SOLUTIONS FOR YOUR SCIENCE

BIOBSERVE

High throughput Forced Swim Test Analysis

Europe:
BIOBSERVE GmbH
Koenigswinterer Str. 418
53227 Bonn
Tel.: +49 228 20 160 20
Fax: +49 228 20 160 29

North America:
BIOBSERVE
2125 Center Ave., Suite 500
Fort Lee, New Jersey 07024
Tel.: 201-302-6083
Fax: 201-302-6062

www.biobserve.com info@biobserve.com

Introduction

This software is designed to automate the forced swim test.

The software analyzes the video image of up to eigth animals simultaneously and automatically calculates the time spent struggling, swimming and floating as suggested by newly enhanced approaches.

Features I

Mice & Rats

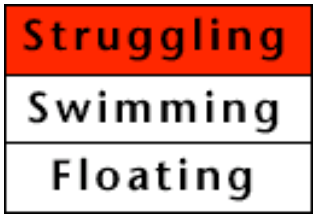
Mice and rats show diffrerent behaviors during the forced swim test. Our system can be used with both species.

High throughput

Up to 8 animals can be tested simultaneously what allows high throughput testing. All acquired data are calculated and presented in real time already during the experiment. The possibility to save different setup configurations and to generate pdf based summary reports automatically makes it even easier to deal with your test sessions.

Three behaviors

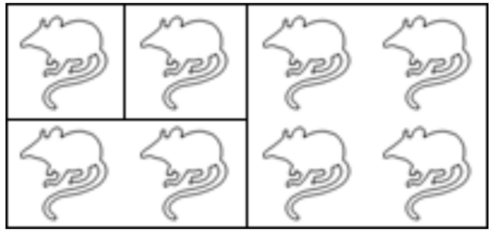
Comparing the active versus the inactive time provides only a small amount of results that are possible to get from the forced swim test. Our system is capable to distinguish between the three behaviors struggling, swimming and floating and considers also the temporal course of the shown behaviors.



Features II

Real time individual and group performance calculation

During the experiment the acquired data are calculated and displayed graphically in real time. Thus you are able to really see what is going on.

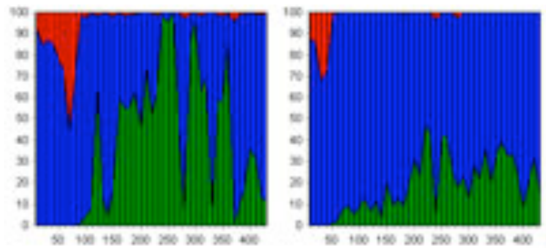


Extensive statistic functions

The software offers a big number of statistical test to analyze the acquired data. You don't need to go through the data with other programs. Just select the algebraic function or test you want to be calulated and see the results instantly. One behavioral test - one software.

Useful diagrams

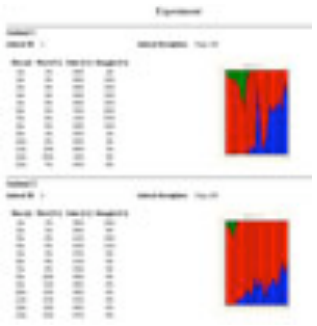
Already during the experiment the acquired data are analyzed and presented in convincing diagrams. All diagrams can be exported in different file formats (bmp, wmf and emf).



Features III

Report generator

An integrated Acrobat pdf based report generator makes it easy to generate standardized experiment reports for each animal or group in a very short time.



Further processing of data and diagrams

The collected data can be exported for other applications. Further individual data manipulations can be conducted.
All diagrams that have been generated during the experiment or the data analysis are saved in the vector graphic format (wmf) thereby making them easy to integrate and work with in other programs.

Export filters for the data:
*.txt, *.doc, *.csv, *.xls, *.xml

Export filters for the diagrams:
*.bmp, *.wmf, *.emf

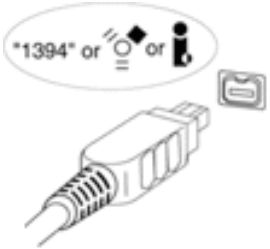
Database integration

The software offers standard interfaces to communicate with other applications like databases. Thereby it is for example possible to transfer data into existing animal databases easily. You can import database records into the FST software, perform experiments and export the data back into your animal databse. That is true high throughput!

