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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, 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, 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:** COMPOSITIONS AND METHODS FOR TREATMENT OF PULMONARY DISEASES AND CONDITIONS

(57) **Abstract:** The invention provides compositions and methods for treating pulmonary diseases and conditions. The provided compositions and methods utilize either low concentrations of selective  $\alpha$ -2 adrenergic receptor agonists having a binding affinity of 300 fold or greater for  $\alpha$ -2 over  $\alpha$ -1 adrenergic receptors or ketamine at specific pH. The compositions preferably comprise bromidone and/or dexmedetomidine and/or ketamine.

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US 12/33452

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC(8) - C12N 5/07, 5/16 (2012.01)  
 USPC - 435/334  
 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)  
 435/334

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
 424/400; 514/249, 396, 617, 646

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
 DialogClassic and Google Patent & Scholar: Alpha 2 receptor adrenergic agonist brimonidine dexmedetomidine guanfacine clonidine guanabenz pulmonary disease condition ketamine bronchodilator aerosol nebulize NMDA antagonist asthma cystic fibrosis theophylline anticholinergic

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2010/0029663 A1 (Horn) 04 Feb 2010 (04.02.2010) para [0012], [0039]-[0040], [0044], [0046], [0051], [0064], [0067], [0070]-[0071], [0073], [0077], [0097], [0100], [0106], [0114]-[0115], [0153], [0156], [0158]	1-7, 9-14, 23-25, 29 ----- 8, 15-22, 26-28
Y	US 6,562,873 B2 (Olejnik et al.) 13 May 2003 (13.05.2003) col 15, ln 47; Table III	8
Y	US 2004/0191176 A1 (Kaplan et al.) 30 Sep 2004 (30.09.2004) para [0004], [0039]; claim 2	15-16
Y	US 6,562,855 B1 (Franks et al.) 13 May 2003 (12.05.2003) col 3, ln 3; col 10, ln 6-7; col 14, ln 14-16; claim 2	17-22, 26-28
Y	US 2002/0016319 A1 (Olney et al.) 07 Feb 2002 (07.02.2002) entire document	1-29
Y	US 2010/0029659 A1 (Horn) 04 Feb 2010 (04.02.2010) entire document	1-29
Y	US 6,544,927 B2 (Burns) 08 Apr 2003 (04.08.2003) entire document	1-29

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"&" document member of the same patent family
"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	

Date of the actual completion of the international search 12 Jun. 2012 (12.06.2012)	Date of mailing of the international search report <b>05 JUL 2012</b>
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