



EzIergy

Overcome Food Allergy: Next generation
Allergn-Specific Immunotherapy

SYSTSEM DESIGN YUJING TANG



Is it Ok to be *TOO CLEAN*?

Hygiene Hypothesis

For many children in the wealthy world, a lack of exposure to bacteria, viruses, and allergens prevents the normal development of the immune system, ultimately increasing the chance of disorders within this system down the road. This is called the hygiene hypothesis.

“Food allergy is an important issue of growing national concern.”

> 200,000 Cases /year

Each year in the U.S., 200,000 people require emergency medical care for allergic reactions to food.

+ 377% Over the last Decade

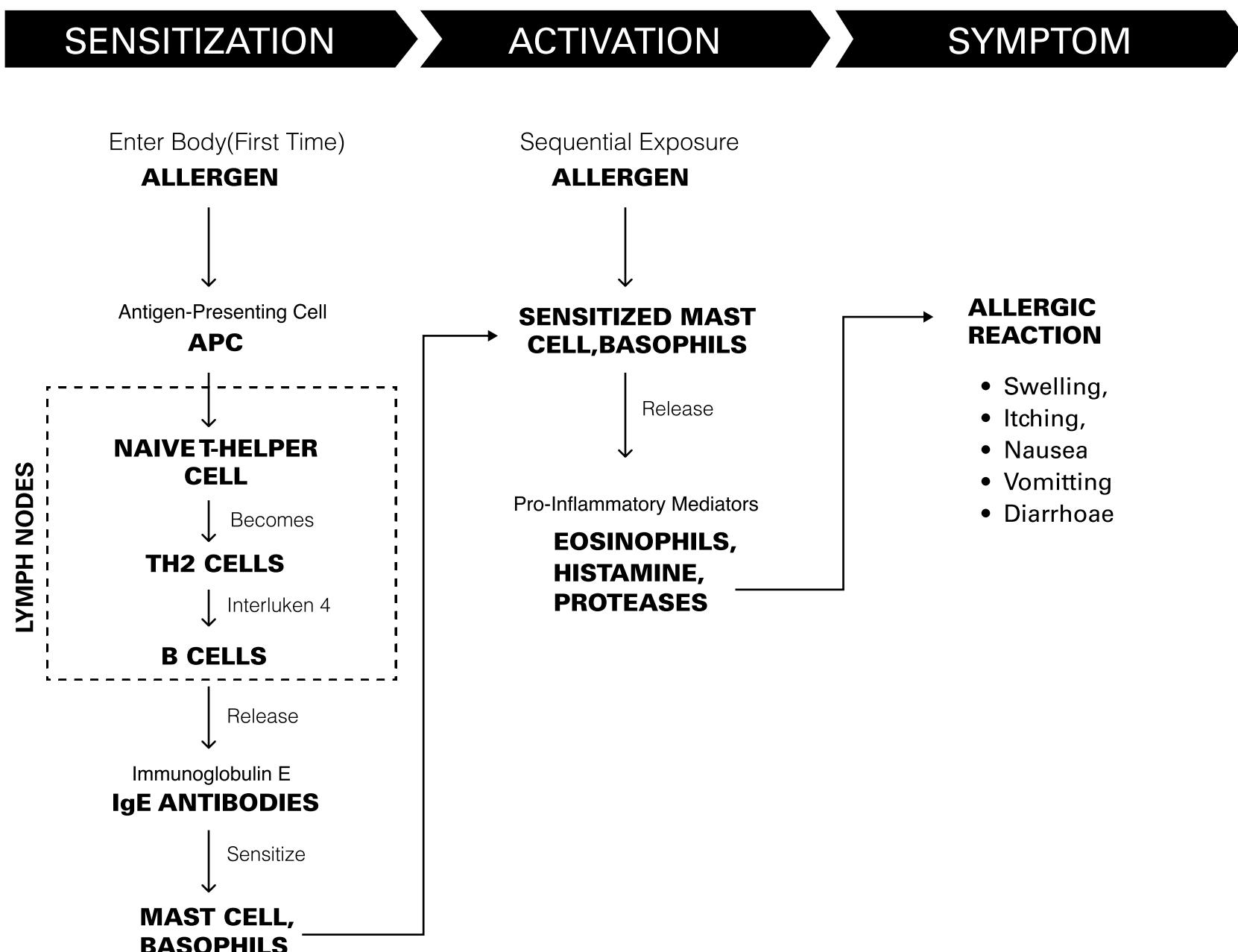
From 2007 to 2016, the number of food allergy reactions requiring emergency treatment is up sharply over the past decade, with a 377% rise in individually listed medical procedures, or claim lines, associated with anaphylaxis caused by food. Anaphylaxis is a severe, potentially life-threatening allergic reaction.

> \$ 25 Billion/year

Researchers report that the costs of food allergies, from medical care to food to pharmaceuticals is \$4,184 per child per year, costing our economy \$25 billion, including lost productivity.