Features IV

FireWire support

The software supports the FireWire/iLink port for digital video cameras. You can use any DV-Camera with a FireWire port. This simplifies the installation because no framegrabber card or driver problems occur. It´s just plug and measure.



Digital video encoding included

You do not want to fill another locker with your experiment tapes? With the FST Analysis software you can directly encode your experiment to a digital video file in real time.
Easy to do, easy to store and easy to handle.

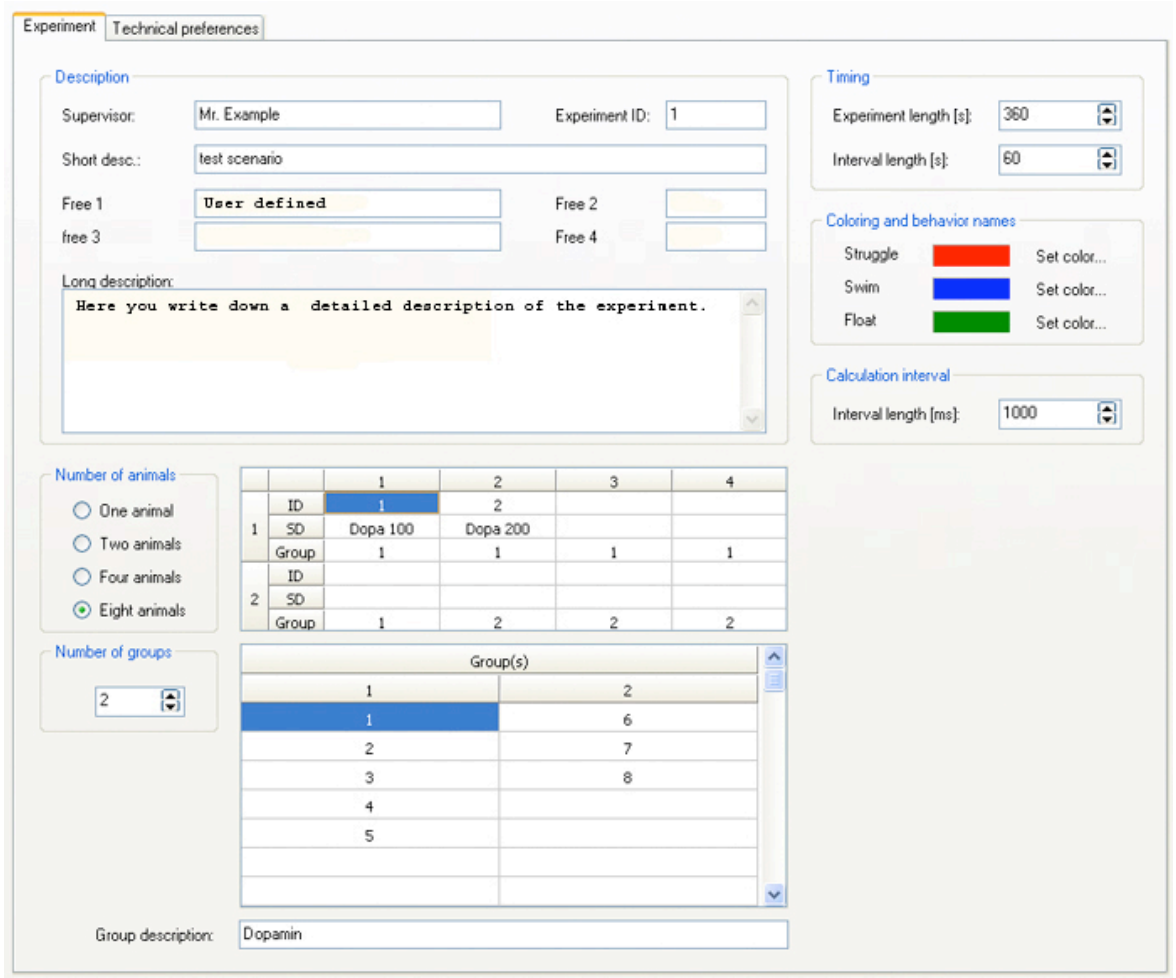
Phenotyping with the FST system

The following list shows what kind of phenotypes can be detected with the FST system based on the Mouse Genome Informatics (MGI) project that provides integrated access to data on the genetics, genomics, and biology of the laboratory mouse.

