"GO NUTS, WITHOUT PEANUTS!"

Background

Food allergies are an increasing health issue in several countries and the number of children affected have been doubled between the years of 1997 and 2011. It has been calculated that 4% of the world population have some kind of food allergy. The most common food allergies are caused by proteins, so called allergens, from tree nuts, peanuts, milk, eggs, fish, shellfish, wheat and so on. Peanut allergy is not the most common of these food allergies but it is what causes the most number of deaths due to anaphylaxis, where blood pressure drops abruptly and severe breathing difficulties occur. Peanut allergy is a chronic condition in the majority of cases, less than 20% outgrow their allergy. Today there is no cure for food allergies. Avoidance of food allergens is therefore the main solution available for those living with food allergies to prevent serious health consequences.

LIU iGEM’s project 2015 is to create a portable and for the consumer easy to use allergen detector, specific for the most prevalent peanut allergen Ara h 1.

Solution

The detection system consists of two compartments, one chemical and one physical. The chemical part is an antibody complex, designed by the LIU iGEM team, consisting of Ara h 1 specific antibodies and fluorescent proteins, fluorescein isothiocyanate (FITC) and red fluorescent protein (RFP), which is linked to an epitope complex. If the sample of interest, a chocolate bar or a restaurant dish, contains Ara h 1, i.e. peanuts, the allergen will bind to the antibody complex causing a change in fluorescent emission. The change in fluorescent emission can be detected and processed by the physical compartment, a biosensor. The physical detector provides an easy color indication, colored lamps, correlated to the changes in fluorescence. A red lamp indicates contamination of peanuts while a green indicates it’s safe to eat.

Policy and practices

To spread knowledge and create interest in synthetic biology, LIU iGEM have been active through social media, newcast as well as through social interactions at several conventions, all from which great responses have been received. LIU iGEM was interviewed by SVT (Swedish television) after which the project appeared both at local as well as national news. A lot of people have contacted LIU iGEM for interest, both in the allergen detector and for iGEM in general.

Several projects for educational purpose has been accomplished. A mini documentary about food allergies have been produced as well as a childrens book about allergies. To give the general public an insight into the field of synthetic biology, the “science 2 go” project was implemented. Short summaries of scientific articles was then written and posted on the teams facebook page.

References