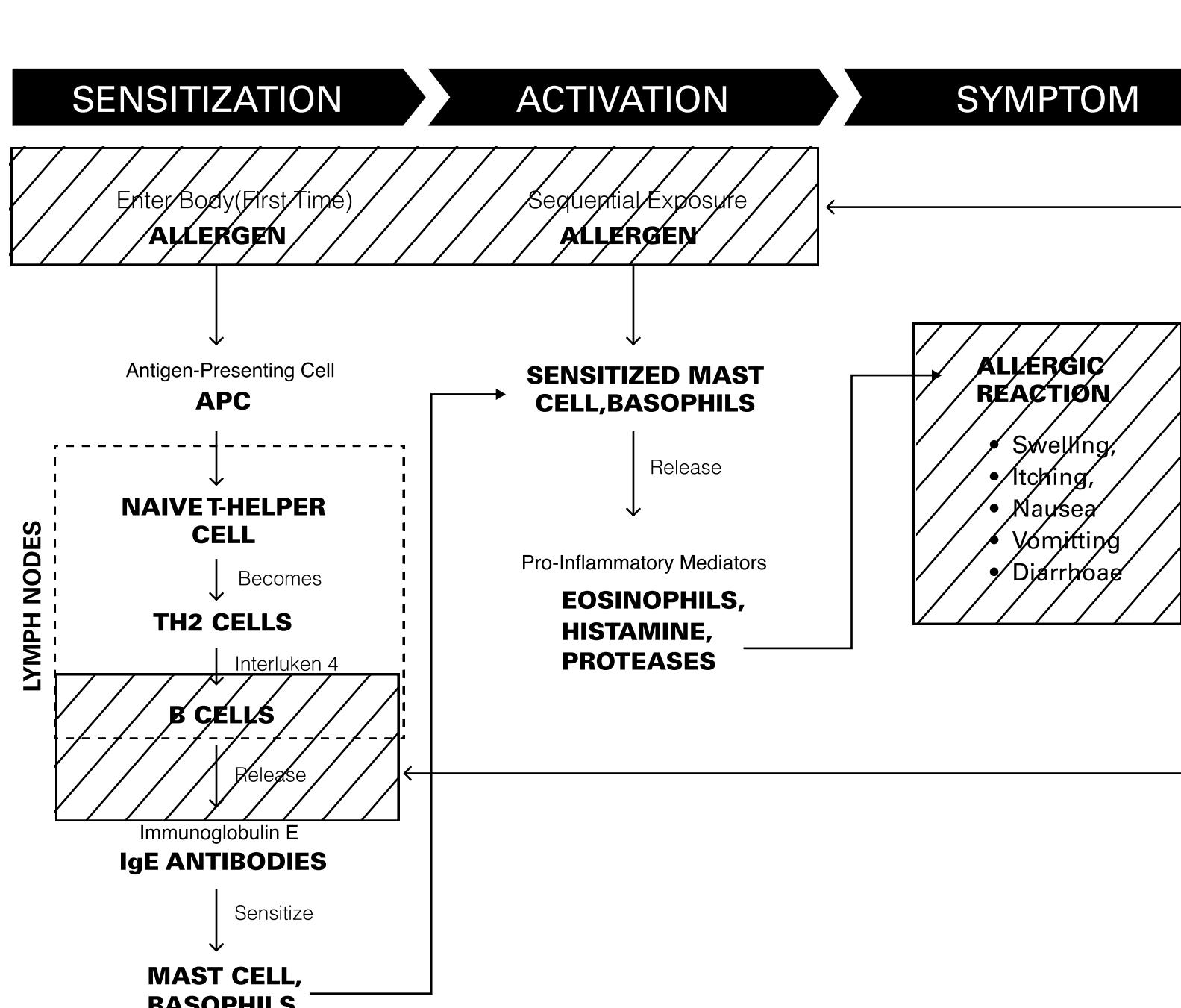
Allergy Reaction Mechanism

For Ig-E -Mediated Allergies



Allergy Reaction Mechanism

For Ig-E -Mediated Allergies



Treatment plan

Avoidance Life Long

To avoid or minimize exposure to the allergens that cause the condition

- Food Labeling

Symptomatic Treatments In 15 Mins

Block the release of histamine or relieve the symptoms of allergic reaction

Medicine

- Epinephrine
- Antihistamines
- Mast Cell Stabilizers
- Nasal Corticosteroids Or Corticosteroid Creams

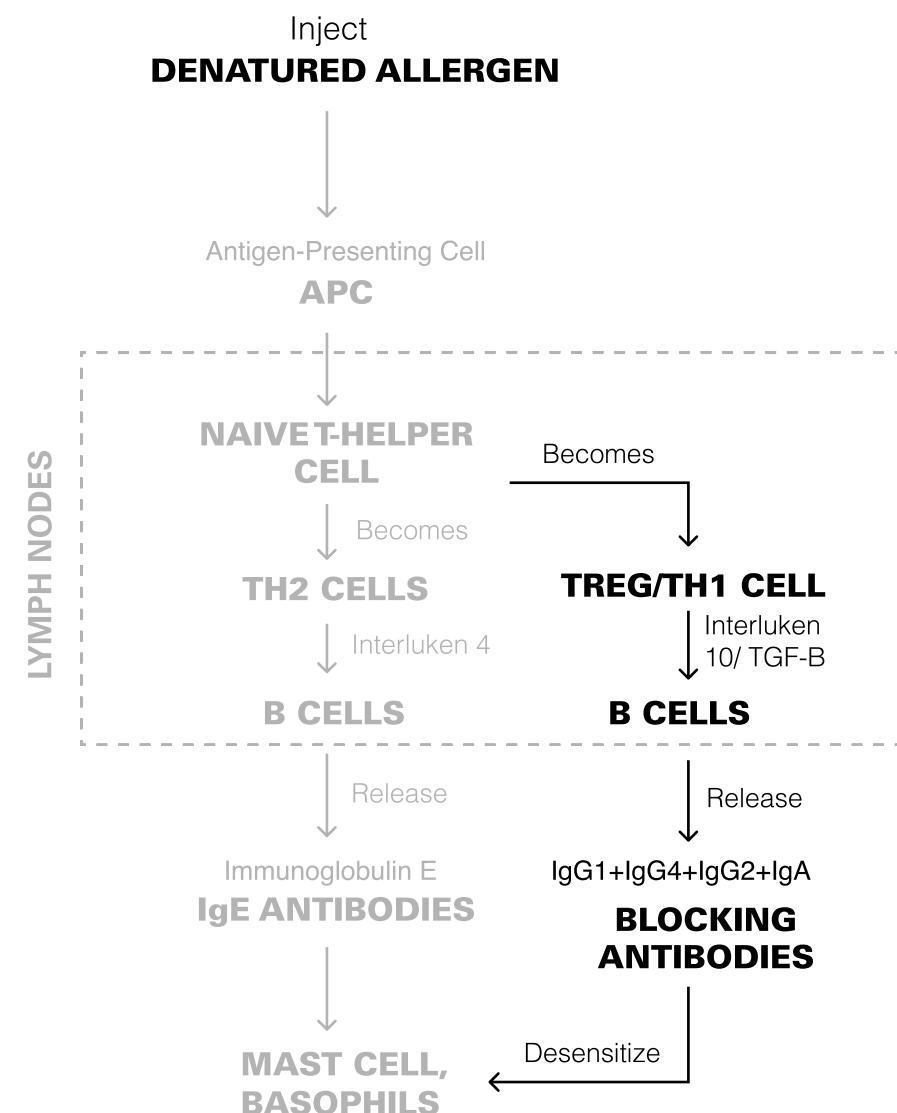
Immunotherapy 1- 3 Yrs

A preventive treatment which weaken your body's response to the allergen by gradually exposing your immune system to it

- Allergy Shots
- SLIT Tablet

Immunotherapy and Its Advantages

IgG1+IgG4+IgG2+IgA > IgE



Two Types Of Immunotherapy

Allergy Shot

Subcutaneous Immunotherapy

Subcutaneous immunotherapy (SCIT) is a form of SIT, whereby small doses of specific allergens are administered by injection.

Oral Medication

Sublingual Immunotherapy

Sublingual immunotherapy (SLIT) is an alternative way to treat allergies without injections. The tablets are placed under the tongue for one to two minutes and then swallowed as they dissolve. The process is repeated from three days a week to as often as daily.

Although immunotherapy therapy has begun to be used in the treatment of diseases such as allergic rhinitis, there are still difficulties in preventing new sensitization.

Advantages Of Immunotherapy



Decrease The Dependence On Allergy Medication



Decrease Long-Term Costs



Treats The Underlying Cause Of Allergies, Not Just The Symptoms



Can Treat Multiple Allergies At Once



Provides Long-Term Allergy Relief

Patients' Experience with Immunotherapy



Jason

Age 22 **Gender** Male

Occupation

College Student

Jason's Situation

Jason currently lives by himself and the closest hospital is 20 min away. He doesn't want to compromise his life quality. Therefore, though he is more than aware of his allergies, he still likes to consume small doses of alcohol with friends until he feels slightly uncomfortable.