Name of the test (MP term)	MP ID
Behavioral despair	2573
decreased coping response	3064
increased coping response	3063

Program Tour - Configuration

Experiment description



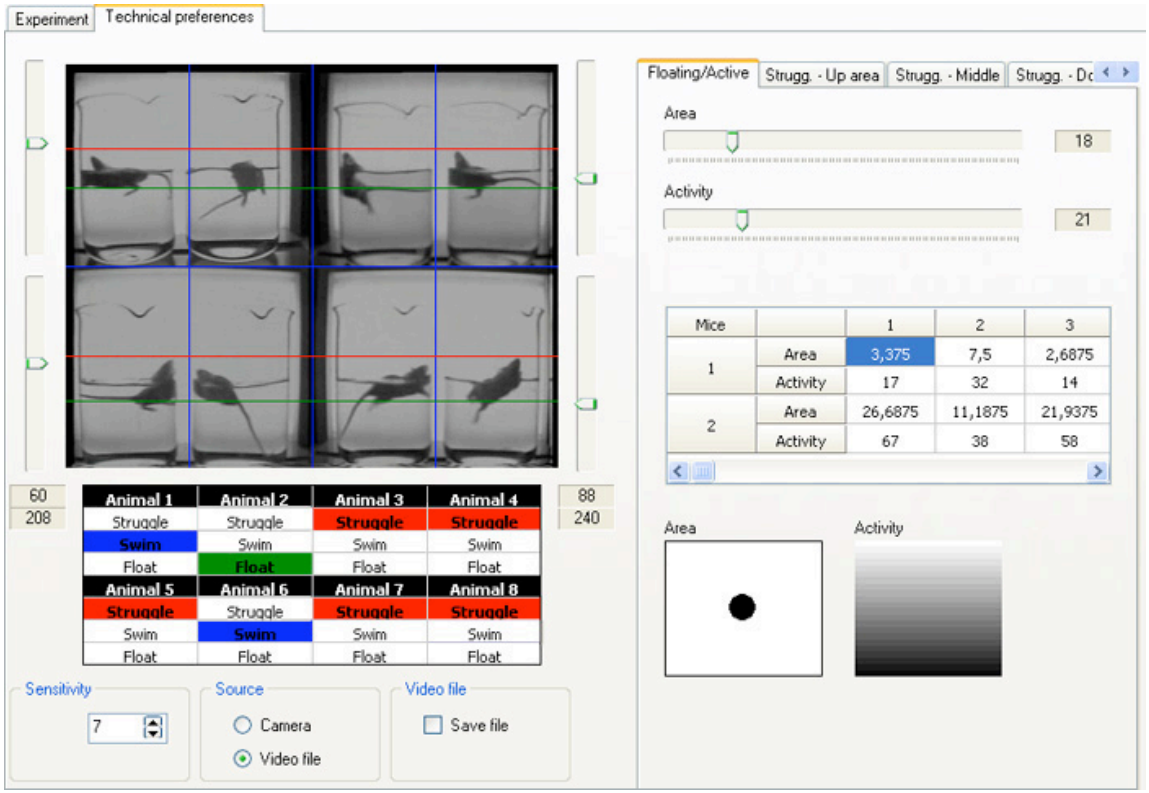
Here you can configure the experiments and save different information about the animals and the experiment.

You can put in a description of the experiment as well as a description for each animal.

You can also combine animals to a group so the data are summarized later on automatically.

