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(71) Applicant:  GR INTELLECTUAL RESERVE, LLC
[US/US]; 1 Resonance Way, Havre de Grace, Maryland 21078 (US).

(72) Inventors:  and
(71) Applicant:  ZHANG, Zhongyan  [US/US]; 1 Resonance Way, Havre de Grace, Maryland 21078 (US).

(74) Agent:  MORTENSON, Mark G.; 1 Resonance Way, Havre de Grace, Maryland 21078 (US).

Title:  METHODS AND TREATMENT FOR CERTAIN DEMYELINATION AND DYSMYELINATION-BASED DISORDERS AND/OR PROMOTING REMYELINATION

Abstract:  The invention relates to methods and compositions for treating demyelination and/or dysmyelination and/or promoting remyelination of neurons and/or preventing the development of myelin-related diseases by administering to a subject in need thereof an effective amount (either therapeutic or prophylactic) of an elemental gold crystal nanosuspension.

FIG. 37B
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: 8 January 2015
**INTERNATIONAL SEARCH REPORT**

**International application No.**
PCT/US 14/37280

### A. CLASSIFICATION OF SUBJECT MATTER

**IPC(8)**  -  A01N 55/02 (2014.01)

**CPC**  -  A61K 31/555; C07D 249/08

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)
USPC: 514/184

Documentary searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC(8) - A01N 55/02 (2014.01)
CPC-A61K 31/555; C07D 249/08

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase (PGPB, USPT, USQC, EPAB, JPAB, DWPI, TDDB), FreePatentsOnline (US Pat, PgPub, EPO, JPO, WIPO, NPL), GoogleScholar (PL, NPL); search terms: reducing demyelination elemental gold nanosuspension

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>US 2007/014966 A1 (Chang et al.) 21 June 2007 (21.06.2007) Abstract, para [0020], [0027], [0029], [0123], [0124], [0149], [0185]</td>
<td>1-3, 9-12</td>
</tr>
</tbody>
</table>

**Further documents are listed in the continuation of Box C.**

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**Date of the actual completion of the international search**
03 November 2014 (03.11.2014)

**Date of mailing of the international search report**
18 NOV 2014

**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:**
Lee W. Young

**Form PCT/ISA/2 10 (second sheet) (July 2009)**

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INTERNATIONAL SEARCH REPORT

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.:
   - 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.

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.

Group I, claims 1-3 and 9-12, directed to a method for reducing neuronal myelin dysfunction
Group II, claims 4, 8, and 16-17, directed to a method for promoting remyelination of central nervous system neurons in a mammal
Group III, claims 5-6, 14-15, and 18-19, directed to a method for treating demyelination of neurons
Group IV, claim 7, 13 and 20, directed to a method promoting myelin preservation/preserving myelin function in a patient is need thereof

The groups of inventions listed above 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:

--------Continued in the supplemental box--------

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. 1-3, 9-12

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.

Form PCT/ISA/2 40 (continuation of first sheet (2)) (July 2009)
Continuation of Box III:

Special Technical Features (Distinct Technical Features):
The special technical feature of each group among Groups I-IV is a method as defined above, not required in any other group.

Common Technical Features (Features Do Not Make a Contribution: Over the Prior Art):
Groups I-IV share the technical feature of a method comprising administering a therapeutically effective amount, to a mammal in need thereof, a composition comprising: a) pharmaceutical grade water; b) at least one processing enhancer; and c) gold nanocrystals suspended in said water forming a suspension, wherein said gold nanocrystals: and i) have surfaces that include at least one characteristic selected from the group of characteristics consisting of: (1) no organic chemical constituents adhered or attached to said surfaces and (2) are substantially clean and do not have chemical constituents adhered or attached to surfaces, other than water or said processing enhancer, which alter the functioning of said nanocrystals; ii) have a mode particle size of less than about 50 nm; iii) are present in said suspension at a concentration of about 2-200 ppm; d) said suspension having a pH of between about 5 to about 9.5 and a zeta potential of at least about -20 mv. However, this technical feature is not a unifying technical feature as it does not make a contribution over the prior art in view of anticipating prior art WO 2011/006007 A1 to Mortenson et al. (hereinafter Mortenson discloses a method comprising administering a therapeutically effective amount, to a mammal in need thereof, a composition comprising: a) pharmaceutical grade water (abstract, pg 46, In 15-21); b) at least one processing enhancer (pg 22, In 1-5); and c) gold nanocrystals suspended in said water forming a suspension (pg 21, In 12-15; pg 48, In 1-6), wherein said gold nanocrystals: i) have surfaces that include at least one characteristic selected from the group of characteristics consisting of: (1) no organic chemical constituents adhered or attached to said surfaces (abstract) and (2) are substantially clean (abstract) and do not have chemical constituents adhered or attached to surfaces (pg 72, 3-9), other than water or said processing enhancer, which alter the functioning of said nanocrystals (pg 72, 3-9); ii) have a mode particle size of less than about 50 nm (pg 21, In 26-31); iii) are present in said suspension at a concentration of about 2-200 ppm (pg 21, In 32-35); d) said suspension having a pH of between about 5 to about 9.5 and a zeta potential of at least about -20 mv (pg 21, In 12-15).

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

Note:
Claims 11-12 improperly depend from claim 12. Therefore, claims 11-12 are assumed to depend from claim 10.
Claim 19 improperly depends from itself. Therefore, claim 19 is assumed to depend from claim 18.
Claim 3 is lacking clarity for improper broadening of gold nanocrystals concentration.