Allergies

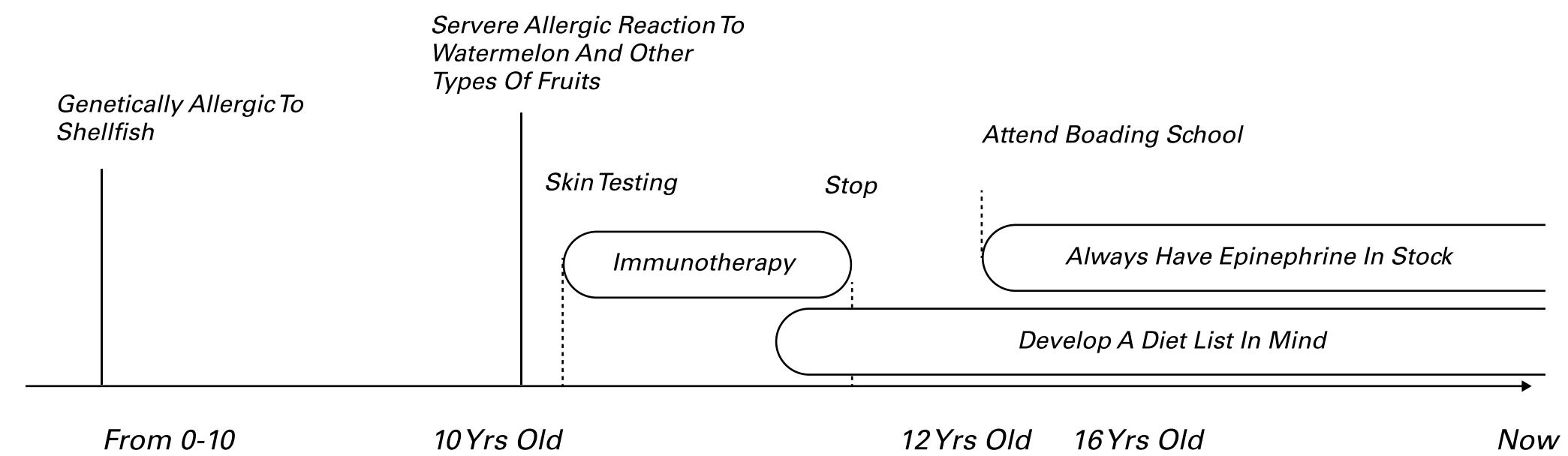
Jason is severely allergic to watermelon, pineapple, shellfish and is mildly allergic to mango, alcohol and many other types of fruits.

Symptom

Severe Hives & Swollen Airways

“ When I was allergic to watermelon for the first time, probably in the first and second year of elementary school, my parents were very concerned and took me to the hospital to identify the allergens. Then I started regular injections (Immunotherapy). It's something that can mediate the allergic symptoms. But to maintain such resistance, I have to take the injections continuously. My family made it for about half a year. Because after half a year, the watermelon was out of season, and it is also very troublesome to keep getting injections. Besides that, I gradually learned what to eat and what not to eat, so I give up the injections.”

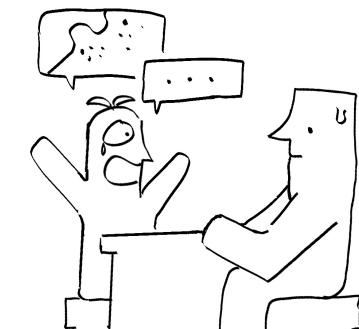
His Experience With Food Allergy



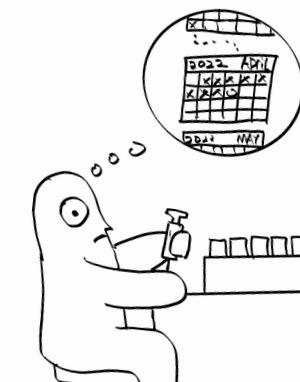
What Is It Like To Receive Regular Allergy Shots?



ALLERGY TESTING



TREATMENT PLAN



REGULAR MEDICAL SHOTS (EVERY MONTH)

2-3 YEARS

KID

Receive the skin testing at the hospital

PARENTS

Drive the kids to the hospital

PROFESSIONAL ORGANIZATIONS

Provide allergy testing toolkit and devices.

DOCTOR/ALLERGIST

Conduct the allergy testing

DOCTOR/ALLERGIST

Review Clinical History and customize Immunotherapy plan

PROFESSIONAL ORGANIZATIONS

Prepare the Allergy Vial based on the allergen

KID

Receive the shot

PARENTS

Set up the appointment and bring the kid to the hospital on time

KID+PARENTS

Observe the reaction over the month

DOCTOR/ALLERGIST

Learn the side effect from the parents

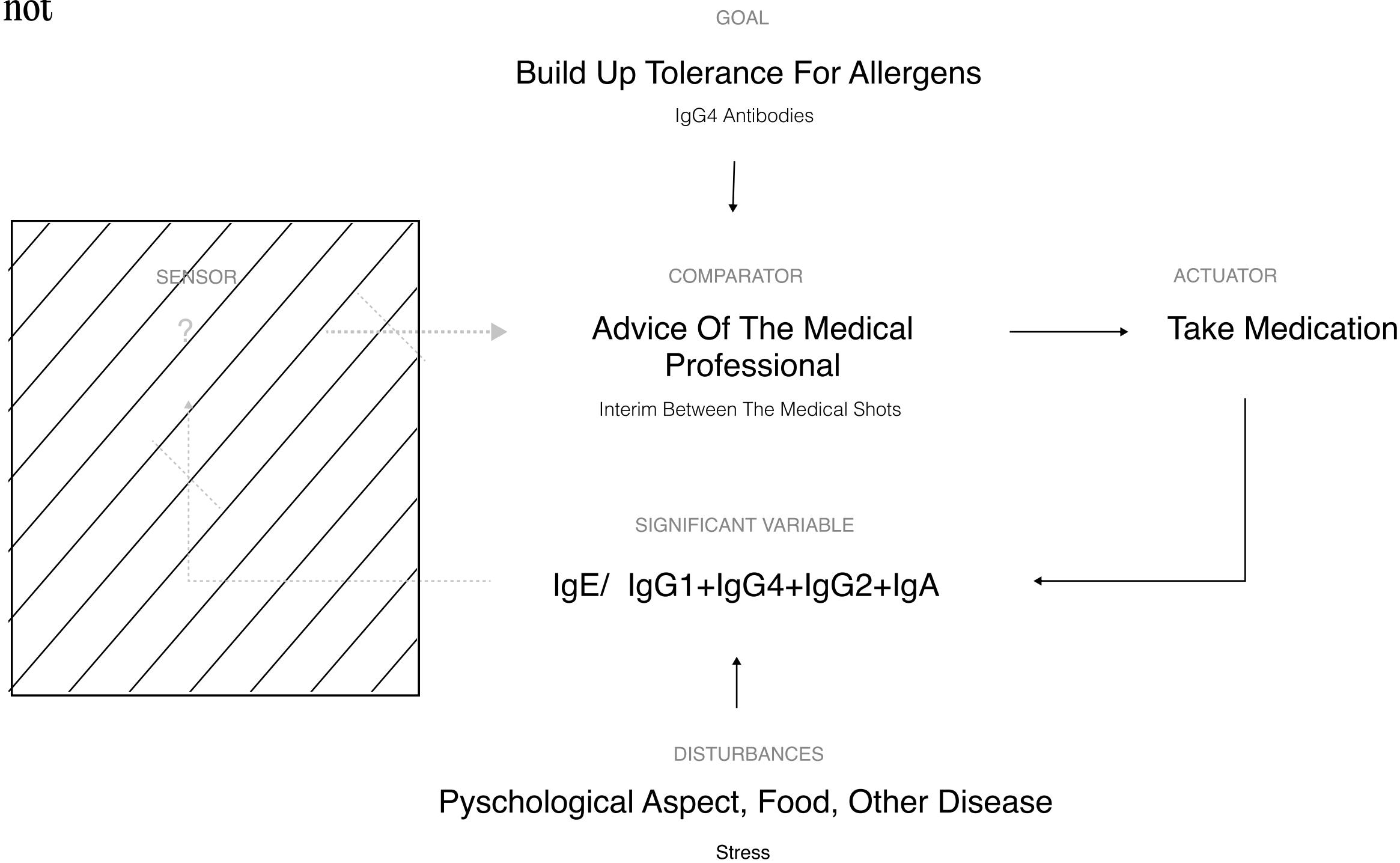
DOCTOR/ALLERGIST

Inject the vial and observe the reaction for 30 min

Increase Allergen Density In The Vial Injected

It's Not A Feedbackloop

Patients have no idea if the immunotherapy is working or not



HMW Improve The Immunotherapy Experience?