Program Tour - Configuration

Technical preferences



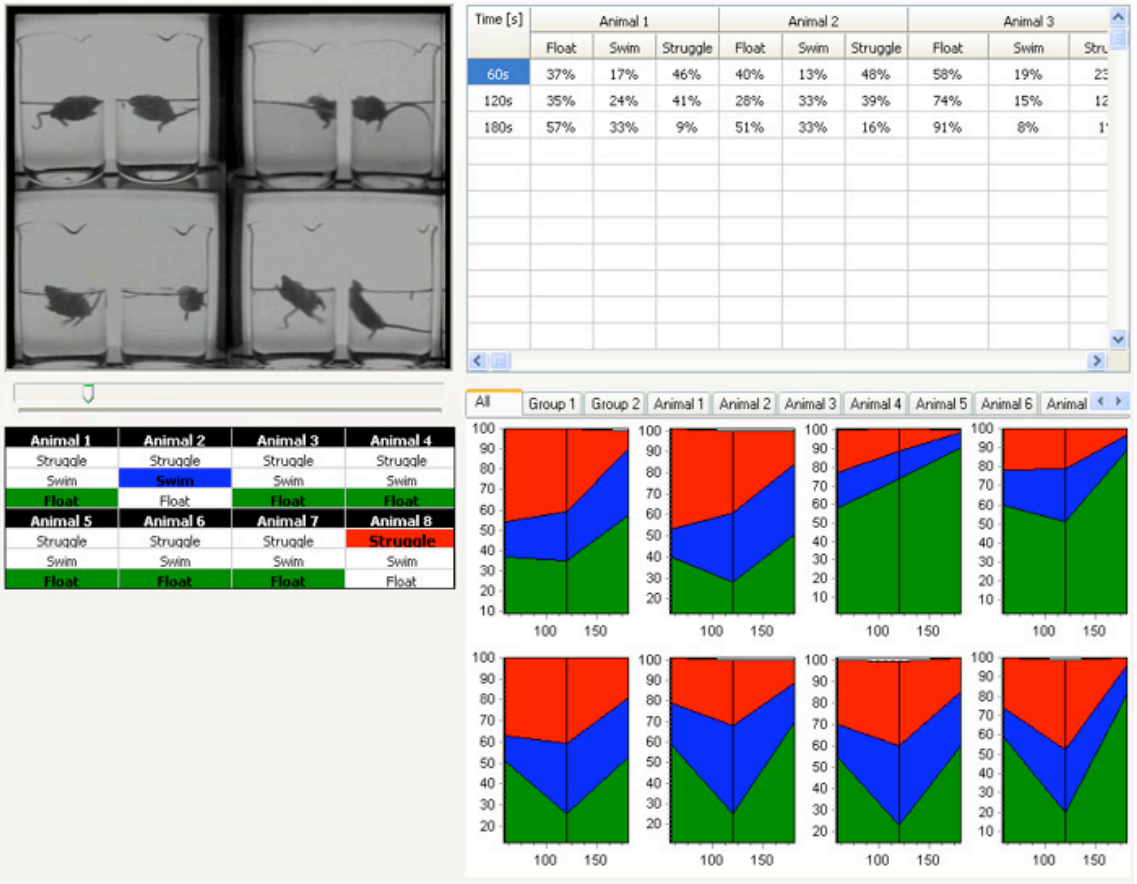
In this section the filter settings for the detection of the three different behaviors are done.

This only needs to be done once, when the whole system is set up. After that, no filter adjustment is necessary any more.

During the filter configuration the video input and the detected behaviors are shown in real time so it is very easy to adapt the filters until the results meet your expectations.

