

ISO/TS 21633:2021 (E)

Label-free impedance technology to assess the toxicity of nanomaterials in vitro

Contents

	Foreword
1	Scope
2	Normative references
3	Terms and definitions
4	Abbreviations
5	Background
5.1	General
5.2	Electrochemical impedance technique
6	Basic principles, instruments
6.1	Basics of electrochemical impedance technique
6.2	Types of instrument
6.2.1	Electrochemical impedance-based instruments for in vitro analysis of toxicity on cell monolayers
6.2.2	Impedance-based flow cytometry
6.2.3	Electrochemical impedance-based spectroscopy
6.2.4	Electrical impedance tomography
7	Application for in vitro toxicity assessment
7.1	General
7.2	Normalized cell index
8	Technical limitations
Annex A	(informative) Basic procedures using the xCELLigence system
A.1	General
A.2	System validation
A.3	System verification
A.4	Cells and cell culture — Testing for seeding concentration
A.5	Reagents
A.6	Growth measurements
A.7	IC50 estimation
A.8	Testing
A.9	Basic experimental design
A.10	Data output
A.11	Maintenance and cleaning
Annex B	(informative) Case studies using standard operating procedure for setting up an xCELLigence experiment with various cellular models
B.1	Human bronchial epithelial (BEAS-2B) cells — Basic experimental design
B.2	Chinese hamster ovary (CHO) cells — Basic experimental design
B.3	Human embryonic kidney 293 (HEK 293) cells — Basic experimental design
B.4	Human liver carcinoma (HepG2) cells
B.4.1	Poly-L-lysine coating of seeding platform (e-plate)
B.4.2	Basic experimental design
B.5	U937 monocyte derived macrophages
B.5.1	Fibronectin coating of seeding platform (e-plate)
B.5.2	Basic experimental design