Patient's Problems With Immunotherapy

Lacking Sense Of Control

The broken loop of immunotherapy provides no feedback for patients to assess the effectiveness of the treatment

Cost Of Compliance

Immunotherapy requires a significant time commitment and regular in-office appointment

Risk Is Not ZERO

Has a low risk of anaphylaxis and may require monitoring in a physician's office for 30 min

Patient's Goal

Pleasant and Successful Treatment,

Quality of Life,

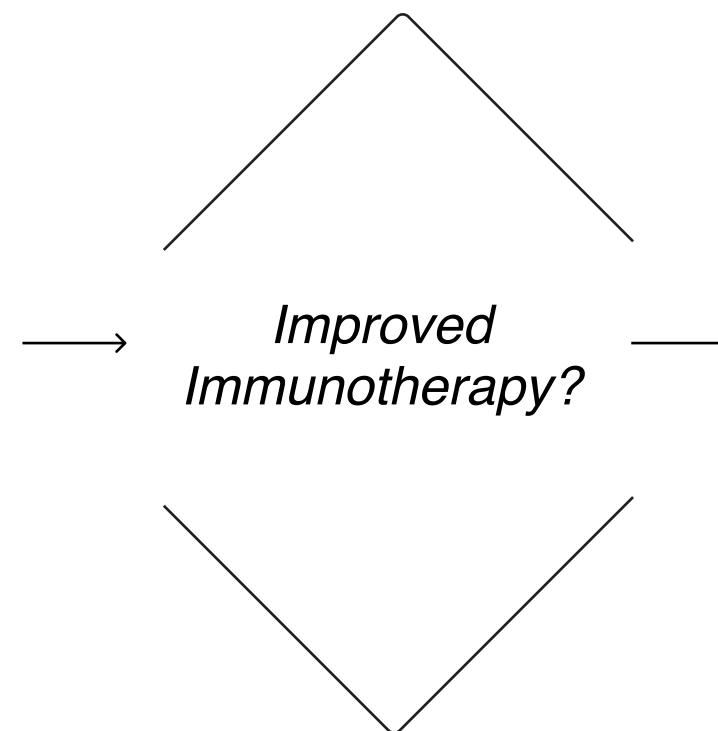
Relief from Anxiety

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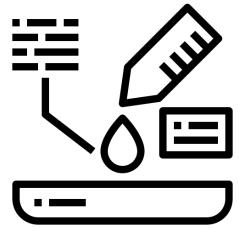
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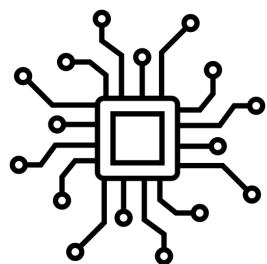
Relief from Anxiety

Ezlergy!

A Brand New Immunotherapy
Experience for Patients of All Ages



Home Testing Kit



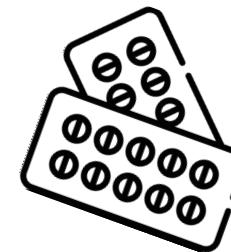
Ezlergy Sensor



Online Expert Allergy
Diagnosis

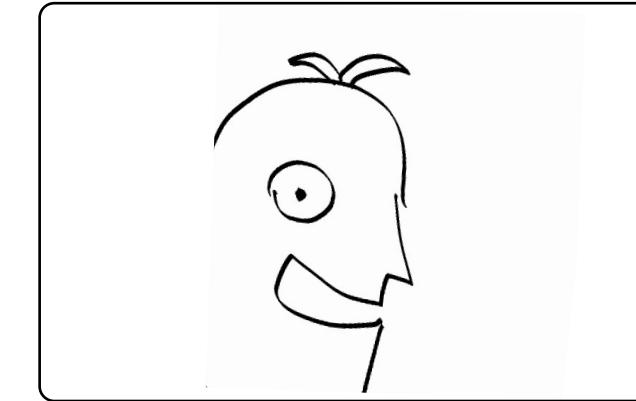


Ezlergy App



Oral Medication

Revamp Jason's Experience



Jason

Age 22 **Gender** Male

Occupation

College Student

Jason's Situation

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Allergies

Jason is severely allergic to watermelon, pineapple, shellfish and is mildly allergic to mango, alcohol and many other types of fruits.

Symptom

Severe Hives & Swollen Airways

Jason

Age 10 **Gender** Male

Occupation

Primary School Kid

Jason's Situation

Jason had a severe watermelon allergy. His parents are extremely worried. They looked up online and found out this service calle Ezlergy, therefore, they ordered him a Test Kit.

Allergies

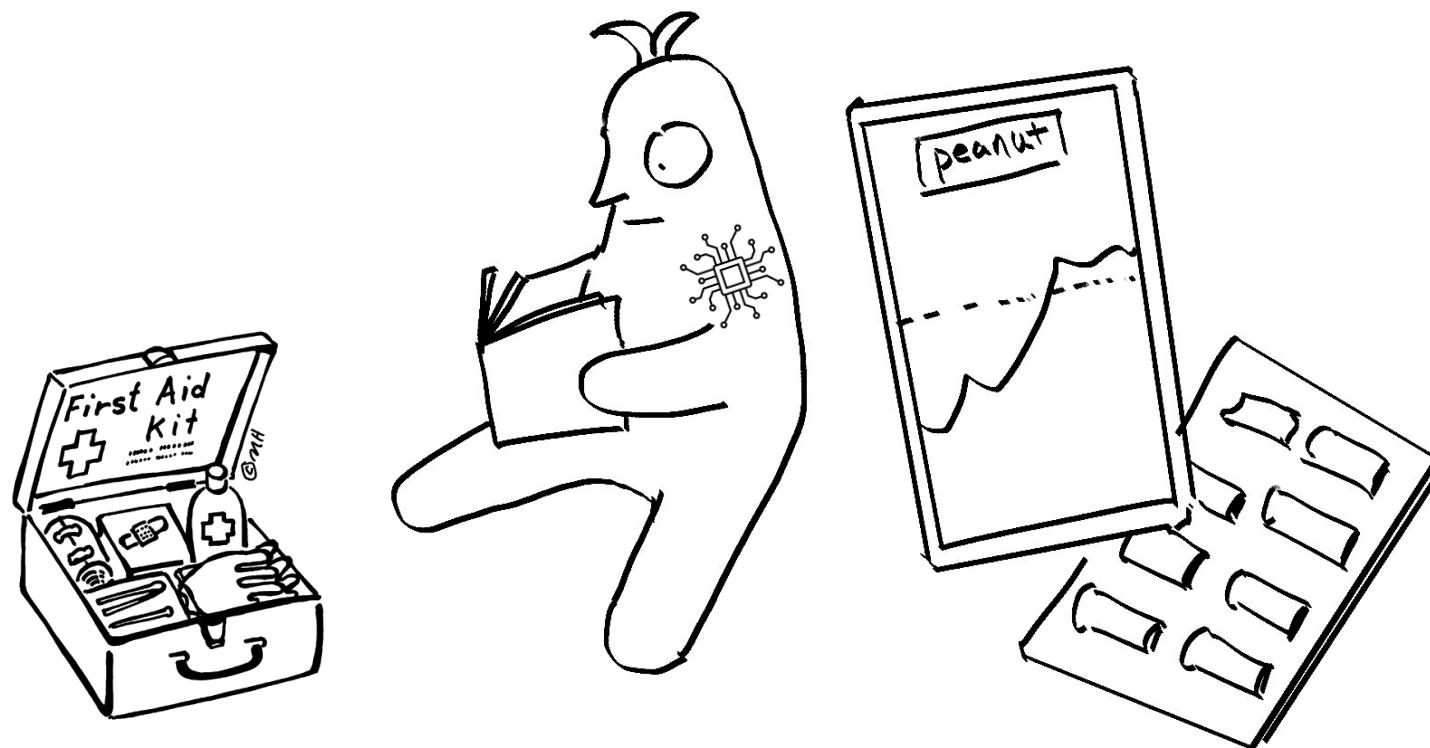
Watermelon, pineapple, shellfish and is mildly allergic to mango, alcohol and many other types of fruits.

