

# Allergy-detecting device pinpoints disorder in just 20 minutes

April 27 2012, By Cecilia Carron

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Abionic, an EPFL spin-off, has just brought its first round of financing to a close and was selected yesterday by Red Herring as one of Europe's 100 most innovative companies. Using only a single drop of blood, the system developed by the company can pinpoint allergies in just 20 minutes. The device could be available by 2013.

With its quick and painless [allergy](#) detection and analysis system, Abionic is on a roll. This spin-off of EPFL's Biomedical Imaging Laboratory has just obtained two million Swiss francs from private and institutional investors, including MedHoldings, Polytech Ventures, Blue Ocean Ventures, Fongit Seed Invest and the Business Angels Switzerland. This funding will allow the company to finish developing its system and aim for commercialization next year. Yesterday, the young company selected as one of Europe's 100 most innovative companies in late April by Red Herring, a US magazine that is considered a reference for many venture capitalists. Four other EPFL startups were also on the top 100 list: Biocartis, Paper.li, HR Matching, and StereoTools.

### **A multitude of allergens on a single CD**

Geared for use by allergists, pediatricians and other medical practitioners, this device resembles a DVD player equipped with a touch screen. It comes equipped with plastic capsules containing single-use biochips. It only takes about 20 minutes to diagnose a patient's primary allergies, using a single drop of blood. This system could free millions of people throughout the world from having to undergo the tedious skin test, which consists of scratching or pricking the skin to allow exposure to various allergens, and then evaluating the skin's reaction.



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A few drops of a reagent are mixed with the blood sample. The preparation is placed in a compartmentalized capsule that contains ten biochips, each of which is prepared with a different allergen. The tiny device is mounted on a plastic surface in the form of a CD and “read” by a laser. The results appear on the screen and are automatically saved to a memory card. The doctor can read, print and save the results to his or her computer. The CD can be personalized with several dozens of different allergens.

## Counting molecules

In a general sense, nanofluidic biochips take advantage of various special properties that fluids exhibit at the nanometer scale. Nicolas Durand built upon this technology as part of his PhD research in EPFL’s

Microsystems Laboratory, and it was further developed by the Biomedical Imaging Laboratory start-up. Here's how it works: The blood enters into contact with allergens that have been previously deposited in the biochip. The interactions between certain proteins in the blood, which are marked with a fluorochrome (a chemical substance that can emit light upon excitation) and the immobilized allergens are measured by fluorescence. The device's laser excites the protein-allergen molecular complexes, and they emit light. The concentration of these complexes determines the degree of the allergy. It's like looking for a needle in a haystack, but in this case, you're sure to find it if it's there.

## **Next targets: cancer and Alzheimer's disease**

According to the Swiss Center for Allergies, about a quarter of the Swiss population exhibits various allergic symptoms. The American Academy of Allergy, Asthma and Immunology has announced that close to 50% of Americans suffer from allergies. On a global scale, all allergies, including food allergies, have been on the upswing since the mid-1950s. "The world market for diagnostics in 2011 was evaluated at more than 40 billion Swiss francs," Durand reports.

The company's objectives are equally promising; in addition to reducing the analysis time on their device even further, the start-up is already looking at the possibility of using the method to detect other diseases whose blood biomarkers will be commercially available, such as certain cancers and Alzheimer's disease.

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