

Table of Contents

- What is Food Allergy – **William**
- Our research on existing solutions – **Jex**
- Solutions We came up with – **Daniel**
- How did the team analyze this problem – **Maya**
- Sharing Ideas with Communities – **Angelina**
- Q&A – **Team**
- Appendix (Back-up Slides)

What is Food Allergy?

- Food allergies is when someone's immune system thinks that something the person ate is harmful to the body when it actually is not. To protect the body, the immune system makes IgE antibodies to that food. IgE antibodies turn on the mast cells (allergy cells in the body) to release chemicals into the bloodstream. One of the chemicals made by the mast cells are histamine. Histamine go to the eyes, nose, throat, lungs, or skin, and make allergic reactions.
- Once the body has made antibodies against a certain food, the antibodies remember that food. Each time the person eats the food, the body releases histamine into the bloodstream again, creating allergy symptoms. In severe food allergies, reactions happen even if the person touches or breathes in parts of the food.

Some reactions to food allergies are:

1. **Skin**. Skin reactions are the most common type of food allergy reactions. They can take the form of itchy, red, bumpy rashes (hives), eczema, or redness and swelling around the mouth or face.
2. **Gastrointestinal system** Symptoms can take the form of belly cramps, nausea, vomiting, or diarrhea.
3. **Respiratory system** Symptoms can range from a runny or stuffy nose, itchy, watery eyes, and sneezing to the triggering of asthma with coughing and wheezing.
4. **Cardiovascular system**. A person may feel lightheaded or faint.

Existing Solutions for Food Allergies

Treat

- For example, giving small doses to the person with allergic reaction (http://kidshealth.org/parent/growth/feeding/food_allergies.html)

Avoid

- Reading labels
- Alerting teachers and friends

We came up with four solutions

- **Treat**
 - Anti-food Allergy Filter
 - Device to Destroy Allergens
- **Avoid**
 - Wireless Food Allergy Sensor/ Scanner
 - iPhone with a sensor

Treat Food Allergy Better

Filter to Remove Allergens

Features:

- Filter solids and liquids
- Disposable or reusable
- Able to fold into a box
- Washable

Materials:

- Surgical steel
- Bamboo or Charcoal?

Color/Size/Shape:

- Customized color
- Tennis ball size can fit in lunch box

Price:

- \$100 (reusable)
- 6 pack at \$20

Targeted Customers:

- General Public

Device to Destroy the Allergens

Features:

- Release chemical content to disintegrate the allergic chemicals

Color/size/shape:

- "Like microwave" put food inside to kill the allergic ingredients

Price:

- \$200

Benefits:


- Non-contact
- Powerful
- Can process food in large quantities


Avoid Food Allergies Easier

<p>iPhone and Sensor Camera</p> <p><u>Features:</u></p> <ul style="list-style-type: none">• Asks for personal profile information• Send radio waves to food to detect ingredients• Download your allergy testing results from your doctor <p><u>Price-point possibilities:</u></p> <ul style="list-style-type: none">• \$75• \$100• \$150	<p>Wireless Food Allergy Sensor/Scanner</p> <p><u>Features:</u></p> <p>Device and sensor connected by</p> <ul style="list-style-type: none">•Wi-Fi•Bluetooth•USB wire <p>Devices can be</p> <ul style="list-style-type: none">•iPad•iPhone (or other smart phone)•Laptop <p><u>Price:</u></p> <p>\$100</p>
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How we analyzed this problem

- **Step 1 - Brainstormed**
 - We thought up ideas from something we've seen or heard of before
 - or we just made up something and fine-tuned the details to make it more realistic





- **Step 2 - Detailed**

Then we wrote down our ideas
And we thought about the details
- **Step 3 - Voted**

When we were done, we voted on the ones we were going to talk about to the doctor

Solution voted as the best – Wireless Sensor



OR



Team Interview # 1 – Dr. Joshua Makower at ExplorAMed

- **Joshua Makower, M.D.**
 - The founder & Chief Executive Officer of ExploraMed
 - Serves as a Consulting Associate Professor of Medicine at Stanford University Medical School and is Co-Founder of Stanford's Biodesign Innovation Program
- **What we learned from him**
 - He likes the idea of food allergy sensor. Actually his company had evaluated and invested in a food allergy sensor before.
 - “Never Give Up” as inventions don't always get it right in the first time, even for serial entrepreneurs and professionals
 - He recommended a textbook “Biodesign: The process of innovating medical technologies” he co-authored