Symptom

Severe Hives & Swollen Airways

01. Identify Allergens with Ezlergy Sensor

Jason's family received the Ezlergy sensor and the testing kit at home. They downloaded the app and helped Jason wear the sensor. Jason was instructed to take the pills inside the testing kit. After a day, an initial report of Jason's severe allergen and mild allergens are generated on the app.



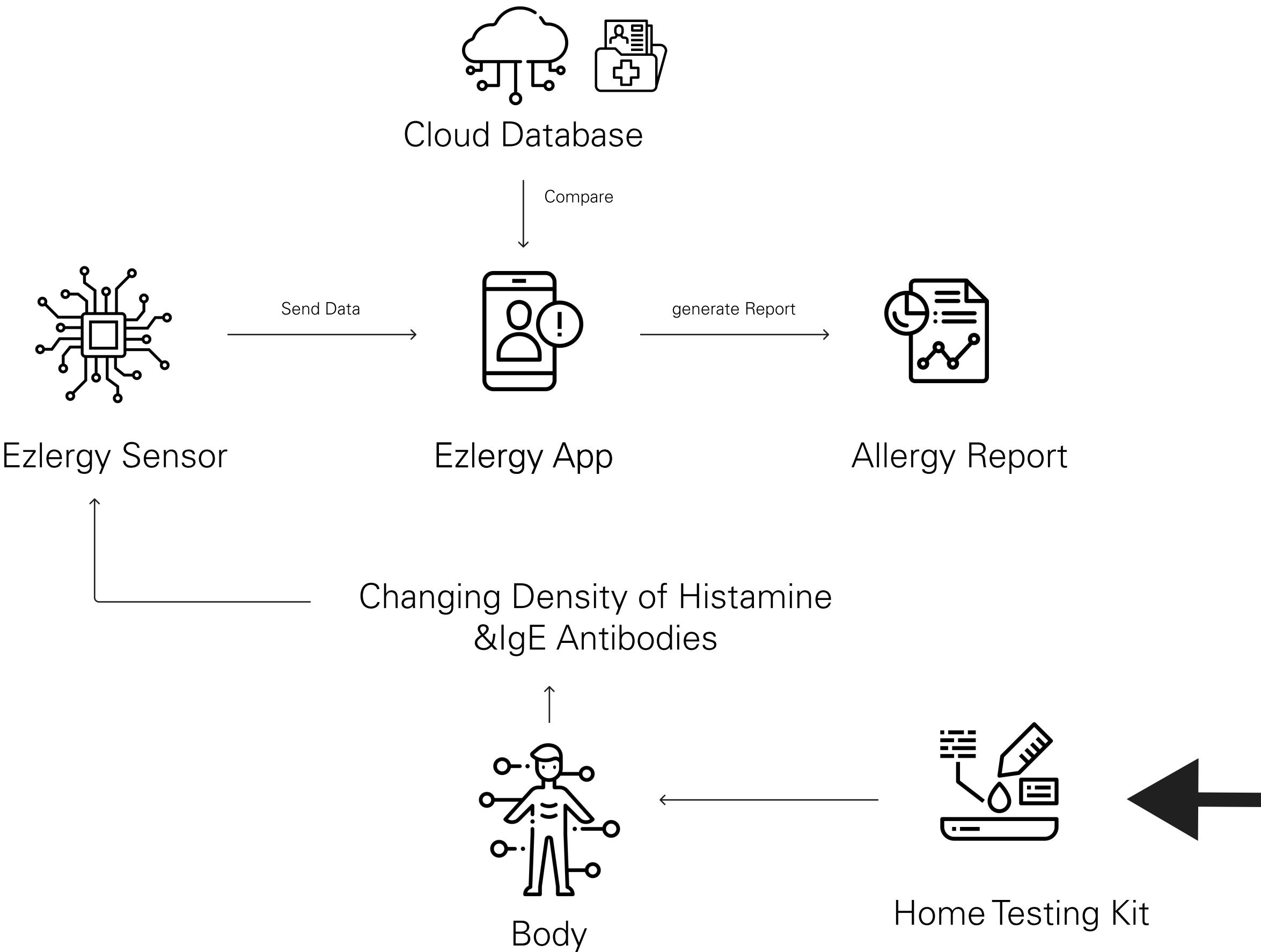
More Precise Outcome

Mild allergen may not be identified from symptoms in a skin testing. But with a Lymph sensor, all fluctuation will be recorded therefore all allergen will be identified.

Less Stressful Environment

Kids are nervous about the hospital environment and the testing process. This stress may influence the test outcome. Now kids can do it at a more familiar environment.

More Convenient



02. Consult with an Ezlergy Allergist

After having the Allergy Report for Jason, Jason's parents consulted with one of Ezlergy's Allergists online. Allergist reviewed the allergy report and his past medical records. By comparing Jason's allergy data with other similar patients' past record, the allergist came up with a customized immunotherapy plan.

