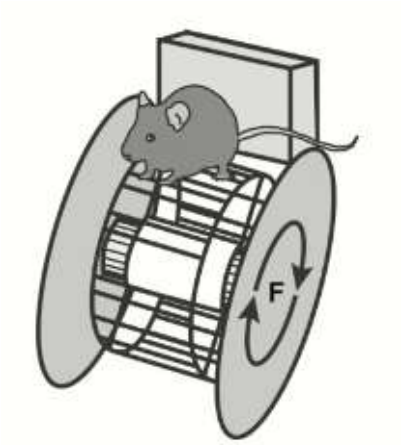
The Complex Wheel add-on, available for Mouse and Rat RotaRod, introduces an additional complexity element for the animal to be tested thanks to the asymmetrical and adjustable rungs which increase the test sensitivity and add a higher involvement of motor cortex and hippocampus, as compared to the classic RotaRod test (Nagai et al. 2017)

Product Description

The Complex Wheel is designed in a way that the animal does not have a uniform surface to walk on but rather a number of horizontal bars (rungs) that can be changed in number and positioned in a symmetrical or uneven position to vary the test complexity.

This provides a different task to the animals, which now don't have to walk on a small rod, but rather on an accelerating wheel with irregular rung pattern.

The Complex Wheel was developed in conjunction with Prof. Michele Bellesi and Prof. Luisa de Vivo from the University of Camerino (Italy).

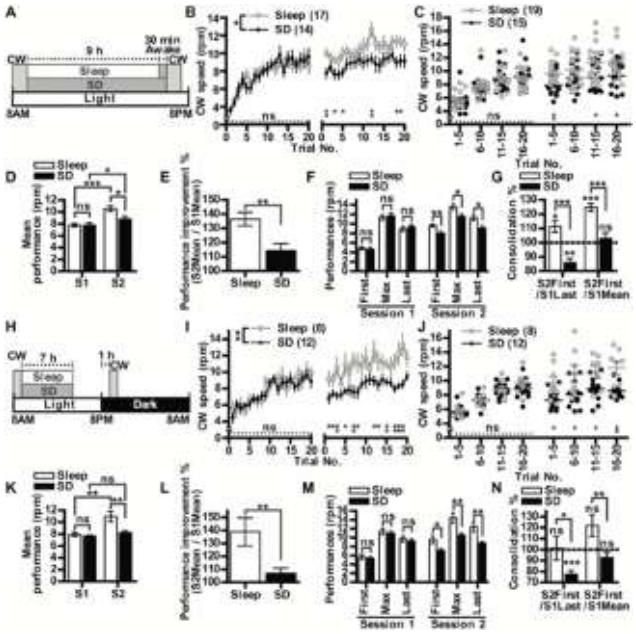


Schematic and rung pattern of the complex wheel (CW)
Nagai et al. 2017

Mouse Complex Wheel

Rat Complex Wheel

Application



What Nagai et al. showed in their 2017 paper is that mice undergoing complex wheel experiments consolidate during sleep a motor skill that engages motor cortex and hippocampus much more than in the traditional rotarod test.

This is potentially due to the increased complexity of movements that happen thanks to the irregular rung patterns in the complex wheel task.

Reference

Nagai et al. 2017, "Sleep consolidates motor learning of complex movement sequences in mice", Sleep

Figure on the left: From Figure 4 (Nagai et al. 2017), showing the high sensitivity of the complex wheel in highligthing the sleep benefits on motor coordination.

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Mouse Complex Wheel

Mouse Complex Wheels include 30 removable bars (rungs), 9 mm distance one from the other. Its diameter is 95 mm.

Mouse RotaRod with Complex Wheel

Mouse Complex Wheel Close Up

Mouse on Complex Wheel - Courtesy of School of Bioscience and Veterinary Medicine, University of Camerino, Italy

Ordering Informations

47650-327	Mouse RotaRod Complex Wheel (30 bars)

Specifications - Physical

Diameter	95 mm
Number of bars (rungs)	30
Distance between bars (rungs)	9 mm
Weight	492 gr

Rat Complex Wheel

Rat Complex Wheels include 22 removable bars (rungs), 20 mm distance one from the other. Its diameter is 144 mm.

Rat RotaRod with Complex Wheel

Rat Complex Wheel Close Up

Rat on Complex Wheel - Courtesy of School of Bioscience and Veterinary Medicine, University of Camerino, Italy

Ordering Informations

47750-327	Rat RotaRod Complex Wheel (22 bars)

Specifications - Physical

Diameter	144 mm
Number of bars (rungs)	22
Distance between bars (rungs)	20 mm
Weight	675 gr

Enlarger for RotaRod

New testing parameter for motor coordination experiment

RotaRod enlargers enable to have an additional parameter to change the complexity of the experiment, by increasing and changing the surface of rods.

Product Description

Having the possibility to change the diameter and the texture of the rod adds another dimension to the variables that can be tweaked in the rotarod test, by changing the complexity of the test itself.

