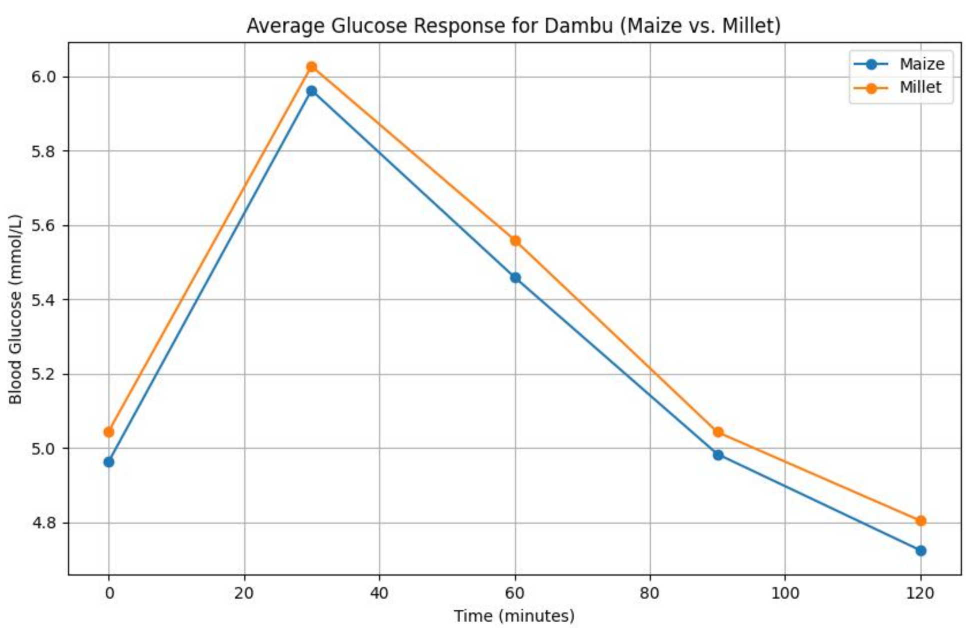
Research Pilot Project: Modeling Glycemic Response of Local Meals (Dambu) and Predicting Diabetes Risk

Overview

This pilot project focuses on analyzing the glycemic response of local meals called Dambu, specifically comparing those made from Maize and Millet. By measuring blood glucose levels over time after meal consumption, we aim to model the body's glucose response and assess the relative diabetes risk associated with these traditional foods. Additionally, the project includes simulating the progression of antibiotic resistance in bacterial populations, reflecting Otondo's broader commitment to AI-driven preventive healthcare.

Graph Explanation: Average Blood Glucose Response for Dambu (Maize vs. Millet)

The graph below illustrates the average blood glucose concentrations (mmol/L) measured at 0, 30, 60, 90, and 120 minutes after consuming Dambu made from Maize and Millet.



X-Axis: Time (minutes) after meal consumption
Y-Axis: Blood Glucose Concentration (mmol/L)
Lines: Blue line represents Maize-based Dambu, and the orange line represents Millet-based Dambu.

Key Observations

• Both types of Dambu cause a significant increase in blood glucose, peaking at 30 minutes post-consumption.
• Millet-based Dambu leads to a slightly higher peak glucose (~6.03 mmol/L) than Maize (~5.96 mmol/L).
• Post-peak, glucose levels decline steadily but remain slightly elevated for Millet compared to Maize across the 2-hour monitoring period.

Interpretation and Implications for Diabetes Risk

• Glycemic Impact: Millet may have a higher glycemic index than Maize, indicated by the higher and prolonged glucose response.
• Diabetes Risk: Foods causing rapid, high glucose spikes could increase the risk of insulin resistance and type 2 diabetes over time.
• Dietary Recommendations: Identifying such differences enables more tailored dietary guidelines for populations reliant on these staple foods.

AI-Driven Preventive Healthcare Applications

1. Modeling Glycemic Response

- Using collected glucose data, AI models can predict how individuals respond to specific local meals.
  This supports personalized nutrition plans to prevent elevated blood sugar and manage diabetes risk effectively.

2. Predicting Diabetes Risk

- AI algorithms can incorporate glycemic responses, demographic, and health data to estimate long-term diabetes risk.
  This enables early identification of at-risk individuals for timely intervention.

3. Simulating Antibiotic Resistance Progression

- The project also models bacterial population dynamics to understand and predict antibiotic resistance trends.
  This is crucial for managing infections, particularly in diabetic patients who are more vulnerable to resistant pathogens.

4. Commitment to Innovation

- Otondo's integration of AI in analyzing glycemic data and bacterial resistance highlights a holistic approach to preventive healthcare.
  The project advances proactive health management and precision medicine tailored to local contexts.

Conclusion

The pilot study’s glycemic response data forms a foundation for AI-powered tools that predict and reduce diabetes risk while addressing antibiotic resistance challenges. By leveraging local dietary insights, Otondo demonstrates leadership in AI-driven, preventive healthcare solutions that can improve outcomes in at-risk populations.