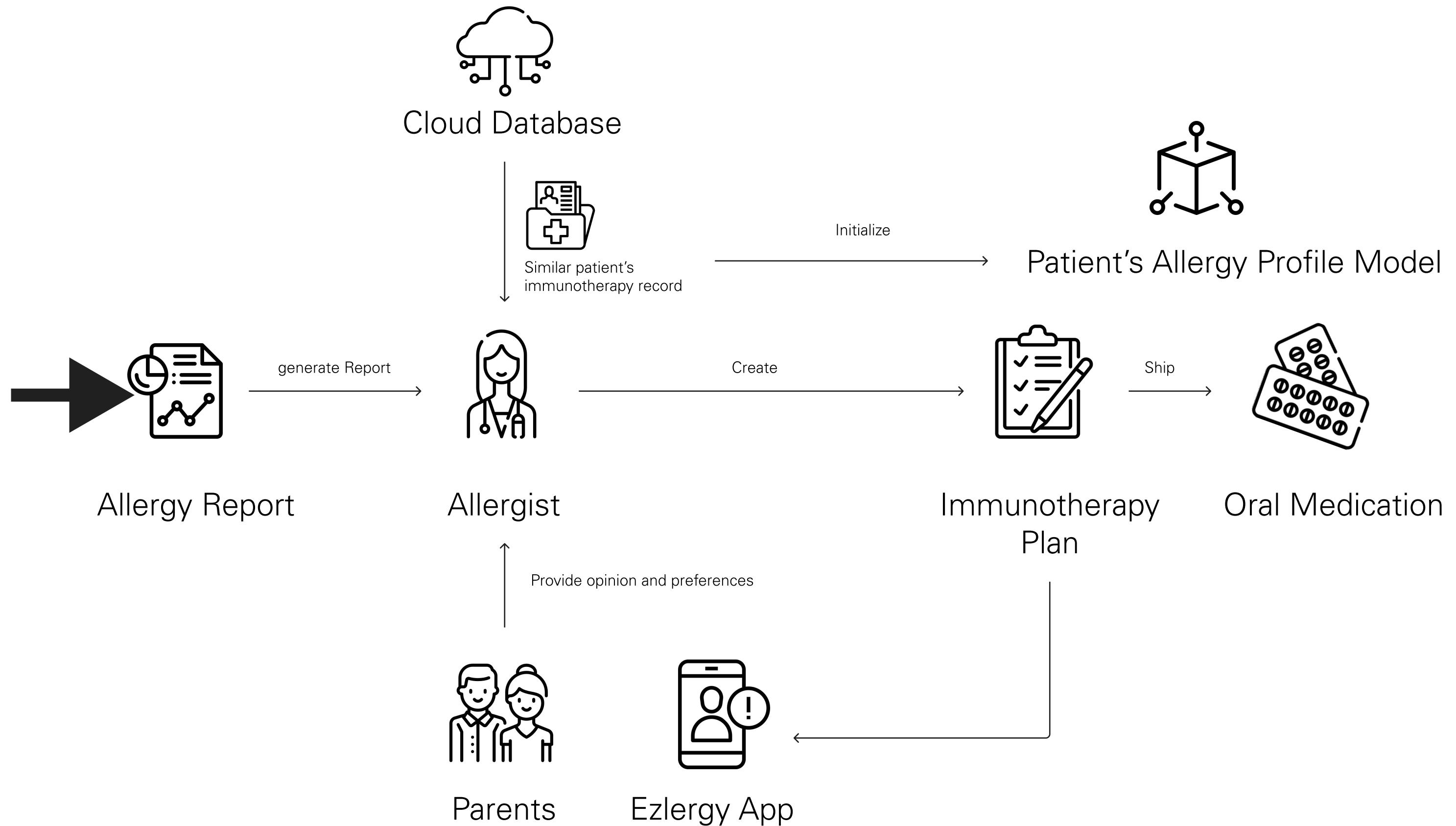


More Accurate Diagnosis for Allergist

The allergist can have access to the raw data of Jason's immune system.

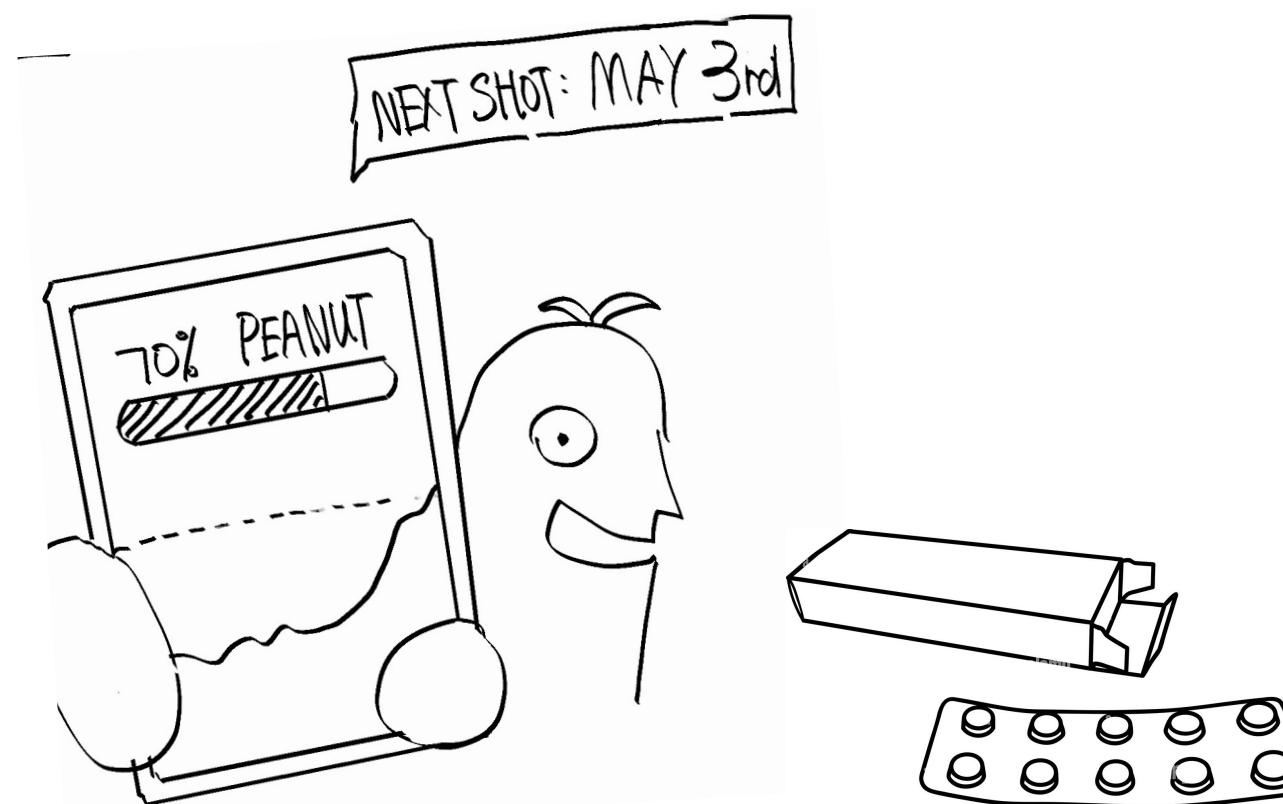
More Reliable Treatment Plan

The allergist can have access to the raw data of Jason's immune system.



03. Track the Progress with Ezlergy App

Jason, therefore, started his immunotherapy journey. Every week, the Ezlergy app will generate a report to Jason's parents. They saw that Jason's IgG density is now higher than his IgE antibodies. Even though they didn't quite understand what it means, they knew that something is changing. In addition, based on Jason's immune system's performance, the app recommended the dose of oral medication Jason should take next time..

