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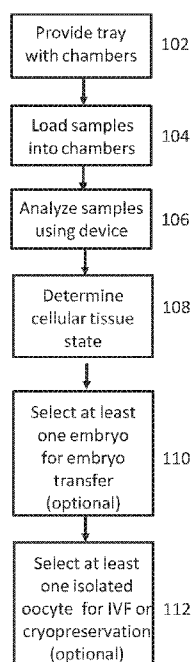
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Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

(54) Title: CELLULAR TISSUE ANALYSIS METHOD AND DEVICE

Fig. 1



(57) Abstract: A system for analyzing samples, for example for IVF, including: a tray comprising at least two chambers shaped and sized to store biological samples, each of said at least two chambers is configured to hold a single sample; an analyzer, comprising: a tray holder, shaped and sized to hold said tray; an identification (ID) reader configured to read one or more ID codes associated with said tray and/or with one or more samples in said tray; a memory; a control circuitry electrically connected to said ID reader, wherein said control circuitry is configured to identify said tray or said one or more samples in said tray according to signals received from said ID reader and one or more indications stored in said memory.



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INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC - B01L 3/00, C12M 1/34, C12Q 1/02, G01N 21/76, G01N 33/48, G01N 33/483 (2020.01)

CPC - B01L 3/5027, B01L 3/50857, B01L 7/00, G01N 21/71, G01N 21/76, G01N 33/48, G01N 33/483, C12M 23/16, C12M 23/58, C12M 21/06, C12M 21/00, C12M 41/12, G01N 35/00732, G01N 35/00871, G16H 10/40, G01N 2035/00811, G01N 2035/00831, Y10T 436/206664, Y10T 436/11

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)

See Search History document

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

See Search History document

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

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y --- A	US 2004/0219074 A1 (CHILDERS et al.) 04 November 2004 (04.11.2004), Fig 4; para [0015], [0033], [0040], [0058], [0080], [0116], [0124]-[0136]	20, 29, 32 ----- 21, 22, 30, 31 ----- 23, 24
Y --- A	US 2014/0247972 A1 (AUXOGYN, INC.) 04 September 2014 (04.09.2014), Fig 24; para [0003], [0009], [0015], [0021], [0073], [0212], [0416]	1, 2, 5-18, 50 ----- 3, 4, 19
Y --- A	US 2011/0229961 A1 (HIGASHI et al.) 22 September 2011 (26.09.2011), Fig 1; para [0002], [0004], [0006], [0012], [0034], [0036], [0039], [0066], [0068]	1, 2, 5-18, 33-36 ----- 3, 4, 19
Y --- A	WIENER-MEGNAZI, Zofnat, et al. "Oxidative stress indices in follicular fluid as measured by the thermochemiluminescence assay correlate with outcome parameters in in vitro fertilization." Fertility and Sterility 82 (2004): 1171-1176, Fig 1, 2; pg 1171-1174 [online] < https://www.fertstert.org/article/S0015-0282(04)01134-3/pdf >	6, 13-15, 21, 22, 50 ----- 23
Y	US 2008/0213872 A1 (REGAN) 04 September 2008 (04.09.2008), para [0040]	30
Y	US 2014/0370609 A1 (ROCHE MOLECULAR SYSTEMS, INC.) 18 December 2014 (18.12.2014), para [0037], [0041], [0042]	31, 33-36

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"D" document cited by the applicant in the international application

"E" earlier application or patent but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL 19/50895

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.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

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:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I: claims 1-19: drawn to a method for scoring in-vitro fertilization (IVF) related cellular tissue.
 Group II: claims 20-36: drawn to a system for analyzing samples and method of validating an ID of a sample and/or tray.
 Group III: claims 37-43: drawn to a method for selecting one or more chambers of a tray used for optical analysis
 Group IV: claims 44-45: drawn to a system for analyzing samples including a vacuum assembly.
 Group V: claims 46-49: drawn to a system for analyzing samples including a heater.
 Group VI: claim 50: drawn to a method for evaluating embryo quality of oocyte quality by detection of photon emission.

