## SABLE ENABLES



# Ingestive Behavior Analysis

## Food Intake: Are you seeing the whole picture?



In the graphs above, we show intake events over a 24-hour period by 8 C57 BL/6J mice using logarithmic axes (error bars are 1 SE). In Graph A, the Promethion System's ability to detect micro intake events is demonstrated by the second cluster forming in the lower left portion of the graph. These micro events constitute 30-40% of feeding events, however, they would otherwise be undetected by conventional systems.



#### Promethion<sup>™</sup> Behavioral Phenotyping System

- Real-time behavioral data standalone or synchronized with metabolic measurement
- Home-cage comfort of an enriched environment
- Beam-break activity and continuous input from all in-cage devices
- Unbeatable temporal resolution from second-by-second observations
- Modular flexibility for various study sizes

### Ingestive Behavior: The Relevancy of What and How Much



Showing EE (left, red) and cumulative food intake (right, blue). EE increases while food is eaten because of the activity of eating, and remains elevated after food intake. This continued elevation is caused by diet induced thermogenesis (DIT), aslo known as SDA or specific dynamic action, which is thought to be the energy required to assimilate the food, and is greater for larger intakes of food. **Problem:** Animal behavior and metabolism are traditionally measured using very different techniques, thus, analyzing meaningful correlations between such phenomena is difficult or impossible. For example, metabolic measurements may take place every 30 minutes, intake measurements may be summarized by event, and behavior (e.g. activity) summarized over fixed windows of time. Moreover, the definitions of intake events and window durations cannot be retroactively changed, further limiting versatility and system efficiency.

**Sable Solution:** Designing a metabolic and behavioral monitoring system to overcome these shortcomings required a complete re-thinking of current practice. Promethion practical power is the the power of synchronized temporal resolution and data precision to extract unprecedented detail from circadian cycles of behavior and metabolism.

#### Ingestive Behavior: Monitoring Circadian Phenomena

The food uptake of 8 male C57BL/6 mice kept at a diurnal cycle 12/h/12h was measured at 6 different temperatures ranging from 19-29 Deg C. "Micro-intake" events (here defined as a single event with a food intake between 2 and 20 mg) typically lasted for <2.5 min, with some lasting < 1 min. Micro-intake events comprise 20-50% of total intake events. Within the light-cycle about 70% of all intake events occurred during the night-phase. However, the proportion of micro intake events to total intake events was higher during the day-phase than during the night-phase. This uptake pattern was shown by each individual mouse and did not change with temperature or, thus, with metabolic flux rates.



Although the contribution of 'micro-intake' events to total food intake amounts is relatively minor, each corresponds to a decision to initiate intake followed by rapid satiety and termination of feeding behavior. Thus, measurement of micro-intake events are relevant to the monitoring of a circadian influence on feeding.

animal	events total	micro total	% micro	dark events total	micro dark total	% micro dark	light events total	micro light total	% micro light
1	577	226	39.17	402	155	38.56	175	71	40.57
2	676	149	22.04	522	112	21.46	154	37	24.03
3	965	383	39.69	621	231	37.20	344	152	44.19
4	669	159	23.77	510	110	21.57	159	49	30.82
5	583	177	30.36	458	135	29.48	125	42	33.60
6	632	250	39.56	473	173	36.58	160	77	48.13
7	629	325	51.67	454	229	50.44	175	96	54.86
8	700	316	45.14	515	226	43.88	185	90	48.65

#### By Scientists. For Scientists.

Sable Systems International 6000 S. Eastern Ave., Bldg 1 Las Vegas, NV 89119 USA

TEL: US: +1 800 330 0465 / + 1 702 269 4445 EMAIL: sales@sablesys.com



Sable Systems Europe GmbH Ostendstr. 25 D-12459 Berlin, Germany TEL: +49 30/ 5304 1002 MOBILE: +49 176/ 2078 7008