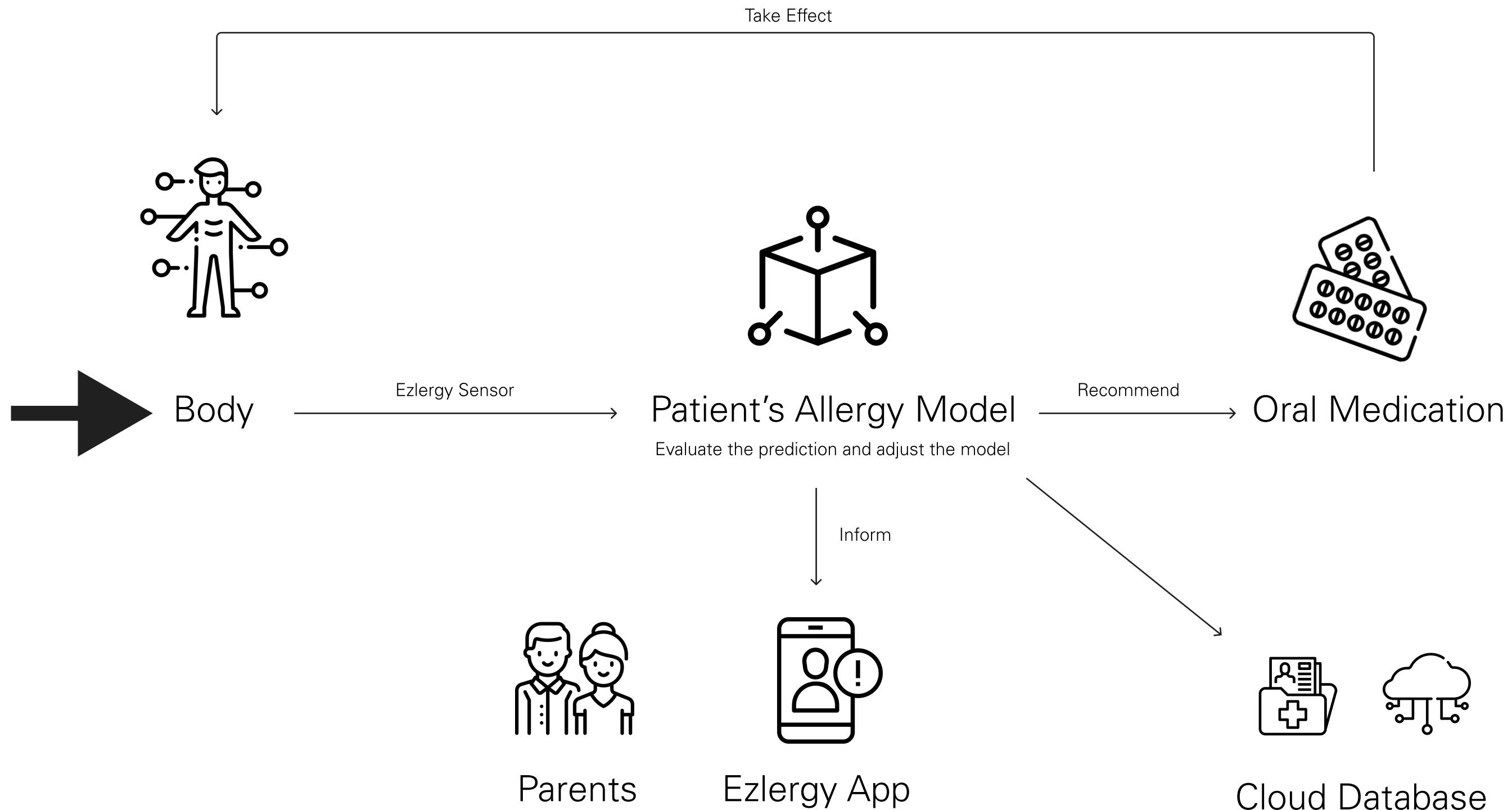


Sense of Progress

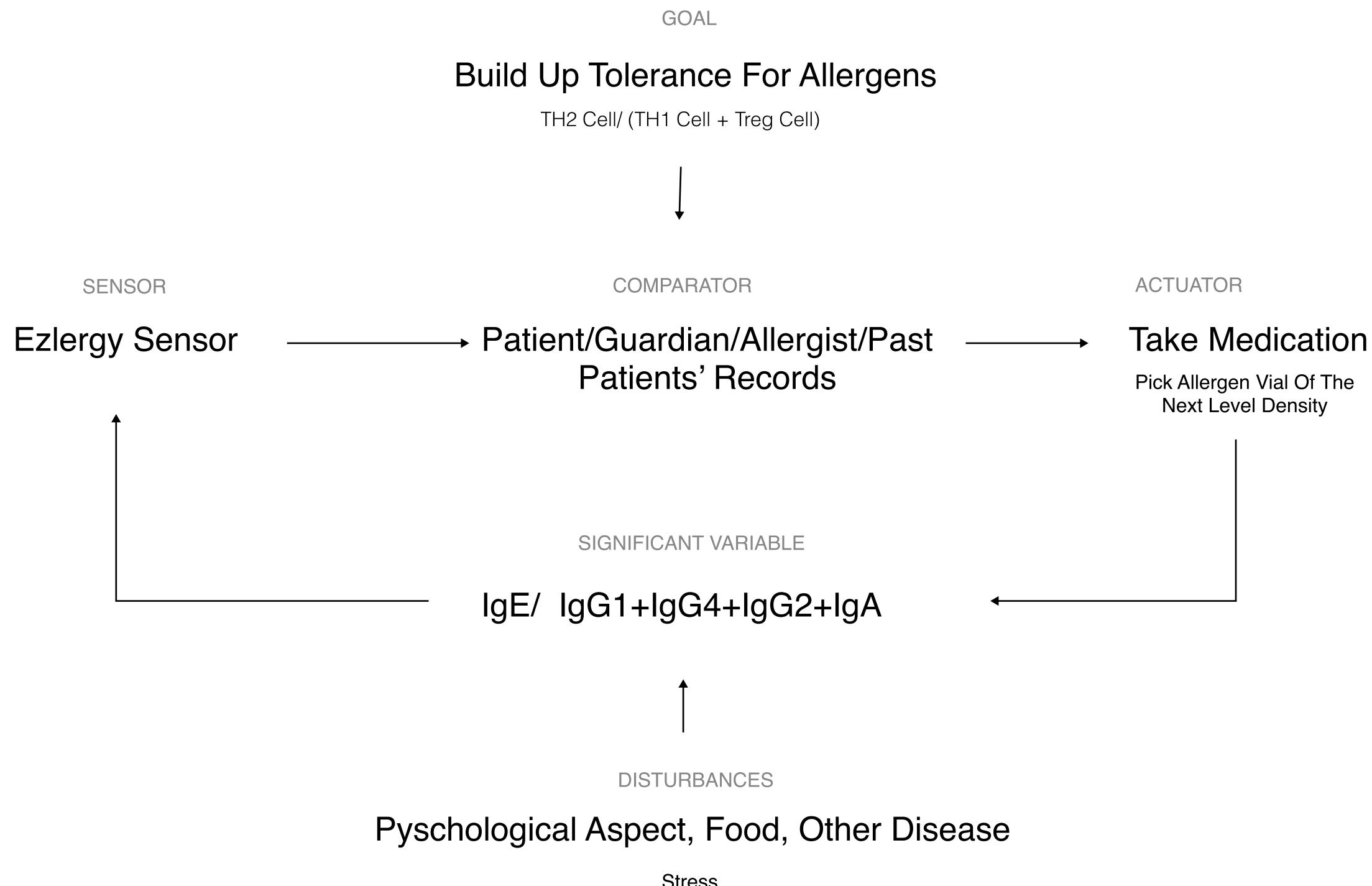
All chemical changes in his body are recorded. He can clearly see the effect of medication because it is reflected in the increase of TH2 cells in his body.

