

**SCR-THE-020**

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## **SCREENING METHODS**

### **Cell-Based Assays**

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#### **• Context**

Among the existing screening analytical methods, cell-based methods are using a biological response measured in a defined cell type to detect the presence of one or more chemicals in a sample extract prepared according to an appropriate procedure and applied onto these cells. Most of such biological tests are working at the genomic level, i.e. consist in the measurement of DNA or RNA entities, the production of which is induced or inhibited by the compound(s) of interest. The first option refers to, for example, single end-point techniques such as reporter gene assays (typical example: luciferase based assay) in which only one target expressed gene is finally monitored. The second option refers to multi-end points techniques such as transcriptomics, in which a full genomic profile is monitored by DNA chips technology. In addition, Quantitative Polymerase Chain Reaction (Q-PCR) may be a complementary technique of high benefit especially to improve the sensitivity. These emerging techniques have to be known by current and future end-users and people in charge of chemical food safety, as they offer today new perspectives in the field.

#### **• General objective(s)**

The first objective of this theoretical session is to describe the main basic principles of cell-based assays including single end-point techniques (reporter gene assay) and multi end-point technologies (transcriptomics). The second objective is to present the principle of Q-PCR, as complementary technique for improving sensitivity by amplifying the measured signal.

#### **• Main items**

Reporter gene assay / Transcriptomics / Q-PCR

#### **• Pedagogical objectives**

- ✓ To describe the main chronological steps of a reporter gene assay based on luciferase expression
- ✓ To describe the main principle of a transcriptomics assay
- ✓ To know the main advantages and limits of Q-PCR approach in the field of chemical contaminants analysis

#### **• Pedagogical tools**

- ✓ PowerPoint slide show

#### **• Duration**

- ✓ 2 hours

#### **• Pre-requisite**

- ✓ Basics of molecular biology (Cell Biology, DNA structure and replication)