



- (51) International Patent Classification:
B01D 63/00 (2006.01)
- (21) International Application Number:
PCT/US2013/047073
- (22) International Filing Date:
21 June 2013 (21.06.2013)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/662893 21 June 2012 (21.06.2012) US
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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, 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.

- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

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

- (88) Date of publication of the international search report:
18 June 2015

(54) Title: METHODS AND REAGENTS FOR GLYCOPROTEOMICS

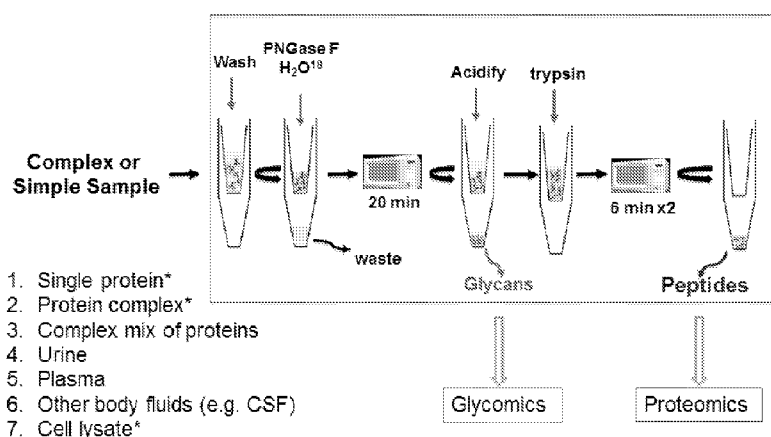


FIGURE 1

(57) Abstract: Some aspects of this disclosure provide a method for separating a glycan and/or a polypeptide fraction from a mixture comprising a glycan and a polypeptide. In some embodiments, the method comprises acidifying the mixture in order to decrease non-covalent glycan/polypeptide interactions prior to separation. Reagents and devices useful for glycan and/or polypeptide separation are also provided. The technology disclosed herein allows for the rapid, cost-efficient separation and isolation of both glycans and polypeptides obtained from glycosylated proteins after release of the glycans, for example, by enzymatic digest. Uses of the disclosed technology include, for example, the separation and isolation of glycans and/or polypeptides from body fluid samples for diagnostics, and quality control of glycosylation in engineered proteins, e.g., in therapeutic antibodies.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2013/047073

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - B01D 63/00 (2013.01) USPC - 210/500.21 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(8) - A61K 38/00, 38/14; B01D 63/00, 63/08; C07K 1/34, 9/00 (2013:01) USPC - 210/321.6, 321.75, 321.84, 500.21; 424/418, 461; 530/395, 414 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched CPC - A01N 25/26; A23J 1/205; A61K 9/5078, 38/00; B01D 61/18, 63/082, 67/0088 (2013.01) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Orbit, Google Patents, Google Scholar		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MANJUNATH et al. "Biochemical, Biological, and Immunological Properties of Chemically Deglycosylated Human Chorionadotropin," The Journal of Biological Chemistry, 25 June 1982 (25.06.1982), Vol. 257, No. 12, Pgs. 7109-7115. entire document	1-5
X	CHENG et al. "Identification of Two Testosterone-responsive Testicular Proteins in Sertoli Cell-enriched Culture Medium Whose Secretion Is Suppressed by Cells of the Intact Seminiferous Tubule," 15 September 1987 (15.09.1987), Vol. 262, No. 26, Pgs.12768-12779. entire document	34, 36-41 ----- 35
Y	CENTRICON, Millipore, Centricon Plus-20 Centrifugal Filter devices, P31925, Rev. G, 1/05, 14 March 2005 (14.03.2005), Pgs. 1-2, Retrieved from the Internet <http://www.millipore.com/userguides.nsf/a73664f9f981af8c852569b9005b4eee/6af1562ba38e63d385256c6b0055477f/\$FILE/P31925.pdf> on 22 October 2013 (22.10.2013). entire document	35
A	US 5,593,580 A (KOPF) 14 January 1997 (14.01.1997) entire document	1-5, 34-41
A	POLO et al "Crystallization and preliminary X-ray diffraction analysis of the fructofuranosidase from Xanthophyllomyces dendrorhous," Acta Crystallographica Section F Structural Biology and Crystallization Communications, 28 October 2010 (28.10.2010), Vol. 66, Part 11, Pgs. 1441-1444. entire document	1-5, 34-41
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/>		
* 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 22 October 2013		Date of mailing of the international search report 07 NOV 2013
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. 571-273-3201		Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2013/047073

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.: 6-33, 42-63
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 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.:

- 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.