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(71) Applicants: **UNIGEN, INC.** [US/US]; 3005 1st Avenue, Seattle, Washington 98121 (US). **UNIGEN, INC.** [KR/KR]; San 80, Songjungli, Byeongchun-Myeon, Dongnam-Gu, Cheonansi, Chungcheongnam-do 330-863 (KR).

(72) Inventors: **BROWNELL, Lidia, Alfaro**; 1224 South Verde, Tacoma, Washington 98405 (US). **CHOI, Byong-Il**; Unit 603-1501 Hoban Vertium Apt., Yeonje-ri, Osong-eup, Cheongwon-gun, Chungcheongbuk-do 363-702 (KR). **CORNELIUSEN, Brandon**; 4148 Offut Lake Road SE, Tenino, Washington 98589 (US). **HONG, Mei-Feng**; 4740 Seville Lane SE, Lacey, Washington 98503 (US). **HYUN, Eu-Jin**; Unit 302-804 Bongmyeong Cheongsol Apt., Bongmyeong-dong, Dongnam-gu, Cheonan-si, Chungcheongnam-do 330-793 (KR). **JIA, Qi**; 3922 Pennant Court NW, Olympia, Washington 98502 (US). **JIAO, Ping**; 4736 Brillshire Lane SE, Lacey, Washington 98503 (US). **KIM, Hyun-Jin**; Unit 109-1001 Yojin Ycity Apt., Jangjae-ri, Baebang-eup, Asan-Si, Chungcheongnam-do 336-747 (KR). **KIM, Mi-Ran**; Unit 1-1503 SunKyeong Apt., Bongmyeong-dong, Dongnam-gu, Cheonan-si, Chungcheongnam-do 330-100 (KR). **KIM, Tae-Woo**; #83-9 Haksung-dong, Jung-gu, Ulsan, Ulsan 681-821 (KR). **LEE, Bo-Su**; Unit 102-303 Junyang 5-cha Apt., Munduck-ri, Ocheon-eup, Nam-gu, Pohang-si, Gyeongsangbuk-do 790-732 (KR). **LEE, Young-Chul**; Unit 14-1103 Samsung Apt., #175-1, Oryu-dong, Jung-gu, Daejeon 301-787 (KR). **NAM, Jeong-Bum**; Unit 104-1103 Woolim 1-cha Apt., Gak-ri, Ochang-eup, Cheongwon-gun, Chungcheongbuk-do 363-782 (KR). **YIMAN, Mesfin**; 23105 52nd Av-

[Continued on next page]

(54) Title: COMPOSITIONS AND METHODS FOR MANAGING WEIGHT

(57) Abstract: The present disclosure provides Diels-Alder adducts of chalcone and prenylphenyl moieties capable of modulating the activity of cannabinoid receptors, and to oligomers of flavan-3-ol capable of modulating fat absorption and storage. Such Diels-Alder adducts of chalcone and prenylphenyl moieties or oligomers of flavan-3-ol can optionally be used in combination with other weight management agents, such as anorectic agents, a lipase inhibitors, other cannabinoid receptor modulators, psychotropic agents, insulin sensitizers, stimulants, or satiety agents, as well as to methods of use thereof such as treating or preventing weight gain or obesity, promoting weight loss, appetite suppression, modifying satiety, or the like.

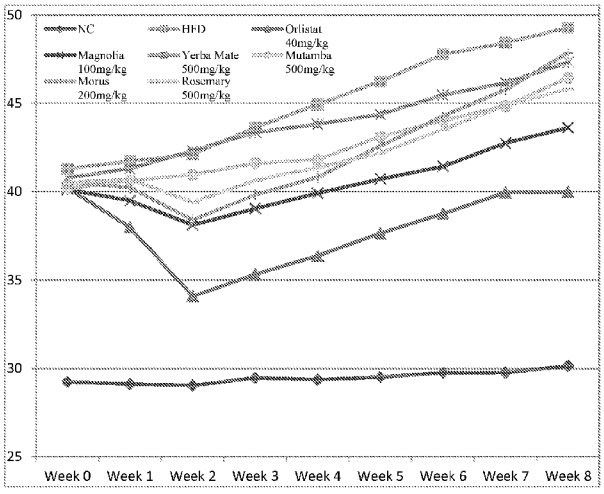


Fig. 1

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enue S., Kent, Washington 98032 (US). **HWANG, Ji-Hye**; Unit 305-1003 Gangjeo Humansia 3(sam)-danji Apt., Gangje-dong, Jecheon-si, Chungcheongbuk-do 390-778 (KR). **OH, Mi-Sun**; #27-24 Munhwa-dong, Dongnam-gu, Cheonan-si, Chungcheongnam-do 330-020 (KR).