Program Tour - Acquisition

Data acquisition during the experiment



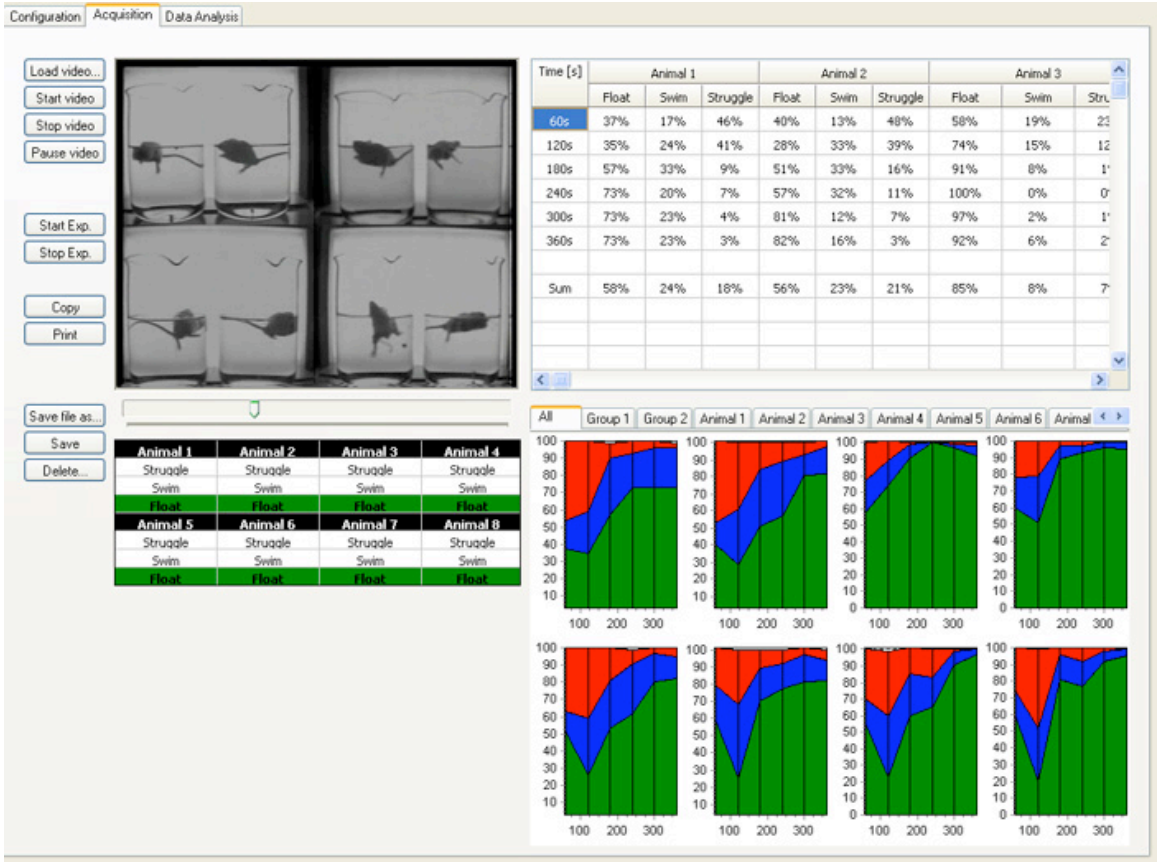
In the upper left corner, the video input of the 8 animals is shown. Underneath the video image, the currently detected behaviors are presented in real time for each single animal.

On the right side the summarized data are shown in a table and in diagrams, again for each single animal and also for the animal groups.

The table and the diagrams are updated in dependence of the analysis interval selected in the configuration (in this example every 60 seconds).

Program Tour - Acquisition

Finished experiment



The table and the diagrams show the data of the entire experiment (360 seconds). In the table there is now also a row that shows the mean values for each behavior.

All data and diagrams can be exported in various file formats.

Program Tour - Data Analysis

The integrated data analysis offers extensive possibilities to analyze and visualize the data. You can for example group the data of different animals of several experiments and perform intra- and inter-group calculations and comparisons.

This is a list of the provided values and calculations:

Individual analysis

Min and max values
Average
Trend
Exponetial trend
Polynoms
p-values of the functions
Standard deviation
Standard error
Upper approximate value

Group analysis

Min and max values
Average
Trend
Exponential trend
Polynoms
p-values of the functions
Standard deviation
Standard error
Upper approximate value
Standard dev. for single values
Standard err. for single values
St. dev. for single animals compared to group average
St. err. For single animals compared to group average