Enlargers, both for mice and rats RotaRod, can be easily attached on the rotating rods thanks to magnetc fixing.

Mouse RotaRod enlarger with rubber (smooth); available also for Rat RotaRod

Mouse RotaRod enlarger with grooves; available also for Rat RotaRod

Detail of enlarger magnetic fixing

Lateral close up of rubber smooth enlarger

Lateral close up of enlarger with grooves

Ordering Informations

47650-325	Mouse RotaRod enlarger with grooves, 60 mm diameter instead of original 30 mm (5 piece set, magnetic fixing)
47650-326	Mouse RotaRod enlarger with rubber (smooth), 60 mm diameter instead of original 30 mm (5 piece set, magnetic fixing)
47750-325	Rat RotaRod enlarger with grooves, 120 mm diameter instead of original 60 mm (4 piece set, magnetic fixing)
47750-326	Rat RotaRod enlarger with rubber (smooth), 120 mm diameter instead of original 60 mm (4piece set, magnetic fixing)

Specifications - Physical

Product	47650-325	47650-326	47750-325	47750-326
Diameter	60 mm	60 mm	120 mm	120 mm
Width	58 mm	58 mm	87 mm	87mm
Groove Distance	2 mm	n.a.	2.2 mm	n.a
Groove Width	1 mm	n.a.	1mm	n.a

RotaRod Family

Specifications - General

Commands	4,3" touch-screen, usable with gloves
Read-out	Touch-screen and PC (via USB key)
Power Requirement	Universal input 100-240 VAC, 50-60Hz, 40W max
Sound Level	< 60 dB (A)
Operating Temperature	10° to 40° C
Trip Box	Stainless-steel to ease sterilization

Specifications - Operation

Start/Stop	From the touch-screen
Speed	Adjustable from 3 to 80 RPM, in steps of 1 RPM (Custom ramp mode allows start from 0RPM)
Mode	Constant, ramp, reverse ramp, custom ramp and rocking
Detection	Trip box magnetic sensor
Results	Time Elapsed, Revolutions, Distance, Speed, Mode for each lane
Data Acquisition	.csv exported file (via USB key)
Data Acquisition	Via X-PAD software (included)
Data Portability	By USB flash drive (included) or LAN connection
TTL Output	Trip box status, rotating direction, start/stop experiment, speed
Data Out	Exported to .cvs
Data In	Import protocol and custom ramps

Physical & Dimensions

Model	47650	47750	47750-D01
Lanes	5 lanes	4 lanes	4 lanes
Rod diameter	3 cm	6 cm	8 cm
Rod Width	5,8 cm	8,7 cm	12 cm
Fall Height	16 cm	30 cm	40 cm
Dimensions	46 x 28 x 33 cm	55 x 46 x 57 cm	70 x 46 x 65 cm
Total Weight	11 Kg	15 Kg	17 Kg
Shipping Weight	16 Kg	21 Kg	40 Kg
Packing Dimensions	70 x 36 x 46 cm	70 x 36 x 46 cm	77 x 65 x 83 cm

Ordering Information

47650 Mouse RotaRod	Mouse RotaRod with USB output and USB flash drive (E-AU 101), including instruction Manual and X-PAD Software Package
47750 Rat RotaRod	Rat RotaRod with USB output and USB flash drive (E-AU 101), including instruction Manual and X-PAD Software Package
47750-D01 Large Rat RotaRod	Climbing test additional measuring cylinder with climbing cylinder and ceiling (diameter 12cm, height, 25.5cm) and divider
47850 Combination Package Mouse + Rat RotaRods	Mouse and Rat RotaRod, each one with USB output and USB flash drive (E-AU 101), including instruction Manual and X-PAD Software Package

Extra warranty (Standard 12 months + 12 months with product registration)

47650-UBC12	UB Care 24 Additional hardware warranty extension 24 months for Mouse RotaRod (Valid for SKU 47650)
47650-UBC24	UB Care 24 Additional hardware warranty extension 24 months for Mouse RotaRod (Valid for SKU 47650)
47750-UBC12	UB Care 12 Additional hardware warranty extension 12 months for Rat RotaRod (Valid for SKU 47750)
47750-UBC24	UB Care 24 Additional hardware warranty extension 24 months for Rat RotaRod (Valid for SKU 47750)
47750-D01-UBC12	UB Care 12 Additional hardware warranty extension 12 months for Large Rat RotaRod (Valid for SKU 47750-D01)
47750-D01-UBC24	UB Care 24 Additional hardware warranty extension 24 months for Large Rat RotaRod (Valid for SKU 47750-D01)

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more than 40,000 citations in the main bibliographic search engines.

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Ugo Basile SRL
Via Giuseppe Di Vittorio, 2
21036 Gemonio (VA) ITALY
Tel. +39 0332 744574
Get a quote: sales@ugobasile.com

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