Mission Biomedical Scientific Inc.(MBS)
Frank J. Swenson Ph.D.

Introducing

METABO

An Innovative Metabolic Skin Sensor

for monitoring Total Metabolism

Team

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It’s Important To Measure Total Metabolism

Diet Control

Many individuals face challenges in controlling their diets.

Physical Activity Optimization

Optimizing physical activity levels can be a struggle for most people.

Chronic Disease Management

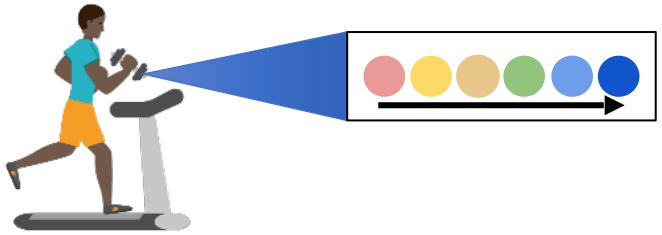
Managing chronic diseases like diabetes and obesity require rigorous monitoring.

Monitoring Total metabolism is extremely difficult. (Calorimetry Room is standard method)

Currently, we use Activity Trackers and Indirect Calorimetry but they do not measure TOTAL daily Metabolism

OUR SOLUTION

The METABO skin sensor
which will conveniently measure your true total metabolism



- A 24-hour+ disposable skin sensor that changes color as CO2 is captured by the sensor.
- Uses a proprietary MBS colorimeter and smartphone to measure color changes. We use Algorithms to translate color space values to caloric expenditure.

- Metabo changes color over a 10- 48 hour period. We take multiple readings using a color reader (colorimeter).

We developed a skin sensor to measure total metabolism

The METABO is superior to other methods that measure metabolism

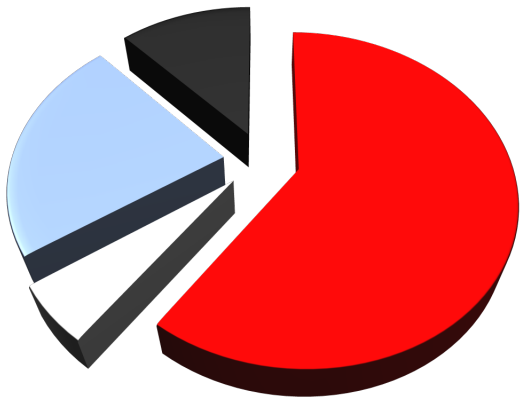
Comparison	Measurement	Accuracy	Convenience	Measures Continuously	Measures Total Metabolism
Wearable Fitness Monitors	Physical Activity Only	NO	YES	YES	NO
Indirect Calorimetry	Breath CO2 and (sometimes O2 decrease)	YES	NO	NO	NO
MBS Metabo	Skin CO2	YES	YES	YES	YES

Technology

CO2 Universal byproduct of metabolism.

- **4% of CO2 emitted from skin**
- 96% CO2 exhaled

Caloric expenditure in the body



- Basal Metabolism (50-70%)
- Metabolic Thermogenic Effects (3-8%)
- Physical Activity (15-30%)
- Variable (10-15%)

Example 1:Metabo would be useful for measuring metabolism from people using weight loss drugs

The recent introduction of GLP-1 Receptor Agonists (Ozempic, Wegovy and several more) has generated considerable public attention as it is proving to be an effective treatment for Diabetes and Obesity.

GLP-1 Positive effects include

- They lower blood sugar and benefit both kidney and heart health.
- Reportedly, they increase metabolism (specifically Basal and Thermogenic metabolic rates).

Currently there are no easy ways to monitor changes in total metabolism in people using Weight loss drugs.

Metabolism information could be useful to determine the correct dosage as well as the early detection of the GLP–1 plateau that eventually happens to most patients who lose weight quickly.