Group to group analysis

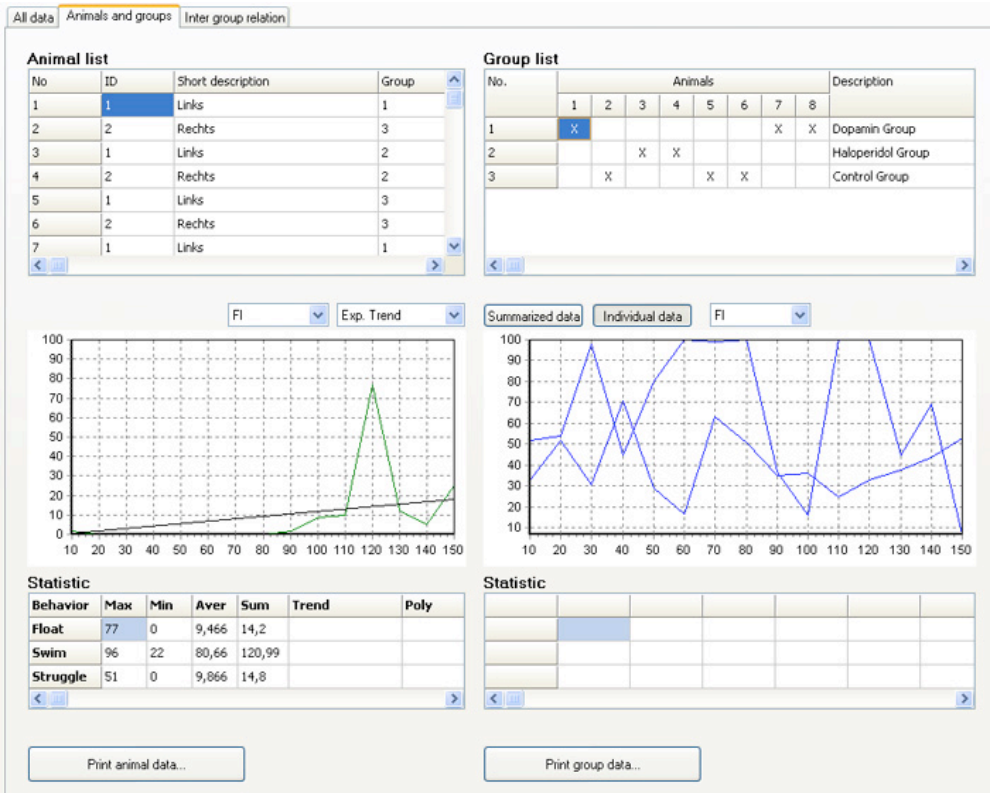
Min and max values and statistical relevant differences
Average and statistical relevant differences
Trend
Exponential trend
Polynoms
Standard deviation for single group values
Standard error for single group values
Standard deviation for groups against each other
Standard error for groups against each other
Combination of single groups statistics and the inter-group statistic for the claculation of the validity of the inter-broup statistic

Program Tour - Data Analysis

The following figures show an example for some data of three different groups.

Group list

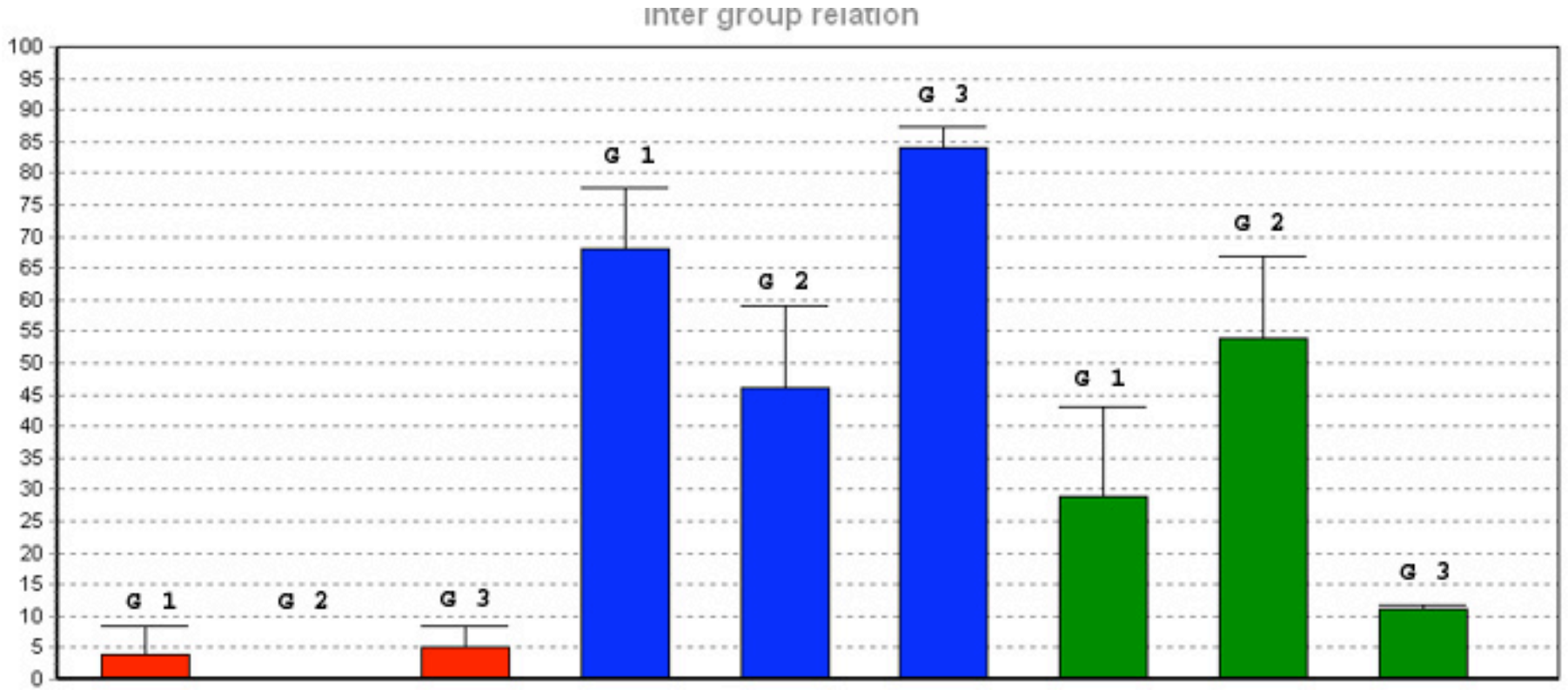
Use	No	Short description
☑	1	Dopamin Group
☑	2	Haloperidol Group
☑	3	Control Group



