In a further aspect, the invention relates to therapeutically acceptable polymers comprising a polymer backbone and a multitude of substituents of formula (**I**) and/or formula (**II**), wherein Z is a linker connecting said substituent to the polymer backbone, wherein the linker Z is aryl, heteroaryl, aryl-lower alkyl, arylcarbonyl, or heteroarylmethyl, wherein aryl or heteroaryl is substituted by alkylene with 3 to 25 carbon atoms connecting to the polymer wherein optionally

(a) one or more carbon atoms of alkylene are replaced by nitrogen carrying a hydrogen atom, and one of the adjacent carbon atoms is substituted by oxo, representing an amide function –NH–CO–; and/or

(b) one or more carbon atoms of alkylene are replaced by oxygen;

(c) one or more carbon atoms of alkylene are replaced by sulphur; and/or

(d1) the terminal carbon atom connecting to the polymer is substituted by oxo; or

(d2) the terminal carbon atom connecting to the polymer is replaced –NH–; and

wherein said polymer backbone is an α-amino acid polymer, an acrylic acid or methacrylic acid polymer or copolymer, or a N-vinyl-2-pyrrolidone-vinyl alcohol copolymer.

Also disclosed herein are pharmaceutical compositions comprising these compounds, diagnostic kits containing these, and to the use of these compounds for the diagnosis and therapy of anti-MAG neuropathy. Thus, in one aspect, there is provided a pharmaceutical composition comprising a compound of formula (**I**) or (**II**) according to the present invention or a polymer according to the present invention. In another aspect, there is provided a diagnostic kit comprising a compound of formula (**I**) or (**II**) according to the present invention or a polymer according to the present invention. In a further aspect, there is provided the compound of formula (I) or (**II**) according to the present invention or the polymer according to the present invention for use in the diagnosis of anti-MAG neuropathy. In yet a further aspect, there is provided the use of the compound of formula (**I**) or (**II**) according to the present invention or the polymer according to the present invention in the manufacture of a medicament for the treatment of anti-MAG neuropathy in a warm-blooded animal.

Brief Description of the Figures

Figure 1. Schematic representation of a competitive binding assay

(a) Incubation of MAG-coated plates with anti-MAG IgM (patient sera) and polymer **25**. (b) Wash step. (c) Incubation with anti-human IgM antibody coupled to horseradish

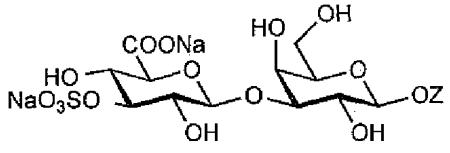
peroxidase. (d) Wash step. (e) Addition of tetramethylbenzidin (TMB) substrate. (f) Addition of acidic stop solution and measurement of the optical density.

Figure 2. Binding curves for compounds **1, 2** and **25**

2(a) The MAG-coated wells were co-incubated with compound **1** (50 mM highest concentration) and the four patient sera **MK**, **DP**, **KH** and **SJ** (%ab = % IgM antibody binding to MAG).
2(b) Co-incubation of MAG-coated wells with compound **2** (50 mM highest concentration) together with patient sera **MK** and **SJ**.
2(c) Co-incubation with compound **25** (15 µM highest concentration) together with patient sera **MK**, **KH** and **SJ**. Compound **25** is a polylysine polymer with a defined percentage of lysine residues coupled to the minimal HNK-1 epitope (**1**). The general abbreviation used is as follows: PL(minHNK-1)$_x$ with x defining the percentage of epitope loading in %. In this case the polymer is PL(minHNK-1)$_{44}$.
2(d) Co-incubation with patient serum **KH** together with the polymers PL(minHNK-1)$_x$ with x being 10, 25, 31 and 44% (0.5 mM highest concentration).

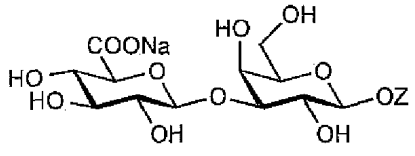
Claims

1. A compound of formula (I)



(I)

or of formula (II)



(II)

wherein Z is optionally substituted phenyl, heteroaryl, arylcarbonyl, or heteroarylmethyl.

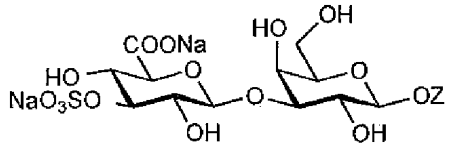
2. The compound of claim 1 of formula (I) or (II) wherein Z is unsubstituted or substituted phenyl.

3. The compound of claim 2 of formula (I) or (II) wherein Z is p-methoxyphenyl.

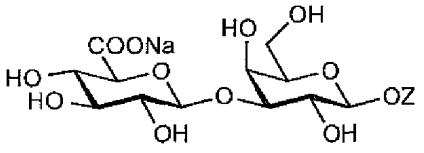
4. The compound of claim 2 of formula (I) wherein Z is p-methoxyphenyl.

5. The compound of claim 2 of formula (II) wherein Z is p-methoxyphenyl.

6. A polymer comprising a polymer backbone and a multitude of substituents of formula (I) and/or formula (II),



(I)



(II)

wherein Z is a linker connecting said substituent to the polymer backbone,
wherein the linker Z is aryl, heteroaryl, aryl-lower alkyl, arylcarbonyl, or heteroarylmethyl, wherein aryl or heteroaryl is substituted by alkylene with 3 to 25 carbon atoms connecting to the polymer wherein optionally
(a) one or more carbon atoms of alkylene are replaced by nitrogen carrying a hydrogen atom, and one of the adjacent carbon atoms is substituted by oxo, representing an amide function –NH–CO–; and/or

(b) one or more carbon atoms of alkylene are replaced by oxygen;
(c) one or more carbon atoms of alkylene are replaced by sulphur; and/or
(d1) the terminal carbon atom connecting to the polymer is substituted by oxo; or
(d2) the terminal carbon atom connecting to the polymer is replaced –NH–; and
wherein said polymer backbone is an α-amino acid polymer, an acrylic acid or methacrylic acid polymer or copolymer, or a N-vinyl-2-pyrrolidone-vinyl alcohol copolymer.

7. The polymer according to claim 6 wherein the polymer backbone is an α-amino acid polymer, wherein the α-amino acid is lysine, glutamic acid or aspartic acid.

8. The polymer according to claim 6 wherein the polymer backbone is poly-lysine.

9. The polymer according to claim 6 wherein the molecular weight of the polymer backbone is 1'000 D to 300'000 D.

10. The polymer according to any one of claims 6 to 9, wherein the relative molecular weight of polymer backbone to disaccharide of formula (I) and/or (II) is between 10:1 and 1:1.5.

11. A pharmaceutical composition comprising a compound of formula (I) or (II) according to any one of claims 1 to 5 or a polymer according to any one of claims 6 to 10.

12. A diagnostic kit comprising a compound of formula (I) or (II) according to any one of claims 1 to 5 or a polymer according to any one of claims 6 to 10.

13. The compound of formula (I) or (II) according to any one of claims 1 to 5 or the polymer according to any one of claims 6 to 10 for use in the diagnosis of anti-MAG neuropathy.

14. The use of the compound of formula (I) or (II) according to any one of claims 1 to 5 or the polymer according to any one of claims 6 to 10 in the manufacture of a medicament for the treatment of anti-MAG neuropathy in a warm-blooded animal.