Background

Celiac Disease and Gluten Intolerance

- There is an unmet need to identify a solution for Celiac Disease and Gluten Intolerance.
- To meet this need, last year, I identified A larger 33-mer peptide from gliadin that three fruit enzymes Papain (in Papaya Skin), Bromelain (in Pineapple) and Actinidin (in Kiwi) when combined respectively in the 1:2:3 ratio can effectively breakdown gluten proteins in wheat. This combination of enzymes is referred to as 1-2-3 EC MIX.
- Based on this finding I proposed two models for the breakdown of gluten by the three enzymes.
- This year, I continued to validate my findings and my proposed models to move it one step closer to clinics as I am optimistic about the potential this novel enzyme mix holds for this patient population.

Experimental Methods

Model Validation and Preclinical Testing of Digestive Enzymes for Gluten Breakdown: A Move to Cure Gluten Intolerance and Celiac Disease

Rationale

- Previous studies have shown that:
  - A larger 33-mer peptide from gliadin is an immunodominant gluten peptide that initiates strong immune response in CD patients.
  - This 33-mer gets deamidated by Transglutaminase (TG2) that causes severe T-cell immune stimulation.
- To test my proposed models, this year I intend to use these peptides and investigate the efficacy of 1-2-3 EC MIX in degrading the immunogenic peptides.

Results

Mass Spectrometry Peaks and Identification of Samples

Results CONTINUED

Results 2 - 1-2-3 EC MIX is effective in breaking down gliadin in the stomach acidic environment

Experimental Results

Gluten peptides treatment with 1-2-3 EC MIX

Results 3 - 1-2-3 EC MIX significantly degraded gliadin at pH 6.2 and at acidic pH 2.5/2.7-2.9 compared to sequential addition of 1/2/3 enzymes and 1-2-3 EC MIX functions better than store bought pill as measured by Elisa G12 assay.

Results 4 - Gliadin immunogenic epitopes treated with 1-2-3 EC MIX loses its ability in stimulating T-cell response

Discussion

Testing the efficacy of 1-2-3 EC MIX in targeting and digesting gluten using human gluten-reactive intestinal T cell line (ITCL). These cells are cultured from the intestinal tissue collected from celiac disease patient.

Summary of Work

Future Work

References