This figure shows the exponential trend for floating of animal 1 in group 1

Program Tour - Data Analysis

Inter group relations



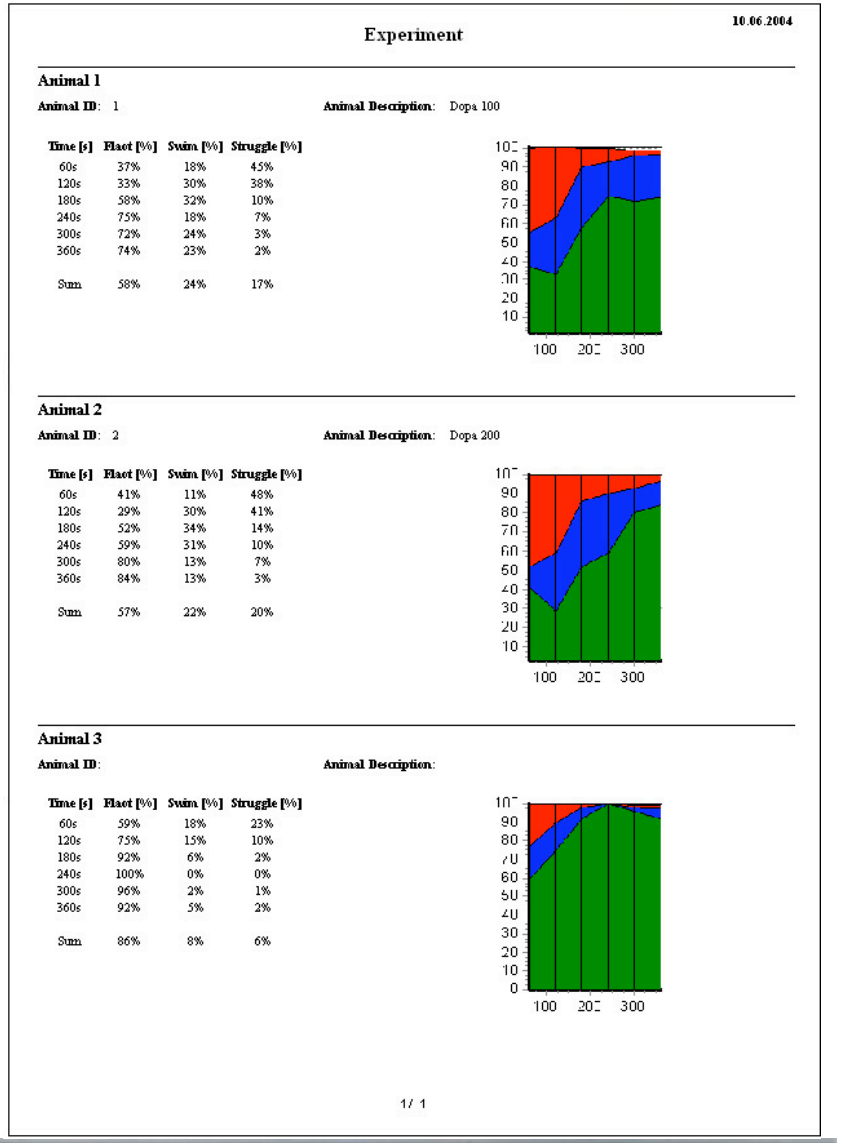
This figure shows the behaviors for the three different groups and you can easily compare the data. All data and graphs can be exported in different file formats.

