ESNATS Conference — The Use of Human Embryonic Stem Cells for Novel Toxicity Testing Approaches

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Summary — The main achievements and results of the ESNATS project (Embryonic Stem Cell-based Novel Alternative Testing Strategies) were presented at the final project conference that was held on 15 September 2013, the day before the traditional EUSAAT (European Society for Alternatives to Animal Testing) Congress in Linz, Austria. The ESNATS project was an FP7 European Integrated Project, running from 2008 to 2013, the aim of which was to develop a novel toxicity testing platform based on embryonic stem cells (ESCs), and in particular, human ESC (hESCs), to accelerate drug development, reduce related R&D costs, and propose a powerful alternative to animal tests in the spirit of the Three Rs principles. Altogether, ESNATS offered the first proof of concept that hESCs can be used to create robust, reproducible and ready-to-use test assays for predicting human toxicity. In the end, essentially five test systems were developed to an adequate level for entering possible pre-validation procedures. These methods are based on hESCs, and can be combined to study the possible effects, on the human embryo, of exposure to a chemical during the early stages of development. In addition to the presentations by the main project partners, external speakers were invited to give lectures on relevant topics, both in the field of neurotoxicity and, more generally, on the applicability of hESCs in the development of advanced in vitro tests.

Key words: in vitro testing, neurotoxicity, omics technologies, reproductive toxicity, stem cells, toxicokinetics.

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Introduction

The ESNATS (Embryonic Stem Cell-based Novel Alternative Testing Strategies) project was an Integrated Project funded within the EU Framework Programme (FP)7 (under grant agreement No. HEALTH-F5-2008-201619). The goal during the project’s five-year duration (2008–2013) was to develop a novel toxicity testing platform based on embryonic stem cells (ESCs), and in particular, human ESC (hESCs), to accelerate drug development, reduce related R&D costs, and propose a powerful alternative to animal tests in the spirit of the Three Rs principles. The work was organised into four research areas:

1. Reproductive toxicity;
2. Neurotoxicity;
3. ESC-based toxicogenomics and toxicopro- teomics signatures; and

In addition, some activities focused on building a common glossary, and disseminating the results and the discussions surrounding the ethical aspects of hESC use.

In order to present the final deliverables of the ESNATS project to the public, it was decided to organise a public conference on 15 September 2013, in conjunction with the annual EUSAAT (European Society for Alternatives to Animal Testing) Congress that has been taking place in Linz, Austria, for 15 years.

The ESNATS conference in Linz combined the work done within the consortium with input from people who were not part of the project, and this contributed to the success of the event. Two panel discussions played an important role in increasing interest in this fascinating topic. This report provides an overview of the event, by presenting a summary of each lecture and the main discussion points. The morning session featured some of the participants of the ESNATS project, while in the afternoon, relevant stakeholders were invited to