Example 2 :Metabo combined with current Metabolism devices

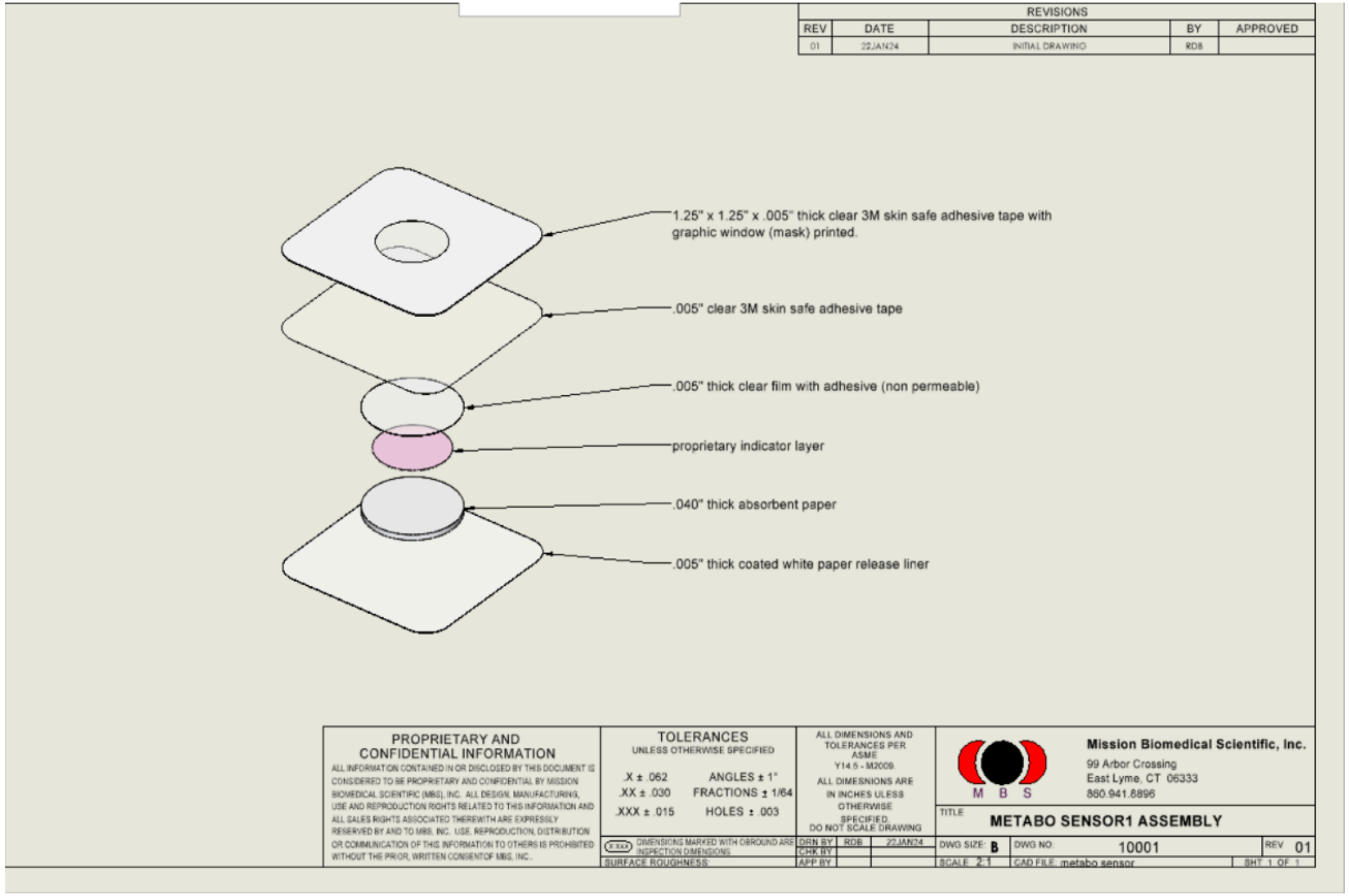
Wearables and smart devices and metabolism measurements

-Metabolic rate approximated from proxies (HR, activity, sleep).

- None measure of true caloric expenditure continuously.

-Metabo: First continuous metabolic rate sensor. Integration with Device or App for a comprehensive metabolic profile and advice.(e.g, Apple, Oura, Garmin, Whoop, Fitbit).