Program Tour – Report generator

The integrated **report generator** makes it possible to create customized and standardized experiment reports in no time.

The reports are fully customizable. You can define what data are presented in which way.

This example report shows the basic data and diagrams of three animals.s



10.06.2004

Experiment

Animal 1

Animal ID: 1 **Animal Description:** Dopa 100

Time [s]	Float [%]	Swim [%]	Struggle [%]
60s	37%	18%	45%
120s	33%	30%	38%
180s	58%	32%	10%
240s	75%	18%	7%
300s	72%	24%	3%
360s	74%	23%	2%
Sum	58%	24%	17%

Animal 2

Animal ID: 2 **Animal Description:** Dopa 200

Time [s]	Float [%]	Swim [%]	Struggle [%]
60s	41%	11%	48%
120s	29%	30%	41%
180s	52%	34%	14%
240s	59%	31%	10%
300s	80%	13%	7%
360s	84%	13%	3%
Sum	57%	22%	20%

Animal 3

Animal ID: **Animal Description:**

Time [s]	Float [%]	Swim [%]	Struggle [%]
60s	59%	18%	23%
120s	75%	15%	10%
180s	92%	6%	2%
240s	100%	0%	0%
300s	96%	2%	1%
360s	92%	5%	2%
Sum	86%	8%	6%

1/ 1

Program Tour – Report generator

This example report shows more detailed data of one animal.

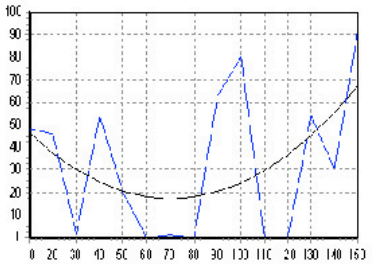
10.06.2004

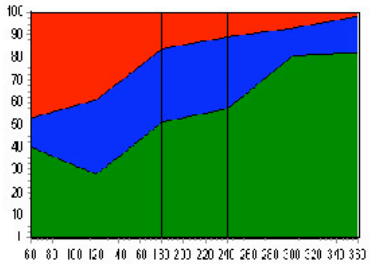
Single animal data

Animal information

ID: 1 **Short description**: Links **Group**: 1

Graphs





Data

Raw data

Time [s]	Float [%]	Swim [%]	Strug. [%]
10	52%	48%	0%
20	54%	46%	0%
30	98%	2%	0%
40	45%	54%	1%
50	80%	20%	0%
60	100%	0%	0%
70	99%	1%	0%
80	100%	0%	0%
90	37%	63%	0%
100	16%	80%	3%
110	100%	0%	0%
120	100%	0%	0%
130	45%	54%	1%
140	69%	30%	1%
150	7%	92%	1%

Statistic

Method	Float	Swim	Struggle
Max	100	92	3
Min	7	0	0
Aver	66,8	32,66	0,466
Sum	100,2	48,99	0,7
Trend	0,267x +41,40	0,399x +58,45	-5,55x +58,45
Poly	46,75 0,952 -0,00	46,31 -0,96 0,007	0,020 0,004 1,777
Std	32,71	32,05	0,83
Err	2,34	2,29	0,06

1 / 1

Add-on products

Custom made infrared illumination devices improve the results of the video analysis. These units also contain a camera. Each unit can be used with two animals.

An A/D video converter can be used to feed analog video material (either live or taped) into the system.

We offer all inclusive "out-of-the-box" systems that include all devices (computer, camera, cables, illumination etc.) that are necessary to set up an automated FST.

Digital video cameras (FireWire/iLink) are used to feed the video signal into the computer with the FST Analysis software.

A remote control to start and stop the program without the keyboard can be useful in behavioral experiments.

Thank you!

Thank you very much for your interest in our solution.

We hope we could provide you an useful overview over the features and capabilities of our high throughput Forced Swim Test Analysis Solution „FST Analysis“.

If you have further questions, please do not hesitate to contact us.

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