

CLAIMS

1. A method for screening for and selecting biological compositions that have an effect upon the chronological lifespan of a population of at least 100 organisms by determining a change in the mobility of the population of organisms over time, in which the organisms are selected from the group consisting of: *Caenorhabditis elegans* and *Dania rerio*; and in which the organisms are labelled, the method comprising applying a biological composition to the population of organisms and:
 - (a) obtaining a first image (I1) of the population at a first time point (T1),
 - (b) obtaining a second image (I2) of the population at a second time point (T2),
 - 10 (c) calculating an absolute difference between I1 and I2 ($\Delta D1$),
 - (d) obtaining a third image (I3) of the population at a third time point (T3),
 - (e) obtaining a fourth image (I4) of the population at a fourth time point (T4),
 - (f) calculating the absolute differences between I3 and I4 ($\Delta D2$), and
 - (g) calculating a change between $\Delta D1$ and $\Delta D2$ to calculate a change in the mobility of the population as a whole, and
 - 15 (h) determining whether the biological composition exhibits an effect upon the chronological lifespan of the population when compared to a population that has not been exposed to the biological composition, in which biological compositions that extend the chronological lifespan of the population of organisms are selected.
- 20 2. A method according to Claim 1, in which the time period between I1 and I2 is 100ms to 5 minutes, 140ms to 3 minutes, 200ms to 90s, 300ms to 1 minute, 400ms to 45s, 500ms to 30s, 600ms to 15s, 700ms to 10s, 750ms to 5s, 800ms to 3s, 850ms to 2s, 900ms to 1s, or 1s to 2s.
3. A method according to Claim 1 or 2, in which the time period between I2 and I3 is at least 6 hours, at least 12 hours, at least 1 day, at least 2 days, at least 3 days, at least 4 days, at least 5 days, at least 6 days, at least 7 days, at least 8 days, at least 9 days, at least 10 days, at least 11 days or at least 12 days.
- 25 4. A method according to Claim 1 or 2, in which the time period between I2 and I3 is at least 4 days.

5. A method according to any preceding claim, in which $\Delta D1$ is calculated from images obtained on day 0.
6. A method according to any preceding claim, in which $\Delta D2$ is calculated from images obtained on day 4.
- 5 7. A method according to any preceding claim, in which the time period between I1 and I2, and the time period between I3 and I4, are each 100 ms to 5 minutes.
8. A method according to any preceding claim, in which the time period between I1 and I2 is from 1 to 3 minutes.
9. A method according to any of Claims 1 to 5, in which $\Delta D2$ is calculated from images
10 obtained on day 6.
10. A method according to any preceding claim, in which the population comprises at least 110, at least 120, at least 150, at least 175, at least 200, at least 250, at least 300, at least 350, at least 400, at least 450, at least 500, at least 550, at least 600, at least 650, at least 700, at least 750, at least 800, at least 850, at least 900, at least 950 or at least 1000 organisms.
- 15 11. A method according to any preceding claim, in which the organisms are labelled with green fluorescent protein (GFP).
12. A method according to any preceding claim, in which the label is localised to one particular area within the organisms.
13. A method according to any preceding claim, in which the organisms are *Caenorhabditis*
20 *elegans*, and the population of *Caenorhabditis elegans* is fluorescently labelled by any suitable means.
14. A method according to Claim 11 or 12, in which the organisms are *Caenorhabditis elegans* expressing green fluorescent protein (GFP), in which the GFP expression is localised to one particular area within the labelled organisms.
- 25 15. A method according to Claim 11, in which the organisms are: drug sensitive *Caenorhabditis elegans* worms expressing green fluorescent protein (GFP) in their pharynx (*Caenorhabditis elegans* MYO2bus-5); or *Caenorhabditis elegans* with GFP expression in their body wall muscle.

16. A method according to any preceding claim, in which the population is maintained in a single well or multi-well plate.
17. A method according to any preceding claim, which is for assessing the effect of at least one test compound or at least one environmental factor on the mobility of the population of organisms, in which the method is used in drug discovery and/or toxicology.
18. A computer program comprising instructions operable to configure a data processing apparatus to perform a method according to any preceding claim.