

**CLAIMS**

1. A method of determining the stage of a disease, especially a neurodegenerative disease, comprising the steps of:
  - a) generating an image of the activation status of microglia cells in a subject's eye and
  - b) relating the status of the cells to disease stage.
2. The method of claim 1, further comprising one or both of steps:
  - c) counting the number of activated, ramified and / or amoeboid microglia in the image generated; and
  - d) comparing the number or percentage of activated, ramified or amoeboid microglia cells found in the image with a previously obtained image, or with the expected the number or percentage of activated, ramified or amoeboid microglia.
3. The method according to claim 1 or claim 2, further comprising the step of identifying a pattern of cell status in the eye and relating that pattern to disease state.
4. The method according to any preceding claim, wherein the subject is a subject to whom a labelled marker has been administrated.
5. The method according to any of claims 1 to 3, further comprising the step of administering a labelled marker to the subject.
6. The method of claim 4 or 5, wherein the labelled marker is an apoptotic marker, particularly a labelled annexin, more particularly annexin 5.
7. The method of claim 4, 5 or 6, wherein the label is a visible label, particularly a . wavelength-optimised label, more particularly D-776.
8. The method of any preceding claims, further comprising the step of generating an image of apoptosing cells; and, optionally, counting the number of apoptosing cells and / or observing the pattern of apoptosing cells; and, optionally, comparing the number or pattern of apoptosing cells with the expected number or pattern or with the number or pattern of apoptosing cells in an image previously generated from the subject.
9. The method of any preceding claim, further comprising one or more of the following steps:
  - comparing the image with an image or with more than one image of the subject's eye obtained at an earlier time point;
  - comparing the number or pattern of activated and / or amoeboid microglia in one image with a previous image;
  - comparing specific cells in one image with the same cells in a previous image;
  - and

- comparing the number or pattern of apoptosing cells or comparing specific cells in one image with the same cells in an earlier image.
10. The method of claim 9, comprising the step of overlaying one image with one, two, three or more additional images.
- 5 11. The method of any preceding claim, wherein the disease is an ocular neurodegenerative disease.
12. The method of any preceding claim, further comprising the step of determining an appropriate treatment for the subject and / or administering to the subject a treatment, particularly for glaucoma or another neurodegenerative disease.
- 10 13. A labelled apoptotic marker for use in identifying microglia activation status.
14. A method of identifying cells in an image of the retina, comprising the steps of:
- a) providing an image of a subject's retina;
- b) identifying one or more spots on each image as a candidate of a labelled cell;
- c) filtering selections; and, optionally,
- 15 d) normalising the results for variations in intensity.
15. The method of claim 14, further comprising the step of providing more than one image of the subject's retina.
16. The method of claim 15, further comprising the step of aligning the images to ensure cells seen in one image are aligned with cells seen in the other image.
- 20 17. The method of claim 16, further comprising the step of accounting for known variants that may cause false candidate identification.
18. The method of any of claims 14 to 17, wherein at least one of the steps is carried out by an automated means, and, optionally, wherein the automated means is trained to improve results going forward.
- 25 19. The method of any of claims 14 to 18, wherein the labelled cells are microglia cells; retinal nerve cells, especially retinal ganglion cells, or both.
20. A computer-implemented method of identifying the status of cells in the retina to, for example, determine the stage of a disease, the method comprising:
- a) providing an image of a subject's retina;
- 30 b) identifying one or more spots on each image as a candidate of a labelled cell;
- c) filtering selections made by template matching using an object classification filter; and, optionally,
- d) normalising the results for variations in intensity.
21. A computer program for identifying the status of cells in the retina to, for
- 35 example, determine the stage of a disease which, when executed by a processing system, causes the processing system to:
- a) provide an image of a subject's retina;

- b) use template mapping to identify one or more spots on each image as a candidate of a labelled cell;
- c) filter selections made by template matching using an object classification filter; and
- 5 d) normalise the results for variations in intensity.

22. A non-transitory computer-readable storage medium comprising a set of computer-readable instructions stored thereon, which, when executed by a processing system, cause the processing system to perform the method of any one of claims 14 to 19.

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