

DSM Science & Technology Awards (SOUTH) 2008	
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Food allergies are on the increase in both children and adults, and in severe cases can be life threatening. The molecular mechanisms underlying the potential of certain substances found in food products to cause allergic reactions are poorly understood. Irene Maier's research project aimed at developing a new, low-cost analytical method for simple and reliable allergy testing by using a biochip sensor that requires only drops of food extracts and patient's sera for analysis. The sensor is based on resonance-enhanced absorption (REA) – a visual effect caused by the generation of coloured light by gold nanoparticles when mounted just nanometers from a mirrored surface. The biochips surface is coated with a layer of antibodies of patients' blood sera or food allergens to be tested. The gold nanoparticles are linked with a second antibody in solution. If the patient is allergic, the antibodies in the solution will bind with the allergenic structures on the chip, causing the metal clusters linked to the antibodies to generate an easily interpretable colour signal visible to the eye. Once developed commercially, this new technology should represent an important scientific advancement for consumers, the food industry, and regulatory authorities.