-- see extra sheet

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 additional fees, this Authority did not invite payment of additional fees.
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.:
1-36, 50
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/IL 19/50895

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2017/0191981 A1 (AYTU BIOSCIENCE, INC.) 06 July 2017 (06.07.2017), abstract; para [0014], [0082]	11, 12
A	US 2002/0106808 A1 (SERGEY et al.) 08 August 2002 (08.08.2002), entire document	1-36, 50
A	US 2014/0302493 A1 (IRVINE SCIENTIFIC SALES COMPANY, INC.) 09 October 2014 (09.10.2014), entire document	1-36, 50
A	US 2008/0091119 A1 (MOFFITT) 17 April 2008 (17.04.2008), entire document	1-36, 50

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL 19/50895

Continuation of Box No. III -- Observations where unity of invention is lacking

The inventions listed as Groups I-VI do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Special technical features:

Group I requires the technical feature of automatically measuring, not found in the other groups.

Group II requires the technical feature of an ID reader, not found in the other groups.

Group III requires the technical feature of measuring photon emission from said one or more chambers in a timed relationship to said heating, not found in the other groups.

Group IV requires the technical feature of a vacuum assembly, not found in the other groups.

Group V requires the technical feature of a heater comprising a surface area of between 80%-120% of a bottom surface area of a cuvette, not found in the other groups.

Group VI requires the technical feature of a measuring one of oxidative stress parameters and oxidative stress-deprived factor in said sample, not found in the other groups.

Shared Features:

The only technical features shared by Groups I-VI that would otherwise unify the groups are a tray having a plurality of chambers.

The only additional technical features shared by Groups I and II and that would otherwise unify the groups are a one or more samples related to IVF-related cellular tissues.

The only additional technical features shared by Groups II and II and that would otherwise unify the groups are an analyzer.

Further, the only additional technical features shared by Groups III and V and that would otherwise unify the groups are a heater.

However, these shared technical features do not represent a contribution over prior art, because the shared technical features are disclosed by US 2011/0229961 A1 to Higashi et al. (hereinafter Higashi) 22 September 2011 (22.09.2011), which discloses a method and system of automatically analyzing biological sample (para [0006] -Disclosed herein are embodiments of a microfluidic cell support system comprising a base assembly, a manifold assembly, and a microfluidic celltray including a microcirculatory path in fluid communication with the manifold assembly, wherein the microfluidic celltray is microfluidically closed and mechanically open. In embodiments, the microfluidic celltray includes one or more cell wells containing fluid for nourishing a living cell, such as an embryo, the fluid having a surface in contact with a gaseous environment, such as an ambient environment.), comprising: a tray having a plurality of chamber, wherein said tray comprises one more more samples related to a IVF-related cellular tissue (para [0006] -Disclosed herein are embodiments of a microfluidic cell support system comprising a base assembly, a manifold assembly, and a microfluidic celltray including a microcirculatory path in fluid communication with the manifold assembly, wherein the microfluidic celltray is microfluidically closed and mechanically open. In embodiments, the microfluidic celltray includes one or more cell wells containing fluid for nourishing a living cell, such as an embryo, the fluid having a surface in contact with a gaseous environment, such as an ambient environment.); an analyzer (para [0036] -This permits ready examination of the resident living cells, e.g., embryos, using routine microscopy. Embodiments of the present invention may include two-dimensional arrays of millimeter-sized wells containing, for example, embryos for IVF and the nutrient solutions to support them. Such an arrangement may enable automated processing as well as simultaneous monitoring and analyzing of a collection of living cells, e.g., embryos.), and a heater (para [0059] - The housing assembly 400 can include features to control other aspects of the cell's environment. To control heating, for example, a heater assembly 430 can be included within the manifold assembly 423, for example in proximity to the cover glass 428. In an embodiment, the heating element 432 for the heater assembly can be formed in proximity to or in conjunction with the cover glass 428. In other embodiments, the heater assembly 430 can be placed wherever convenient, for example, as part of the base assembly or in proximity to the fluid-bearing portion of the cell wells. In embodiments, the heater assembly 430 can be positioned adjacent to the cell wells 422, for example, as a heating element 432 that is set into the celltray itself or that is positioned vertically to parallel the cell well 422.).

As the shared technical features were known in the art at the time of the invention, they cannot be considered special technical features that would otherwise unify the groups.

Groups I-VI therefore lack unity under PCT Rule 13.