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- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
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(54) **Title:** MEANS AND METHODS FOR ASSESSING DISORDERS RELATED TO IMPAIRED IRON ADSORPTION OR ENERGY METABOLISM

(57) **Abstract:** The present invention pertains to the field of diagnostics for iron adsorption disorder or impaired energy metabolism and toxicological assessments for risk stratification of chemical compounds. Specifically, it relates to a method for diagnosing iron adsorption disorder or impaired energy metabolism. It also relates to a method for determining whether a compound is capable of inducing such iron adsorption disorder or impaired energy metabolism in a subject and to a method of identifying a drug for treating iron adsorption disorder or impaired energy metabolism. Furthermore, the present invention relates to a device and a kit for diagnosing iron adsorption disorder or impaired energy metabolism.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2013/051819

## A. CLASSIFICATION OF SUBJECT MATTER

See the extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC:A61B 5/-; A61B 19/-;

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT,CNKI,WPI,EPODOC,GOOGLE; choline 1w plasmalogen, praline, DAG, methionine, cholic 1w acid, alpha 1w tocopherol, citrate, serine, threonine, hippuri 1w acid, propionic 1w acid, creatinine or alanine, phosphatidylcholin, malate, ornithine, threonic 1w acid, glutamate, glutamine, campesterol, lysophosphatidylcholine, hydroxybutyrate, pyruvate, succinate, iron 1w adsorption, energy 1w metabolism, oryastrobin, dimoxystrobin, iron 1w deficient, methoxyethano, aminonicotinamide

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Lei Ji et al., Effects of ascorbic acid and citric acid on iron bioavailability in an in vitro digestion/ Caco-2 cell culture model, J South Med Univ, Vol.28, No.10, Pages 1743-1747, 2008	3-20
X	WANG Yu-ping et al., EFFECTS OF ACUTE HYPOXIA ON PLASMA METABOLOME IN MICE, Chin J Appl Physiol, Vol.25, No.2, Pages 177-180, 2009	3-20
X	S.M.I, Kazmi et al., 6-AMINONICOTINAMIDE:EEG CHANGES AND EFFECTS ON THE ACTIVITIES OF ENZYMES RELATED TO GLUTAMATE METABOLISM IN RAT BRAIN REGIONS, pharmacological Research Communications, Vol.18, No.8, Pages 747-758, 1986	4-9,11-15,18-20

Further documents are listed in the continuation of Box C.

See patent family annex.

<p>* Special categories of cited documents:</p> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&amp;”document member of the same patent family</p>
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Date of the actual completion of the international search  
24 July 2013(24.07.2013)

Date of mailing of the international search report  
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Name and mailing address of the ISA/CN  
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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2013/051819

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: 1, 2, 4 (part)-9 (part), 16

The subject matter of claims 1, 2, 4 (part)-9 (part) referring to claim 1 relates to "a method for diagnosing iron adsorption disorder or impaired energy metabolism".

The subject matter of claim 16 relates to "use of at least one biomarker selected from anyone of 1a, 1b, 1c, 1d or 2 or a detection agent for the said biomarker for diagnosing iron adsorption disorder or impaired energy metabolism in a sample of a subject".

The subject matter of claims 1, 2, 4 (part)-9 (part), 16 relates to a method for diagnosis or treatment of human disease and does not meet the criteria set out in Rule 39.1(iv) Regulations under the PCT.

The subject matter of claim 16 is searched on the basis of the following subject matter: at least one biomarker selected from anyone of 1a, 1b, 1c, 1d or 2 or a detection agent in the manufacture of a detection reagent for diagnosing iron adsorption disorder or impaired energy metabolism.

2.  Claims Nos.:

3.  Claims Nos.:

because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2.  As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fee.

3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on protest

The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2013/051819

Continuation of: A.CLASSIFICATION OF SUBJECT MATTER of second Sheet

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A61B 19/00 (2006.01) i