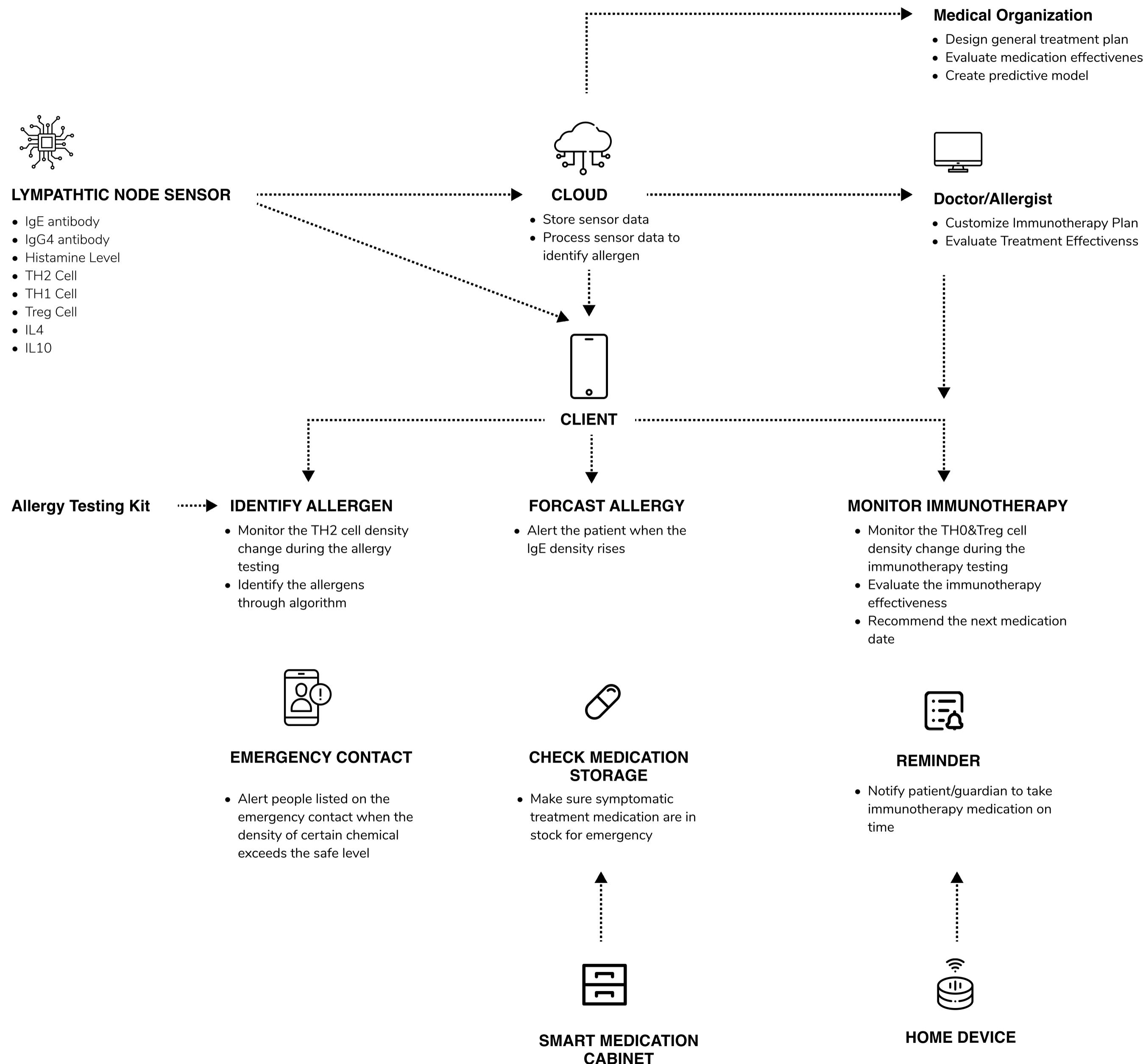
Optimized Titration

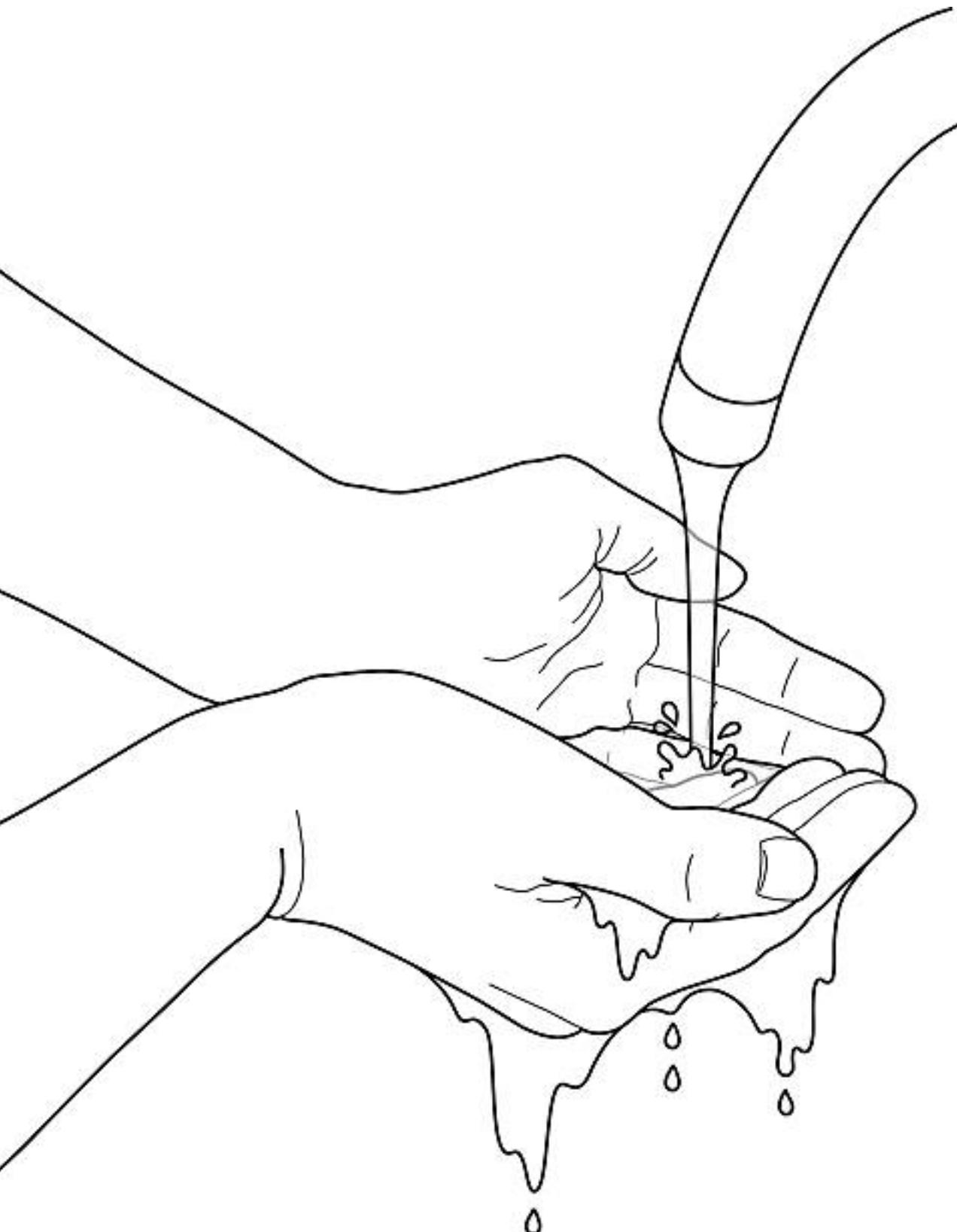
Based on the IgG density curve in his blood after taking the medication, the algorithm comes up with the best next vial he need to inject.



Ezlergy Will Fix the Loop







THANK YOU!!!

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4891384/>

<https://pubmed.ncbi.nlm.nih.gov/12530113/>
#:~:text=Flow%20cytometry%20is%20a%20reliable,than%20allergen%20specific%20IgE%20antibodies.

https://pdf.dfcfw.com/pdf/H3_AP202012091438237614_1.pdf?1607606889000.pdf

<https://www.mblintl.com/resources/learning-center/technologies/immune-monitoring/>
#:~:text=Detection%20of%20antigen%20specific%20T%20cells&text=In%20clinical%20trials%2C%20MHC%20tetramers,(e.g.%20cancer%2C%20infection).

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4554737/>

