



Press Release

Rapid allergy detector to beat penicillin deaths

Sufferers of hypersensitivity to common antibiotics like penicillin and amoxicillin will soon find help with a new allergy detector, a low-cost, bio-photonic device that will be 6 times faster and 100 times more efficient than current technology, providing more targeted treatment for millions of patients.

Over 2.5 million people in Europe and more than 5.4 million Americans suffer from hypersensitivity to Beta Lactam Antibiotics (BLCs), the most commonly prescribed drugs that contain the penicillin family, with up to 10 percent of people reporting an allergy.

Despite its effectiveness, many people avoid penicillin and its relatives fearing a severe allergic reaction, where symptoms can include wheezing, coughing, breathing problems, tissue swelling, or in some serious cases anaphylaxis, requiring urgent medical attention.

Currently, anaphylaxis leads to 500–1,000 deaths per year in the United States, 20 deaths per year in the United Kingdom, and 15 deaths per year in Australia. It is thought that drugs may be accountable for as many as 1 in 2 anaphylactic deaths

With existing in-vitro allergy detection technology delivering a waiting time of over 3 hours and a cost of €30 per allergen, a team of European researchers running the Horizon 2020 project COBIOPHAD ('Compact Biophotonic Platform for Drug Allergy Diagnosis'), aim to improve this with their scanning device employing the latest photonics technology.

Similar in size to a small notebook computer, the detector, which could be used in hospitals in as little as five years, examines a tiny plasma sample from the patient's blood, producing a result in less than 30 minutes and at a cost of €2.40 per allergen, a twelfth of the current price.

It works by 'reading' a compact disc-like cartridge with a laser, similar to the way an everyday CD ROM drive in your computer works. The cartridge contains pre-loaded Beta Lactam reagents which will recognise a specific Immunoglobulin E (IgE), (the antibody contained in blood that plays a vital part in manifestation of allergy), and a secondary tracer antibody.

When the patient's blood sample is run across the cartridge, if there is a positive response the IgE will recognise the antibiotic and the laser will read the reaction product, leading to an unambiguous detection. The intensity of this signal is related to the levels of hypersensitivity within the patient for ten different targeted Beta Lactams.

Although similar laser-reading tests exist, the COBIPHAD device distinguishes itself not only in terms of speed, cost and size, but also because it has the potential to look at a greater number of samples per disc by testing different drugs at different compartments of the cartridge and avoiding contamination. Exploitation Manager, Dr Ian McKay explains:

"The COBIOPHAD device aims to take drug hypersensitivity detection into a new era: compared to current tests our device can deliver a rapid diagnosis of the main allergenic BLCs in less than half an hour, making it 6 times faster."

“With an improved *in vitro* diagnostic (IVD), we offer a much more patient-friendly alternative to the invasive and risky *in vivo* testing. Current IVDs, developed with bulky auto-analysers and based on classical technologies, show poor sensitivity (less than 40%) and detection limits (more than 0.2 kU per litre), analyse only five beta-lactam antibiotics and give false-positive and negative results.”

“The COBIOPHAD approach must reach a sensitivity of 80% with a detection limit below 0.1 kU per litre. It deploys an increased multiplexing capability, looking at more samples per disc and examines a greater number of BLCs per sample. As a result the overall system is a hundred times more efficient.”

With savings of €27.60 per patient amounting to a colossal €69 million per year from European sufferers, and by significantly reducing the costs from additional hospitalization from allergic reactions to certain drugs creating potential savings in this area of up to €4500 per patient, the COBIOPHAD team have large scale ambitions.

Earlier this year the COBIOPHAD project received a grant of €3,734,780.64 from the EU via the H2020 and the Photonics Public Private Partnership. Concluding at the end of 2018, COBIOPHAD is made up of a number of high profile European organisations, including Universitat Politècnica de València (Spain), Centre Hospitalier Universitaire Montpellier (France), Dr. Fooke-Achterrath Laboratorien GMBH (Germany), DAS Photonics (Spain), Fundación para La Investigación del Hospital Universitario de la Comunidad Valenciana (Spain), Optoelectronica (Romania), Stiftelsen Sintef (Norway), EurExploit Ltd (UK), STRATEC Consumables (Austria) and Biotronics 3D Limited (UK)

About COBIOPHAD

COBIOPHAD aims at the development of an innovative *in vitro* diagnostic (IVD) device for diagnosis of IgE-mediated drug allergies by building an integrated biophotonic system based on compact disc technology. For that, key enabling technologies will be integrated in order to achieve high sensitive (<0.1 kUA/L), selective (>98%), multiplexed (10 BLCs), rapid (30 min), and low-cost (2.4 €/allergen) drug allergy test. The solution involves an advanced approach to the diagnosis and management of drug allergy with the aim to ameliorate patient safety.

The consortium comprises multidisciplinary knowledge on optics, electronics, advanced materials, biotechnology, smart microstructures, microfluidics, surface/organic chemistry, allergy, manufacturing systems, and telecom networking. Also, the key industrial actors, present in the consortium, will contribute to the manufacturing and placing the product on the IVD market.

About Photonics21

Photonics21 is the European Technology Platform (ETP) for photonics –a technology encompassing all of the products and processes around the emission, manipulation and detection of light. It is integral to a wide range of industries that include the medical, healthcare, transport, manufacturing, and telecommunications sectors. In December 2005 "Photonics21" was set up to bring the community of photonics professionals and industries

together.

In September 2009, the European Commission defined photonics as one of five European Key Enabling Technologies (KET's) and shortly after the European Research & Innovation Program "Horizon 2020" invited Photonics21 to become a "Public Private Partnership" (PPP). In November 2013 the "Photonics 21 Association", a legal entity under Belgium law, became the private contract partner in a Public Private Partnership (PPP) in conjunction with the EU Commission.

Today Photonics21 represents more than 2600 personal members from all over Europe. Our members are experts in the photonics industry, research organisations and universities who actively engage with us to develop a joint photonics strategy for future research and innovation in Europe.

With the global photonics market growing at twice the world economic growth rate, from 350 Billion Euros in 2011 to 615 Euros in 2020, Photonics21 stands in a secure global market position. The production of European photonics alone accounts for 60 billion Euros and employs over 350,000 people directly.

With strong growth forecast, current industry trends like digitalisation, resource efficiency, individual and zero failure production will drive the photonics industry further.

For more information about Photonics21 please go to <http://www.photonics21.org/index.php>