Microarray of the wheat proteome to detect and classify gluten and non-gluten wheat sensitivity

*Technology #cu12253*

Celiac disease, wheat allergy and gluten intolerance have recently been thrust into the spotlight as gluten-free diets become more common in society today. However, there is controversy as to whether gluten has negative consequences in non-celiac individuals. In addition, the correlation between gluten and a range of human disorders is unclear. These complications are in part due to inconsistent scientific results stemming from the fact that “gluten” is a complex mixture comprising over 70 different molecules in any given wheat variety. In addition, recently published data indicate that in addition to the well-recognized immune reaction to gluten, celiac disease is associated with a robust antibody response directed at a specific subset of the non-gluten proteins of wheat. This technology is a microarray of hundreds of gluten and non-gluten wheat proteins for the probing and classification of an immune response to wheat. The high-throughput technology may expand upon the characterization of an individual’s immunogenic response to wheat and may lead to insight about the underlying mechanisms of purported links between wheat and other disorders.

Standardized, high-throughput microarray simplifies analysis while expanding results to non-celiac responses to wheat

For years now, evidence has suggested a link between immune reactivity to gluten and the development of neuropsychiatric disorders such as autism spectrum disorder, bipolar disorder or schizophrenia. Furthermore, many patients report celiac-like symptoms without histologic or serologic evidence of celiac disease or wheat allergy. Recent findings report that the immune response to wheat in celiac patients significantly differs from that of autistic children, and underscores the importance of expanding study parameters to include wheat proteins outside the celiac-specific peptides. The technology accomplishes this in a microarray design to keep costs low while maintaining or even increasing throughput when compared to classical methods.

Prototypical microarrays have been printed and display marked differences in reactivity between patients and healthy controls.
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Applications:

- Expand immunological investigations of wheat intolerance to non-celiac peptides.
- Biomarkers discovery for complex diseases that display an abnormal response to wheat.
- Standardize the evaluation of immune responses between celiac disease, wheat allergy, and non-celiac gluten sensitivity to simplify research efforts while expanding the knowledge gained.
- Detecting patterns of cross-reactive autoantibodies in other disorders.
- Provide valuable disease-related information to assist healthcare workers in drafting personalized medicine treatment plans.
- High throughput analysis of immune reactivity towards gluten and non-gluten wheat proteins.

Advantages:

- Compact, low-cost, high-throughput assay
- Potential to standardize research efforts across multiple institutions
- Microarray design allows for flexibility to include different varieties of wheat, controls, or specific peptides to stay up-to-date with on-going research

Patent Information:

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Related Publications:

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