Measurement of urea synthesis in cultured stem cell-derived hepatocyte-like cells

Created on: 08-03-2019 - Last modified on: 23-07-2025

Organisation

Name of the organisation Vrije Universiteit Brussel (VUB)
Department Pharmaceutical and Pharmacological Sciences
Specific Research Group or Service In Vitro Toxicology and Dermato-Cosmetology
Country Belgium
Geographical Area Brussels Region

SCOPE OF THE METHOD

The Method relates to	Human health
The Method is situated in	Basic Research
Type of method	In vitro - Ex vivo
Specify the type of cells/tissues/organs	Human stem cells

DESCRIPTION

Method keywords

Stem cells
Hepatocytes
Hepatotoxicity
urea

Scientific area keywords

hepaticdifferentiation
hepatic toxicity
Hepatotoxicity
Cell culture
cellular programming

Method description

The present standard procedure describes a protocol for measuring the urea concentration in supernatant of human stem cell-derived hepatocyte-like cells. This procedure relies on a chromogenic reagent that forms a colored complex specifically with urea. The latter can be measured and is directly proportional to the urea concentration in the sample.

Lab equipment

Biosafety cabinet;
Multiplate reader;
Thermostated bath.

Method status

History of use
Internally validated

PROS, CONS & FUTURE POTENTIAL

Advantages

The current protocol represents a simple and direct method to quantitatively measure the urea concentration in human stem cell-derived hepatocyte-like cell cultures. This assay has no harmful effect on the cultured cells. Therefore, after incubation of the cells with the substrate (ammonium chloride (NH4Cl)), the cultures can be maintained.

Future & Other applications

Can be applied to other types of *in vitro* systems of hepatocytes.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

References

Gómez-Lechón MJ, Lahoz A, Gombau L, Castell JV, Donato MT. (2010) In vitro evaluation of potential hepatotoxicity induced by drugs. Curr Pharm Des 16:1963-77
Lavon N, Benvenisty N. (2005) Study of hepatocyte differentiation using embryonic stem cells. J Cell Biochem 96:1193-202
Roelandt P, Pauwelyn KA, Sancho-Bru P, Subramanian K, Ordovas L, Vanuytsel K, Geraerts M, Firpo M, De Vos R, Fevery J, Nevens F, Hu WS, Verfaillie CM. (2010) Human Embryonic and Rat Adult Stem Cells with Primitive Endoderm-Like Phenotype Can Be Fated to Definitive Endoderm, and Finally Hepatocyte-Like Cells. PLoS One; 5(8): e12101
Snykers S, Vanhaecke T, De Becker A, Papeleu P, Vinken M, Van Riet I, Rogiers V. (2007) Chromatin remodeling agent trichostatin A: a key-factor in the hepatic differentiation of human mesenchymal stem cells derived of adult bone marrow. BMC Dev Biol 7:24
Snykers S, De Kock J, Rogiers V, Vanhaecke T. (2009) In vitro differentiation of embryonic and adult stem cells into hepatocytes: state of the art. Stem Cells 27:577-605

Associated documents

Urea synthesis.doc

Coordinated by

Financed by