

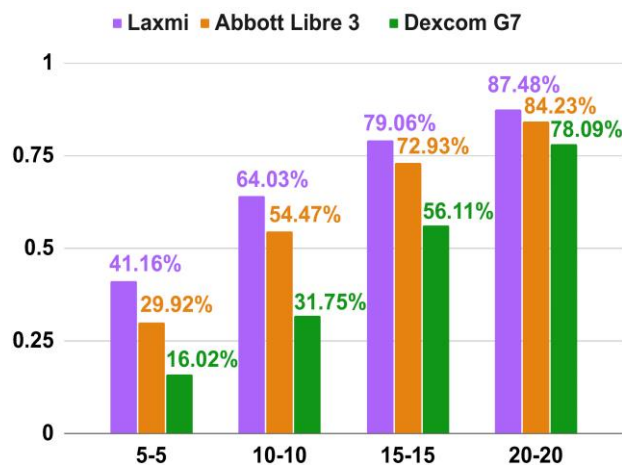
## INTRODUCTION

Continuous Glucose Monitors (CGMs) provide near to real-time glucose readings and trends, allowing individuals with Diabetes to make informed and timely decisions. However, currently developed CGMs are designed to measure glucose in the interstitial fluid (ISF) of the subcutaneous tissue, with a physiological delay (10-20 minutes) compared to blood. Additional delays arise from membrane mass transfer and digital signal processing. Such time delays can impact the timely detection and subsequent management of hypo and hyperglycemic events, particularly during rapid rates of change. To eliminate such time delays, we developed a novel CGM that measures glucose in the dermis, and we expected to observe a minimal time lag.

## METHODS

This study shows the results of the first prototype CGM developed by Laxmi. It is an electrochemical sensor based on glucose oxidase (GOx) chemistry. The sensor is inserted into the dermis using a patented inserter which reliably places the sensor in the dermal space (1.8 to 2.4 mm below the skin). To evaluate dermal sensing and its associated physiological time constant, we conducted a prospective, open label multi-center, non-significant risk study at two US-based clinical centers, where we had subjects with T1DM enroll and wear a first-generation prototype of the Laxmi CGM on the back of the arm, and simultaneously wear one of two commercial CGMs: Abbott FreeStyle Libre 3 (FSL3) or Dexcom (G7). The total study duration was 7 days, in which we compared data from both CGMs to plasma glucose over 3 in-clinic sessions in 55 subjects. The 1<sup>st</sup> session happened on either day 1 (48 subjects) or 2 (7 subjects), the 2<sup>nd</sup> session on day 4, and the 3<sup>rd</sup> session on day 7. In each clinic session, participants were fasting, and after the 2nd YSI measurement was taken, they consumed a standardized meal (570-650 calories, 12-15 g protein, 15-17 g total fat (9-11 g saturated), 97-107 g carbohydrate (62-85 g sugars)) to induce hyperglycemia. A total of 40 YSI measurements were performed in each clinic session over a duration of approximately 8 hours. Data from both the Laxmi and the comparator CGMs was compared against the YSI data, during euglycemia, hypoglycemia and hyperglycemia. **Figure 1** shows data of a Laxmi sensor from one clinic session.

**Figure 2: ISO Metrics – Percent of Measured Values within Ranges**



## RESULTS

Results from 55 subjects (56.4% Male, mean age 46.5, mean HbA1C 7.2%) showed that over 94% of the Laxmi prototype sensors had a time lag of less than 2 minutes. Using a YSI value as the calibration point at each clinic visit, data showed that the overall MARD for the Laxmi sensor was 10.4%, while the overall MARD for FSL3 was 13.3%, and 17.3% for G7. A 2-sided statistical comparison of distribution of these MARDs shows that the Laxmi CGM had superior performance to the commercial CGMs with a p-value of <0.001 across all groups. Analysis of accuracy over rates of change from -3 to 3 mg/dl/min demonstrates that Laxmi CGM is superior across most ranges (**Table 1**). Data of ISO metrics is in **Figure 2**, where 15/15 means 15 mg/dl below 100 mg/dl and 15% above 100 mg/dl. Overall, the data clearly demonstrates that dermal sensing could be more accurate than sensing in the subcutaneous tissue.

## CONCLUSION

In this clinical study with data from 55 subjects, we have demonstrated that our first-generation prototype CGM using dermal sensing has a low time constant that offers near instantaneous readings of glucose, which outperforms that of currently available commercial CGMs, and offers the potential for an advancement in accuracy. We are actively pursuing a second-generation, fully disposable product that will be commercializable. The second-generation product will have a transmitter form factor that is smaller than the G7, and will employ a new, patentable technique for factory calibration that will not rely on a blood-based calibration.

**Figure 1: Data from a Clinic Session**



**Table 1: Superiority of Laxmi CGM Across Most Rates of Change**

Rate of Change	Significance (p): Laxmi vs Both Comparators (Libre 3 and G7)
< -2.5 mg/dL/min	0.45
-2.5 to -1.5 mg/dL/min	0.61
-1.5 to -0.5 mg/dL/min	< 0.001
-0.5 to 0.5 mg/dL/min	< 0.001
0.5 to 1.5 mg/dL/min	< 0.001
1.5 to 2.5 mg/dL/min	< 0.001
> 2.5 mg/dL/min	< 0.001