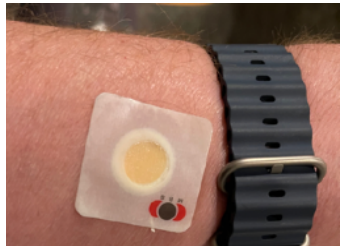
Metabo Skin Sensor Development



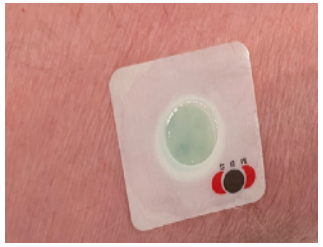
We measure the color changes over time as the CO2 accumulates in the Metabo Skin Sensor. Specifically, we measure the Hue value, using a handheld colorimeter.

start

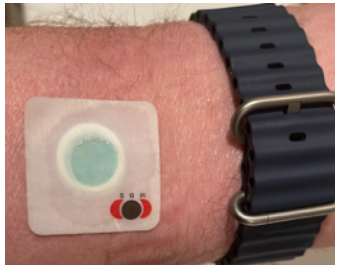
310 kcals



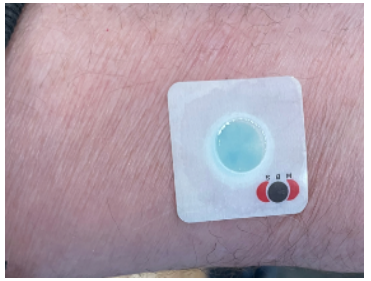
2409 kcals

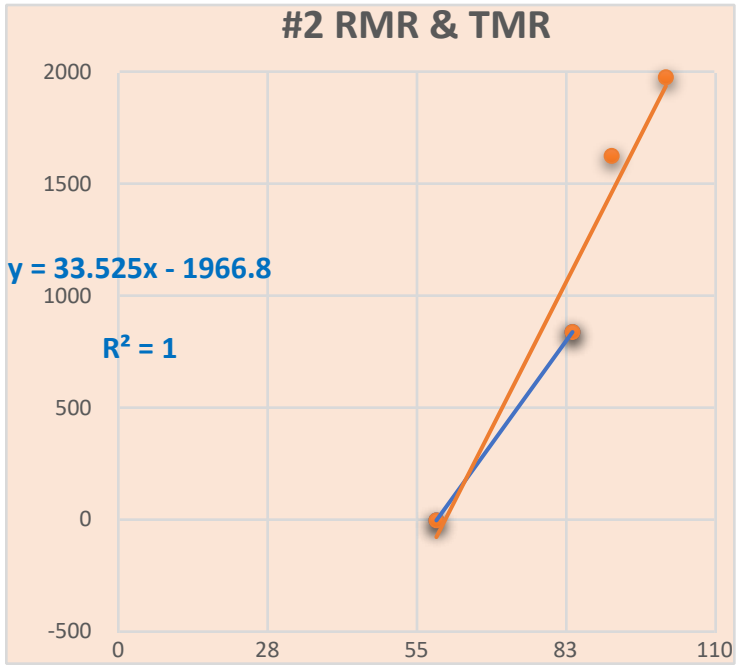


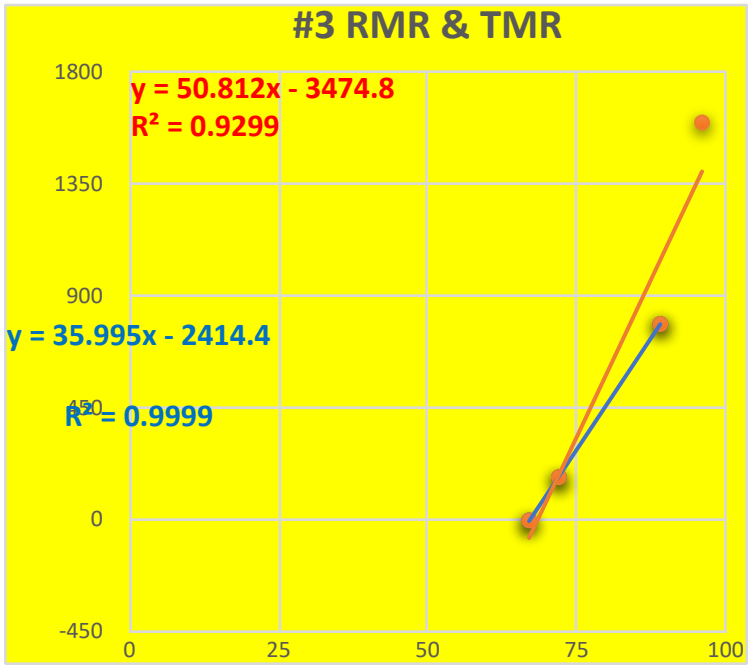
3112 kcals

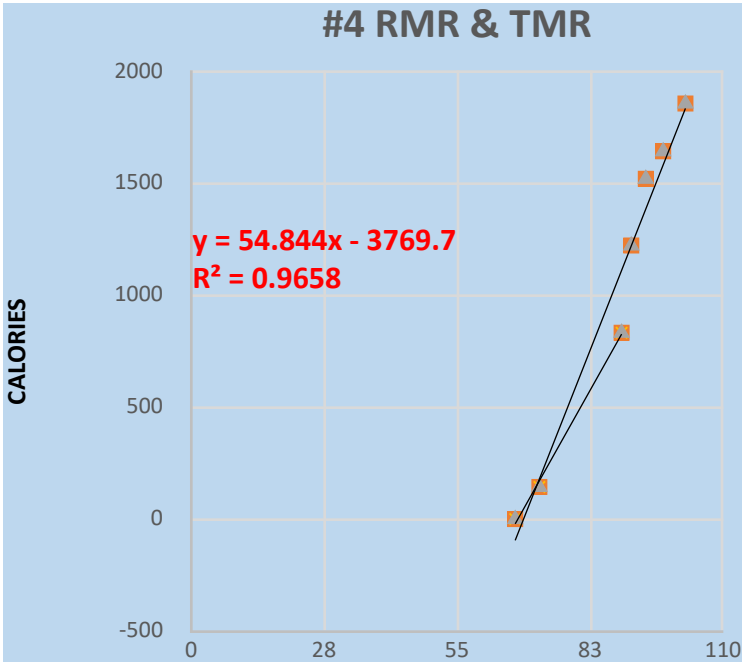


4264 kcals









	TMR	RMR	DIFFERENCE
#2	Y=47.61x-2868	Y=33.5x-1967	Y=1411x-901
#3	Y=66.7x-4613	Y=36x-2414	Y=30.7x-2199
#4	Y=54.8x-3770	Y=38.5x-2604	Y=16.3x-1166

TMR =TOTAL METABOLIC RATE

RMR = RESTING METABOLIC RATE

Accomplishments since Inception

- Submitted Provisional patent (April 2014)
- Founded Company (April 2015)
- Submitted Full US Patent (April 2015)
- US Patent **9,724,023 i**ssued (August 2017)
- New Provisional patent submitted (Sepember 2024)
- Finalized Metabo patentable design and formulation and tested on small number volunteers (2017-2024).
- Started developing designs of propriety reader. (2023-2025)

MBS Market Partnering Opportunities

Pharmaceutical Companies:

Companion Diagnostic for their GLP-1RA *drugs

Weight Loss Companies:

Measure true metabolic rate

Wearable activity monitor companies

(Apple, Fitbit etc.)

Indirect Calorimetry device companies

(Cosmed, Microlife etc.)

Next steps for MBS

Continue testing of sensor

Produce larger batch of skin sensors for testing

Hire Consultants

- **Marketing studies and Sales plan**
- **Manufacturing plan**
- **Clinical trials**

Skin sensor calibration further testing.

- **Test on healthy volunteers.**
- **Verification studies using metabollic carts and Calorimetry Room**

Hardware development

Continue development and testing of prototype reader

App Development

- **Develop preliminary App**
- **Develop Final App**

- **Expand organization**
- **Rent more Lab space**

- **Legal**
- **New patents, and other business development legal expenses**

How partners could help us

Provide financial backing for us to build the company and a combination and/or providing us access to partner's existing infrastructure and expertise.

Major Goals with support from Partners

- Scale up Metabo skin sensor production
- Scale up Metabo Reader production.
- Testing Metabo system on volunteer subjects for commercial applications in weight loss and physical exercise optimization.
- Testing our system in concert with Pharma and others including clinical trials.