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Emery et al.

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(54) **PROTEIN PURIFICATION**

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USPC **530/416**; 530/412; 530/388.1; 530/289.1

(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,571,720 A * 11/1996 Grandics et al. 435/286.1
5,677,171 A 10/1997 Hudziak et al.
6,339,142 B1 1/2002 Basey et al.
6,417,355 B1 7/2002 Chapman et al.
6,433,144 B1 8/2002 Morris et al.
8,044,017 B2 * 10/2011 Emery et al. 514/1.1
2001/0034053 A1 * 10/2001 Winge 435/212

FOREIGN PATENT DOCUMENTS

WO WO 98/30694 7/1998
WO WO 99/57134 * 11/1999 ..... C07K 1/18
WO WO 00/02921 1/2000
WO WO 00/55184 9/2000

OTHER PUBLICATIONS

Carter et al., "Humanization of an Anti-P185HER2 Antibody for Human Cancer Therapy" Proceedings of the National Academy of Sciences of USA, National Academy of Science, Washington, DC, US., 89(10):4285-4289 (1992), XP000275844, issn:0027-8424.
Fukuoka, et al., "Studies of quality control of ^{99m}Tc-labelled Macroaggregated Albumin—part 1. Aggregation of non-mercaptalbumin and its conformation", Nucl. Med. Biol., vol. 20, No. 5, pp. 643-648 (1993).
Harris et al., "Identification of Multiple Sources of Charge Heterogeneity in a Recombinant Antibody" Journal of Chromatography B: Biomedical Sciences & Applications, Elsevier, Amsterdam, NL, 752(2): 233-245 (2001), XP004317158, ISSN: 1570-0233.
Kawaguchi et al., "Rapid analysis of serum lactate dehydrogenase isoenzymes by high-performance ion-exchange chromatography", Journal of Chromatography, 378: 456-461 (1986).

* cited by examiner

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(57) **ABSTRACT**

A method for purifying a polypeptide by ion exchange chromatography is described in which a gradient wash is used to resolve a polypeptide of interest from one or more contaminants.

14 Claims, 4 Drawing Sheets