Columbia Technology Ventures

Bacterial peptides to attenuate infection or autoimmune disease

Technology #cu14287

Commensal mucosal microbiota have been gaining appreciation for their ability to dramatically affect a host’s immune response to other pathogenic bacteria, fungi, and viruses as well as being indispensable for proper metabolic function. These symbiotic microorganisms have proven to be a major determinant on the type and robustness of immune responses. This technology identified specific peptides from segmented filamentous bacteria (SFB) that inhabit the intestines of humans and other mammals as the major cues for T cells to differentiate into T helper 17 (Th17) cells. The technology further describes which pathways are required for Th17 induction. The significance of this finding is underscored by the fact that Th17 cells have the dualistic effect of producing cytokines that fight off infections while also being a key player in inflammation and autoimmune disorders.

Simplified modulation of immune function without the requirement for live cultures

While previous investigations have shown that SFB colonization is capable of inducing an immune response by increasing Th17 cell numbers or their response, they required live cultures in order to carry out this function. This technology has identified the key peptides that SFB provide and thus provides a potential approach that does not require infection using live bacterium. This technology may then help increase an immune response in compromised individuals via delivery of these of these peptides. This technology may also aid in the development of antibodies to downregulate the response to SFB peptides in individuals with autoimmune or inflammatory disorders. Furthermore, the technology has demonstrated this effect is localized and does not require peripheral lymph nodes, thus offering the potential for targeted immune modulation based on an individual’s needs (e.g. modulation of immune response in the lungs of cystic fibrosis patients).

The technology has been validated in vivo using mouse models.
Lead Inventor:

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Applications:

- Increase the immune response in individuals who are immune compromised
- Aid in the development of inactivating antibodies to downregulate Th17 activity in subjects with autoimmune disorders
- Engineer specific SFB strains that contain antigens capable of promoting immune health
- Create peptide adjuvants to increase the effectiveness of vaccines

Advantages:

- Does not require colonization with live bacteria which may be detrimental in immune compromised individuals
- Produces a localized effect and could be used in patients with malfunctioning peripheral lymph node systems or as a targeted therapy
- Because the technology does not require colonization, the effect could be transient in nature, thus allowing acute induction of a strengthened immune response during cold and flu season or in response to acute outbreaks

Patent information:

Patent Pending

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Related Publications:


Inventors

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