(74) **Agents**: **PEPE, Jeffrey, C.** et al.; Seed Intellectual Property Law Group PLLC, Suite 5400, 701 Fifth Avenue, Seattle, Washington 98104-7064 (US).

(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, 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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Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) **Date of publication of the international search report**:
30 January 2014

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/043188

A. CLASSIFICATION OF SUBJECT MATTER

A61K 31/12(2006.01)i, A61K 31/353(2006.01)i, A61K 31/343(2006.01)i, A61K 31/36(2006.01)i, A61P 25/00(2006.01)i

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)
A61K 31/12; C07D 43/02; A61K 31/497; A61K 9/00; A61K 35/78; A61K 36/24; A61K 31/353; A61K 31/343; A61K 31/36; A61P 25/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: chalcone, prenylphenyl, Kuwanon, Morus, obesity, weight loss, carnosic acid, Hoodia, honokiol, Diels-Alder adduct

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PUSAN UNIVERSITY, 'Development of functional soybean food modulating obesity and enhancing neurogenesis', Final Research Report, Ministry for Food, Agriculture, Forestry and Fisheries, 2008. See page 91, lines 10-16.	1-14,22,23,27
Y		15-21,24-26
Y	US 2005-0054659 A1 (ELLSWORTH, B. A. et al.) 10 March 2005 See claims 10, 12 and 49.	15-17,19-21,24
Y	WANG, T. et al., 'Carnosic acid prevents obesity and hepatic steatosis in ob/ob mice', Hepatology Research, 2011, Vol. 41, pages 87-92. See abstract.	18
Y	US 2003-0206975 A1 (STOGNIEW, M. et al.) 06 November 2003 See abstract.	21
Y	US 2005-0003026 A1 (BOK, S.-H. et al.) 06 January 2005 See claims 1-3.	25
Y	US 2011-0236438 A1 (AHARON, R. et al.) 29 September 2011 See claims 1 and 6.	26

☒ 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
"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

Date of the actual completion of the international search	Date of mailing of the international search report
28 November 2013 (28.11.2013)	**28 November 2013 (28.11.2013)**

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea
Facsimile No. +82-42-472-7140

Authorized officer
CHOI, Sung Hee
Telephone No. +82-42-481-8740

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/043188

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JANG, S. J. et al., 'Anti-obesity effect of Mulberry leaves extraction in obese rats high-fat diet', Korean J. Oriental Physiology & Pathology, 2009, Vol. 23, No. 4, pages 831-836. See abstract and page 835.	1-27

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/043188

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.: 32-36
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 32-36 pertain to methods for treatment of the human body by therapy, and thus relate to a subject matter which this International Searching Authority is not required, under Article 17(2)(a)(i) of the PCT and Rule 39.1(iv) of the Regulations under the PCT, to search.

2. ☒ Claims Nos.: 31
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:
Claim 31 does not comply with PCT Article 6, since it refers to claim 30 which is not drafted in accordance with PCT Rule 6.4(a).

3. ☒ Claims Nos.: 28-30, 32-36
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:

(See extra sheet.)

1. ☐ As all required addtional 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 any 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.:

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.:
1-31 (all in part)

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/US2013/043188

(Continuation of Box No. III)

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

Group I, claims 1-31 (all in part), drawn to a composition comprising a compound having a structure of Formula Ih.

Group II, claims 1-31 (all in part), drawn to a composition comprising a compound having a structure of Formula Ii.

Group III, claims 1-31 (all in part), drawn to a composition comprising a compound having a structure of Formula Ij.

Group IV, claims 1-31 (all in part), drawn to a composition comprising a compound having a structure of Formula Ik.

Group V, claims 1-31 (all in part), drawn to a composition comprising a compound having a structure of Formula Il.

Group VI, claims 1-31 (all in part), drawn to a composition comprising a compound having a structure of Formula IIh.

Group VII, claims 1-31 (all in part), drawn to a composition comprising a compound having a structure of Formula IIi.

Group VIII, claims 1-31 (all in part), drawn to a composition comprising a compound having a structure of Formula IIj.

Group IX, claims 1-31 (all in part), drawn to a composition comprising a compound having a structure of Formula IIk.

Group X, claims 1-31 (all in part), drawn to a composition comprising a compound having a structure of Formula III.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2013/043188

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		EP 1653962 A4	11/06/2008
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