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(71) Applicant: **DUKE UNIVERSITY** [US/US]; 2812 Erwin Road, Suite 306, Durham, NC 27705 (US).

(72) Inventors: **LEFKOWITZ, Robert**; c/o Duke University, 2812 Erwin Road, Suite 306, Durham, NC 27705 (US).
KAHSAI, Alem; c/o Duke University, 2812 Erwin Road, Suite 306, Durham, NC 27705 (US).

(74) Agent: **MASSEY, Carl, B., Jr.**; Massey Law, PLLC, P.O. Box 541, Lewisville, NC 27023 (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, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, 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, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

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(54) Title: β -ARRESTIN-MODULATING COMPOUNDS AND METHODS OF USING SAME

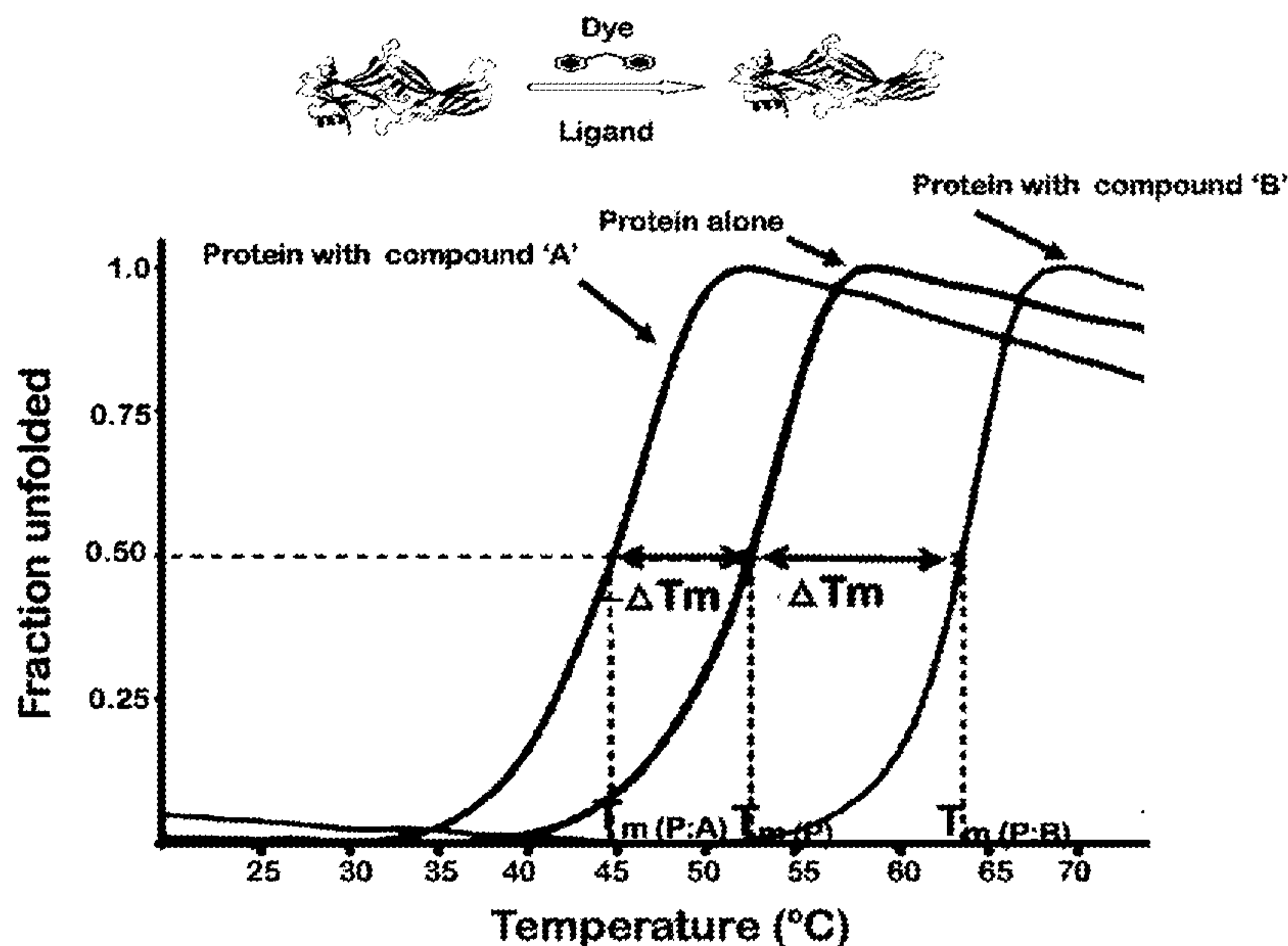


FIG. 1

(57) Abstract: The present disclosure provides novel β -arrestin-modulating compounds and methods of making and using same.



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))*

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20 May 2021 (20.05.2021)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 20/44403

A. CLASSIFICATION OF SUBJECT MATTER
 IPC - A23F 5/46; A23L 27/00; A23L 27/20 (2021.01)
 CPC - A23F 5/465; A23L 27/2056; A23L 27/86; A61K 31/135

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 -- A | WO 2018/057989 A1 (WASHINGTON UNIVERSITY) 29 March 2018 (29.03.2018), especially: para [0144], Table 3, NSC62208; para [00152]. | 1,5 ----- 8-9 |
| A | BEAUTRAIT et al. "A new inhibitor of the b-arrestin/AP2 endocytic complex reveals interplay between GPCR internalization and signalling", NATURE COMMUNICATIONS. 2017. Vol. 8:15054, 16 pages, especially: abstract; pg 9, Figure 6c. | 8-9 |
| A | PubChem-SID-6510364, Modify Date: 14 September 2005 (14.09.2005), pg 2, Fig. | 8-9 |
| E/X | WO 2021/022111 A2 (DUKE UNIVERSITY) 4 February 2021 (04.02.2021), entire document. | 1,5,8,9 |

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

Date of the actual completion of the international search

11 March 2021

Date of mailing of the international search report

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Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
 P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-8300

Authorized officer

Lee Young

Telephone No. PCT Helpdesk: 571-272-4300

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 20/44403

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.: 6-7,12-16
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 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.:

- 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.:
1,5,8,9

- 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
Information on patent family members

International application No.

PCT/US 20/44403

--BOX III - LACK OF UNITY--

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, (5, 8, 9)/(in part) is directed towards a compound comprising the general formula (I).

Group II: Claims 2, (5, 8, 9)/(in part) is directed towards a compound comprising the general formula (II)

Group III: Claims 3, (5, 10-11) (in part) is directed towards a compound comprising the general formula (III)

Group IV: Claims 4, (5, 10-11)/(in part) is directed towards a compound comprising the general formula (IV)

The inventions listed as Groups I-IV 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 a compound of formula (I), not required by groups II-IV.

Group II requires a compound of formula (II), not required by groups I and III-IV.

Group III requires a compound of formula (III), not required by groups I-II and IV.

Group IV requires a compound of formula (IV), not required by groups I-III.

Shared technical feature

There is no shared technical feature between groups I-IV.

Therefore, Groups I-IV lack unity under PCT Rule 13.

Note:

Claims 6-7 are determined unsearchable because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Claims 12-16 are determined unsearchable because these are omnibus claims under Rule 6.2(a).