

CLAIMS

1. A method of scanning for vascular ill health using a data set from an in vivo scan acquired in the absence of contrast agent, the method including the steps of:
 - extracting blood vessel location data and blood vessel size data from the scan data set;
 - selecting a region in the extracted vessel location data; and
 - comparing the size data in the selected region to size data in a corresponding region of a normative data set to determine vascular health.
2. The method of claim 1, wherein the normative data set is an average of multiple healthy scans.
3. A method of scanning for lung ill health using a data set from an in vivo lung scan acquired in the absence of contrast agent, the method including the steps of:
 - extracting blood vessel location data and blood vessel size data from the scan data set;
 - selecting a first region and a second region in the extracted vessel location data; and
 - comparing the size data in the first region to the size data in the second region to determine vascular health.
4. A method of assessing lung disease treatment efficacy using a data set from a pre-treatment in vivo lung scan and a data set from a post-treatment in vivo lung scan acquired in the absence of contrast agent, the method including the steps of:
 - extracting blood vessel location data and blood vessel size data from the pre-treatment scan data set and the post-treatment scan data set;
 - selecting a region in the extracted vessel location data from either the pre-treatment scan data set or post-treatment scan data set; and

- comparing the size data in the selected region to size data of a corresponding region in the other scan data set to assess the efficacy of the treatment.
5. The method according to any one of the preceding claims, wherein the data set is derived from a 2D or 3D in vivo scan.
 6. The method according to any one of the preceding claims, wherein the in vivo scan is converted to a visual image.
 7. The method according to any one of the preceding claims, wherein the in vivo scan is an X-ray computer tomography scan.
 8. The method according to any of claims 1 to 6, wherein the in vivo scan is a 2D scan.
 9. The method according to any one of the preceding claims, wherein the step of extracting blood vessel location and size data includes applying a filter to the scan data to provide a probability field and a scale field.
 10. The method according to claim 9, including performing vessel segmentation on the probability field to extract a vasculature tree from the probability field.
 11. The method according to claim 10, including mapping the scale field to the segmented vasculature tree to quantify the geometry of the vasculature tree.
 12. The method according to any one of the preceding claims, wherein the ill health is any one of pulmonary hypertension, pulmonary embolism, congestive heart failure, acute lung injury and lung cancer.
 13. The method according to any one of the preceding claims, wherein the blood vessel size data is blood vessel diameter data.

14. A non-transitory computer readable storage medium having a computer program stored therein for performing the method of claim 1, wherein the program, when executed by a processor of a computer, causes the computer to execute the steps comprising:
 - extracting blood vessel location data and blood vessel size data from the scan data set;
 - selecting a region in the extracted vessel location data; and
 - comparing the size data in the selected region to size data in a corresponding region of a normative data set to determine vascular health.
15. A non-transitory computer readable storage medium having a computer program stored therein for performing the method of claim 3, wherein the program, when executed by a processor of a computer, causes the computer to execute the steps comprising:
 - extracting blood vessel location data and blood vessel size data from the scan data set;
 - selecting a first region and a second region in the extracted vessel location data; and
 - comparing the size data in the first region to the size data in the second region to determine vascular health.
16. A non-transitory computer readable storage medium having a computer program stored therein for performing the method of claim 4, wherein the program, when executed by a processor of a computer, causes the computer to execute the steps comprising:
 - extracting blood vessel location data and blood vessel size data from the scan data set;
 - selecting a region in the extracted vessel location data from either the pre-treatment scan data set or post-treatment scan data set; and
 - comparing the size data in the selected region to size data of a corresponding region in the other scan data set to assess the efficacy of the treatment.

17. An application stored on a non-transitory medium adapted to enable scanning for vascular ill health using a data set from an in vivo scan acquired in the absence of contrast agent, the said application comprising a predetermined instruction set adapted to enable a method comprising the steps of:
 - extracting blood vessel location data and blood vessel size data from a scan data set;
 - selecting a region in the extracted vessel location data; and
 - comparing the size data in the selected region to size data in a corresponding region of a normative data set to determine vascular health.
18. An application stored on a non-transitory medium adapted to enable scanning for vascular ill health using a data set from an in vivo scan acquired in the absence of contrast agent, the said application comprising a predetermined instruction set adapted to enable a method comprising the steps of:
 - extracting blood vessel location data and blood vessel size data from the scan data set;
 - selecting a first region and a second region in the extracted vessel location data; and
 - comparing the size data in the first region to the size data in the second region to determine vascular health.
19. An application stored on a non-transitory medium adapted to enable assessment of lung disease treatment efficacy using a data set from a pre-treatment in vivo lung scan acquired in the absence of contrast agent and a data set from a post-treatment in vivo lung scan acquired in the absence of contrast agent, comprising the steps of:
 - extracting blood vessel location data and blood vessel size data from the data set;
 - selecting a region in the extracted vessel location data from either the pre-treatment scan data set or post-treatment scan data set; and
 - comparing the size data in the selected region to size data of a corresponding region in the other scan data set to assess the efficacy of the treatment.

20. A method of assessing a lung disease treatment using a data set from an in vivo lung scan acquired in the absence of contrast agent performed prior to application of the treatment to a patient and a data set from an in vivo lung scan acquired in the absence of contrast agent performed after application of the treatment, the method including the steps of:
- extracting blood vessel location data and blood vessel size data from the scan data sets;
 - selecting a region in the extracted vessel location data from either the pre-treatment scan data set or post-treatment scan data set; and
 - comparing the size data in the selected region to size data of a corresponding region in the other data set to assess the efficacy of the treatment.
21. The method according to claim 20, wherein the treatment comprises application to the patient of a pharmaceutical active or immuno-therapeutic agent.
22. A method of determining a further treatment regime for a patient suffering a lung disorder using a first data set from a first in vivo lung scan acquired in the absence of contrast agent and a second data set from a second in vivo lung scan acquired in the absence of contrast agent performed after application of a treatment regime, the method including the steps of:
- extracting blood vessel location data and blood vessel size data from the scan data sets;
 - selecting a region in the extracted vessel location data from either the first scan data set or the second scan data set; and
 - comparing the size data in the selected region to size data of a corresponding region in the other data set,
 - assessing the efficacy of the treatment, and
 - determining the further treatment regime for the patient.
23. The method according to claim 22, wherein the lung disorder is chosen from pulmonary hypertension, pulmonary embolism, congestive heart failure, acute lung injury and lung cancer.