

Contribution of Glyco-Cellular Engineering in microbiotas biodiversity via Click-Chemistry

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Abstract

Click-chemistry is a growing technology in the field of life sciences. In short, this technology makes it possible, under physiological conditions and in a non-lethal manner, to generate a covalent link between two functionalized molecules. In other terms, the functionalized molecules both present a bio-orthogonal function, which get connected together by a chemical reaction called “click-chemistry”.

Since 2004, click chemistry has been used to combine a variety of molecules with Eucaryotic cells. In 2012 and 2014, two publications in *Angewandte Chemie* enlarged this kind of cell engineering to Prokaryotes. They highlighted the existence of two natural monosaccharides of the ulosonic acids family, allowing the specific marking of Gram-negative bacteria and *Legionella pneumophila*. Those two discoveries led to the creation of DIAMIDEX company in December 2014. DIAMIDEX “technology” consists in marking Prokaryotes cells (adding them a bio-orthogonal function) and associating them to colorimetric, fluorescent or magnetic molecules via click-chemistry. This allows to detect/count/concentrate or identify specific microorganisms of interest. DIAMIDEX has developed more than 10 different monosaccharides that allow to target a wide range of microorganisms, from specific species to all microorganisms present in a sample. During the marking process, only dividing microorganisms will be targeted by our technology, as the monosaccharides need to be metabolized by the cells. With this approach, DIAMIDEX technology is able to provide a large contribution to the microbiotas field. This strategy has been used by Wang et al., (*Biochemistry*, 2017, 56(30), 3889-3893) to imaging Gram-Negative and Gram-Positive microbiotas in mice guts.

Biography:

Sam Dukan has completed his PhD (Microbiology) at the age of 29 years, at the University Paris 6 (France) and postdoctoral studies in Lund and Goetborg Univeristy (Sweden). After 20 years as head of an academic research group (National Center for Scientific Research, CNRS, France), he is now and since 2014, the CEO of DIAMIDEX, an innovative start-up company.

Speaker Publications:

1. “A passive physical model for DnaK chaperoning”
- 2 “Hydrogen Peroxide Induced Cell Death: The Major Defences Relative Roles and Consequences in *E. coli*”
3. “Hydrogen peroxide induced cell death: One or two modes of action?”

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