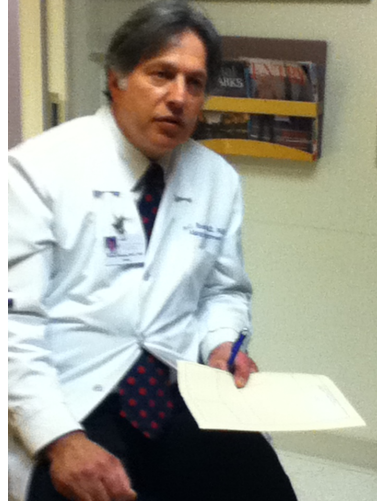
Team Interview # 2 – Prof. Jan Benjamin Pietzsch at Stanford Univ.

- **Dr. Jan Benjamin Pietzsch**
 - Consulting Assistant Professor in the Department of Management Science and Engineering at Stanford University
 - co-founder, President and CEO of Wing Tech Inc. a management consulting firm active in the fields of technology assessment, advanced systems analysis, and strategic decision support
- **What we learned from him**
 - [Google Scholar](#) is helpful for research a certain topic
 - We should also consider [Patient Groups](#) to get feedback from the potential users
 - When deciding the price of a piece of medical equipment, you should first think about the cost/benefit to the patients.



Team Interview # 3 – Dr. Robert Bocian at PAMF

- **Robert C. Bocian, M.D., Ph.D., FAAAAI**
 - Doctor in Pediatric, Specialty, Allergy & Immunology Department in Palo Alto Medical Foundation
 - Adjunct Clinical Associate Professor of Pediatrics Stanford University School of Medicine Lucile Salter Packard Children's Hospital at Stanford
- **What we learned from him**
 - 7% of children have symptoms because of food allergies. The other 93% have food-related problems.
 - The percentage of kids with food allergies has increased over the years. No one knows why, but there are lots of theories.
 - Central California is the most allergenic place in the world because there is no "hard freeze" any time. It's spring all year long.
 - There are five types of immunoglobulin: IgG, IgA, IgM, IgE, and IgD.



Thank You!

Questions?

APPENDIX – BACK UP SLIDES

Other Research that we have done

Relevant Topic	URL	How we found this link	Interesting Points
Food solutions for food allergy	http://www.whatcanieat.com.au/	Search "Food allergy filter"	
Food allergy testing from VEGA	http://www.pacificallergics.com/vega.htm	Search "Food allergy neutral device"	
Better way to detect food allergy	http://www.sciencedaily.com/releases/2010/05/100521191241.htm	Search "food allergy testing robot"	Love is now working with Dale Umetsu, professor of pediatric immunology at Children's Hospital Boston, on a project they hope will pinpoint the relationship between cytokine activity and allergic reactions. In that study, children with milk allergies are
Treating food allergies with allergens	http://www.cbsnews.com/stories/2006/11/28/health/webmd/main2213564.shtml	Search "food allergy desensitize"	As many as 12 million Americans have food allergies, says Ann Munoz-Furlong, chief executive officer and founder of The Food Allergy and Anaphylaxis Network. Roughly 8 percent of children under the age of 3 are allergic to some food, she says. Most children outgrow their food allergies, but there is currently no way to tell which ones will and which ones won't, she tells WebMD. "That is just one of the things we don't know," she says. "We don't know why one twin might have a food allergy while the other doesn't, and we can't predict who will have [life-threatening] anaphylactic reactions." SOURCES: Buchanan, A. Journal of Allergy and Clinical Immunology, Nov. 21, 2006; online edition. A. Wesley Burks, M.D., department of pediatrics, Duke University Medical Center, Durham, N.C. Ann Munoz-Furlong, CEO and founder, Food Allergy and Anaphylaxis Network.
iPhone allergy app	http://www.mynewsdesk.com/us/view/press-release/food-allergies-slain-by-cell-phones-409496	Search "food allergy scanner"	The next obvious step is already underway. An iPhone application is being crafted to read the barcode and give a red or green light on whether a particular food is allergen free. Originally developed by Deakin University, this particular app is being comp

Questions to Ask the Experts

- **About food allergies**

- Why does your body not like the certain type of food that your body is allergic to?
- Do all people who have allergies have the same reactions?
- Why do people get food allergies?
- Can you get food allergies while you are living or does it occur when you are born?
- Can you die from food allergies?

