In vitro gastrointestinal Dialysis model (with colon phase)

Commonly used acronym: *GIDM & GIDM-colon*

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Contact person

Annelies Breynaert

Organisation

Name of the organisation University of Antwerp (UAntwerpen)

Department Pharmaceutical Sciences

Specific Research Group or Service NatuRA (Natural Products and Food - Research and Analys

Country Belgium

Geographical Area Flemish Region

SCOPE OF THE METHOD

The Method relates to	Animal health, Human health
The Method is situated in	Basic Research
Type of method	In vitro - Ex vivo

DESCRIPTION

Method keywords

passive diffusion

availability

validated in vitro model

colonic metabolism

Scientific area keywords

effect of food matrix on availability of compounds
metabolisation pattern of bio-active compounds
availability and release of compounds in pharmaceutical formula

Method description

The GIDM-colon is a validated *in vitro* model that allows the study of the availability of compounds and the metabolisation at the level of the colon. The human physiological conditions of the gastrointestinal tract (stomach, small intestine and colon) are mimicked. The continiuous flow eliminates the compounds diffusing through a semi-permeable membrane, simulating absorption by passive diffusion. The impact of the digestive conditions of various age groups or diseases states (e.g. metabolic syndrome) on availability and metabolite formation can be investigated.

Lab equipment

Anaerobic glove box ;
Sample analysis:
- HPLC,
- AAS,
- LC/QTOF.

Method status

History of use
Internally validated
Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

Reproducability ;
Circumstances can be well controlled and standardized ;
Representative of colon microbiome ;

Sampling at any time.

Challenges

Absence of an active transport of digestion products.

Future & Other applications

An adaptation can be made to the gastrointestinal tract of animals investigating the availability and the release of compounds in certain drugs or healthy food.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

References

Optimization of an *in vitro* gut microbiome biotransformation platform with chlorogenic acid as model compound: From fecal sample to biotransformation product identification. Mortelé O, Iturrospe E, Breynaert A, Verdickt E, Xavier BB, Lammens C, Malhotra-Kumar S , Jorens PG, Pieters L, van Nuijs ALN, Hermans N ; J Pharm Biomed Anal.2019 ; 175.

Chlorogenic Acid as a Model Compound for Optimization of an *In Vitro* Gut Microbiome-Metabolism Model. Mortelé O, Iturrospe E, Breynaert A, Xavier BB, Lammens C, Malhotra-Kumar S , Jorens PG, Pieters L, van Nuijs ALN, Hermans N: proceedings 2019, 11(1), 31.

Revelation of the metabolic pathway of hederacoside C using an innovative data analysis strategy for dynamic multiclass biotransformation experiments Peeters L, Beirnaert C, Van der Auwera A, Bijttebier S, de Bruyne T, Laukens K, Pieters L, Hermans N, Foubert K. Journal of chromatography: 2019, p. 240-247.

Toll-like receptor-dependent immunomodulatory activity of Pycnogenol® Verlaet A, Bolt van der N, Meijer B, Breynaert A, Naessens T, Konstanti P, Smidt H, Hermans N, Savelkoul H F.J., Teodorowicz M, Nutrients - ISSN 2072-6643-11:2. 2019.

In vitro gastrointestinal biotransformation of a Desmodium adscendens decoction: the first step in unravelling its behavior in the human body. van Dooren I, Foubert K, Bijttebier S, Breynaert A, Theunis M, Exarchou V, Claeys M, Hermans N, Apers S, Pieters L, Journal of Pharmacy and Pharmacology ISSN 0022-3573-70:10 p. 1414-1422. 2018.

In vitro and *in vivo* study of the gastrointestinal absorption and metabolisation of hymenocardine, a cyclopeptide alkaloid. Tuenter E, Bijttebier S, Foubert K,

Breynaert A, Apers S, Hermans N, Pieters L; Planta medica: natural products and medicinal plant research, 83:9, p. 790-796. 2017.
Vegetable relishes, high in -carotene, increase the iron, zinc and -carotene nutritive values from cereal porridges. Kruger J, Breynaert A, Pieters L, Hermans N; International journal of food sciences and nutrition - ISSN 0963-7486, p. 1. 2017.
Development and validation of an *in vitro* experimental GastroIntestinal Dialysis Model with colon phase to study the availability and colonic metabolisation of polyphenolic compounds. Breynaert A, Bosscher D, Khant A, Claeys M, Cos P, Pieters L., Hermans N; Planta Medica, 81, 1075-1083), 2015.

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