JCI 2015

Conférences plénières / Plenary session

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HIV genetic flexibility as a biotechnological tool: improved sensitisation of cancer cells to anticancer drugs

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Can we enlist the AIDS virus to help us in public heath affairs? This was the question when we started our project on the evolution of cellular genes by the HIV virus. We exploited the genetic flexibility of HIV to try and generate, in the laboratory, variants of cellular genes that can be of interest for biotechnological applications in biomedicine. Namely we generated a variant of the human dCK gene, which is responsible for the activation of some anticancer drugs used in clinical therapy of tumours, that improves sensitisation of cancer cells to treatment with at least two anticancer compounds used in the clinic. This variant could have several interesting biomedical applications in the field of gene and cell therapy.

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Surgical targeting of RIPK2 kinase using macrocyclic-based Nanocyclix® platform

Pascal Benderitter

Oncogenesis, Dijon

Oncodesign's proprietary macrocyclic platform Nanocyclix® enabled the identification of unique probes targeting RIPK2. The use of these potent and selective inhibitors in collaboration with Prof. Abbott, expert in the field, enabled to validate the therapeutic potential of this novel chemical series and quickly advance the program towards lead optimization. This presentation will highlight the discovery and optimization of a new class of RIPK2 inhibitors as potential therapeutics in auto-immune diseases.

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Phage Therapy is coming back

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Today, everyone, anywhere, can be infected by multidrug resistant (MDR) bacteria. The hope for the discovery of new antibiotics has lasted 25 years without any major breakthrough. In this context, research on bacteriophages, the natural biological enemies of bacteria have been reignited. Despite an early development started 100 years ago, therapeutic use of bacteriophages, Phage Therapy, will not again be considered as a medical treatment, without experimental data demonstrating its efficacy in treating MDR infections.

The past few years, we reported several successful experimental treatments of pulmonary infections caused by either *Pseudomonas aeruginosa* or *Escherichia coli* using animal models. We are also investigating fundamental questions on the relationships between bacteriophages and bacteria in complex ecosystems such as the digestive tract of mammals.

Plateformes / Platforms

Anagenesis Biotechnologies: development of new treatments for muscle degenerative diseases

Aurore HICK, Fanny BOUSSON, Charlotte FUGIER, Bénédicte GOBERT, Mélissa GUYOT and Jean-Yves BONNEFOY.

R&D team, Anagenesis Biotechnologies

Anagenesis Biotechnologies is a preclinical-stage stem cell-based company focused on developing novel treatments for genetic and chronic muscle degenerative diseases with unmet medical needs *(e.g. Duchenne Muscular Dystrophy, Cachexia, Sarcopenia)*. It owns a unique proprietary technology, which is the result of 15 years of research in the laboratory of Professor Olivier POURQUIÉ, a world expert in the field of musculo-skeletal development and stem cells. Our knowhow allows us to efficiently differentiate both mouse embryonic stem cells (mES) and human induced pluripotent stem cells (hiPS) into skeletal muscle cells, by mimicking early steps of embryonic muscle development.

Skeletal muscle is an organ with remarkable renewing capacities, allowing to compensate for natural and injury-induced turnover of muscle fibers. This property is mediated by resident stem cells distributed along the muscle fibers, called “satellite cells”. This cell population is therefore of particular interest for the treatment of muscle degeneration. We are using mES and hiPS derived satellite-like cells in two approaches: (1) *in vitro* in pharmacological screening, to identify compounds able to induce proliferation of satellite-like cells and (2) *in vivo* by grafting them in muscles to assess their regenerative capabilities. These both approaches are complementary and aim at improving muscle regeneration process of patients suffering from muscular atrophy.

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From research to start-up: **Syndivia** – best-in-class technology provider for bioconjugation

Oleksandr Koniev