Questions to Ask the Experts

- **About our solutions**

- Which solution do you like better? Why?
- Which solution would have a better chance to implement? Why?
- Do you know of any similar solutions in the market?
- Who / where else should we get more feedback / research from?

Questions to Ask the Experts

- **About the Expert**

- What inspired you to become a doctor
- What interested you when you were our age
- What education and training needed to follow this career
- What are some qualities that would help in this career
- What do you like most about your job
- What do you like least about your job
- What is a typical workday like for you?
- Do you treat food allergies?
- How do you decide the price for a medical device or solution

- <http://www.drspock.com/article/0,1510,5692,00.html>
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- **Diagnosing and Treating Food Allergies**
- by [Robert Needlman, M.D., F.A.A.P.](#)
reviewed by [Laura Jana, M.D., F.A.A.P.](#)
Reprinted from *Scholastic Parent and Child* magazine
-
- Without question, the most [effective treatment](#) is to avoid the offending food. This is easier for some foods (nuts, shellfish, fish, and soy) than for others (dairy, wheat, eggs, and peanuts). As the grocery shopper in the home, you have to read every label, stay away from most commercially baked breads and cookies, find substitutes for milk, and so on.
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- Also remember that [medication](#)
- can treat the symptoms, but it can't cure the underlying food allergy itself. Experts continue to learn about prevention, however. For example, breastfeeding for at least four to six weeks reduces the risk of food allergies, as does delaying introduction of highly allergic foods (like wheat and eggs) until age one, and even until age three for peanuts and shellfish. These precautions are especially worthwhile if your family has a history of food allergies.
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- **Helpful websites**
- The Food Allergy Network, (800) 929-4040, www.foodallergy.org
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- The American Academy of Allergy, Asthma, and Immunology, (800) 822-2762, www.aaaai.org
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- <http://www.webmd.com/allergies/news/20061128/food-allergies-possibly-treated-with-allergic-food>
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- **Treating Allergies With Allergic Food**
- Pilot Study Offers Hope Food Allergy Sufferers Can Build Tolerance
- By [Salynn Boyles](#)
WebMD Health News
- Reviewed by [Louise Chang, MD](#)
- Nov. 28, 2006 -- Children with food allergies are told to avoid problem foods at all costs, but a novel experimental treatment is taking the opposite approach.
- In a two-year pilot study conducted by researchers at Duke University and the University of Arkansas, eggs were very gradually introduced into the [diets](#) of kids who were highly allergic to them in an effort to desensitize the children.
- A similar study is under way involving children with peanut [allergies](#), which more often trigger potentially life-threatening allergic reactions.
- Early findings suggest that this gradual challenge approach increases tolerance to problem foods, senior researcher A. Wesley Burks, MD, tells WebMD. Burks is a professor of pediatrics at Duke University Medical Center.
- Researchers hope desensitization will help protect food allergy sufferers from serious reactions brought on by accidental ingestion of problem foods.
- It may even cure people of their food allergies, although it is too soon to tell, Burks adds.

- http://kidshealth.org/parent/growth/feeding/food_allergies.html#
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- **Treating a Food Allergy**
- After diagnosing your child with a food allergy, the allergist will help you create a treatment plan. No medication can cure food allergies, so treatment usually means avoiding the allergen and all the foods that contain it.
- You'll need to familiarize yourself with [food labels](#) so you can avoid the allergen. Since 2006, a new food labeling law has made this a little easier. Makers of packaged foods are required to clearly state, in or near the ingredient lists, whether the product contains milk, eggs, fish, shellfish, tree nuts, peanuts, wheat, or soy.
- Although there's no cure for food allergies, medications can treat both minor and severe symptoms. Antihistamines might be used to treat symptoms such as hives, runny nose, or abdominal pain associated with an allergic reaction.
- If your child wheezes or has [asthma](#) flares (also called attacks) as the result of a food allergy, the doctor will likely recommend that a bronchodilator such as albuterol (which can be inhaled from a handheld pump device) be taken right away to reduce breathing difficulties.