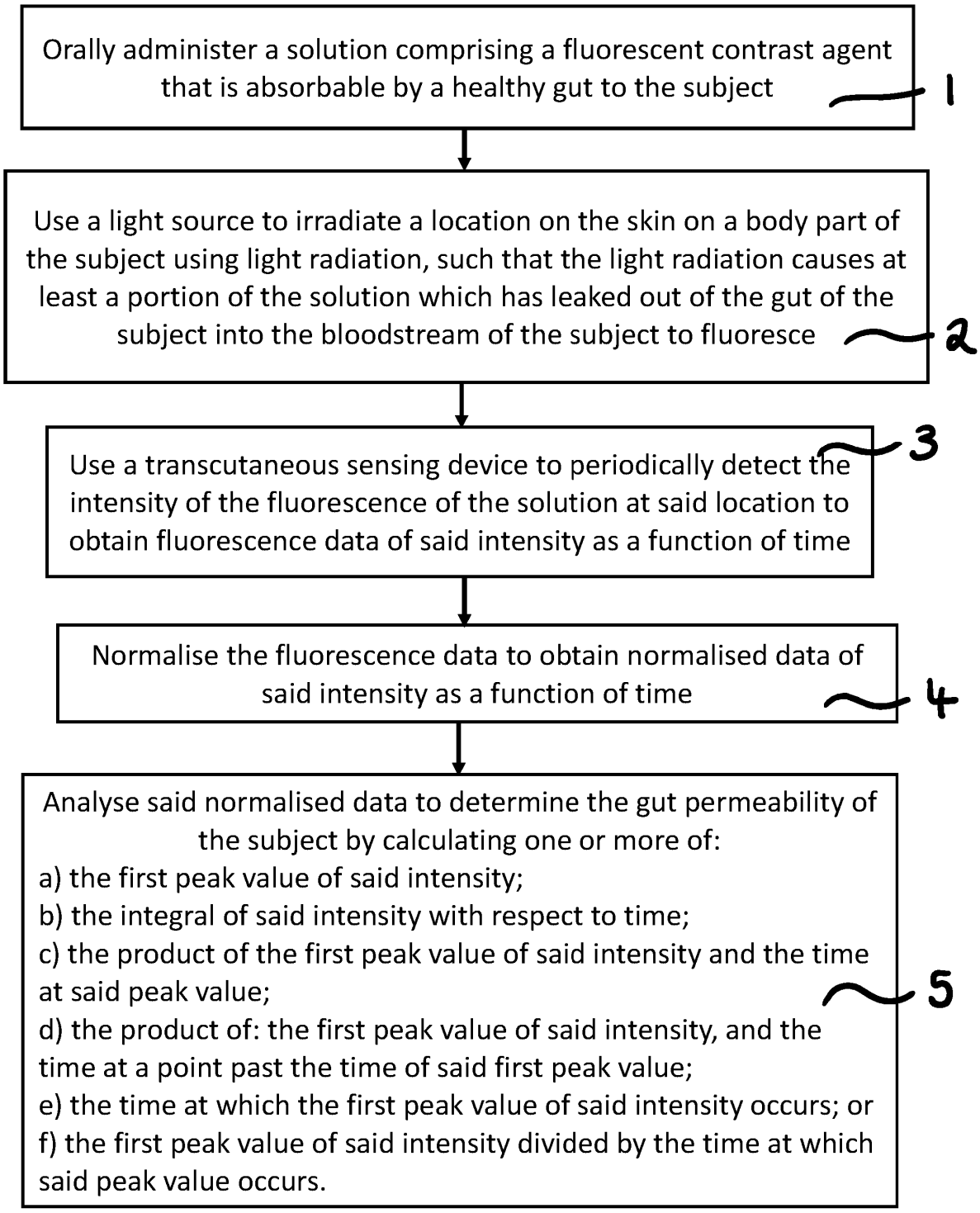

Orally administer a solution comprising a fluorescent contrast agent that is absorbable by a healthy gut to the subject
1
Use a light source to irradiate a location on the skin on a body part of the subject using light radiation, such that the light radiation causes at least a portion of the solution which has leaked out of the gut of the subject into the bloodstream of the subject to fluoresce
2
Use a transcutaneous sensing device to periodically detect the intensity of the fluorescence of the solution at said location to obtain fluorescence data of said intensity as a function of time
3
Normalise the fluorescence data to obtain normalised data of said intensity as a function of time
4
Analyse said normalised data to determine the gut permeability of the subject by calculating one or more of:
a) the first peak value of said intensity;
b) the integral of said intensity with respect to time;
c) the product of the first peak value of said intensity and the time at said peak value;
d) the product of: the first peak value of said intensity, and the time at a point past the time of said first peak value;
e) the time at which the first peak value of said intensity occurs; or
f) the first peak value of said intensity divided by the time at which said peak value occurs.
5

FIG. 1

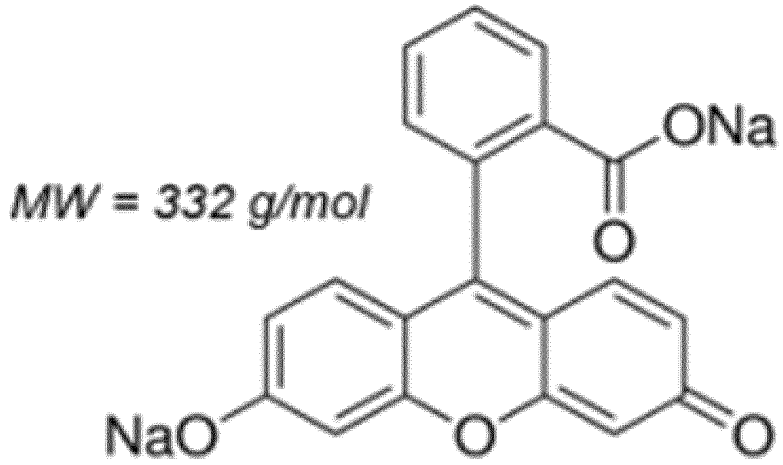

MW = 332 g/mol
ONa
O
NaO
O
O

FIG. 2

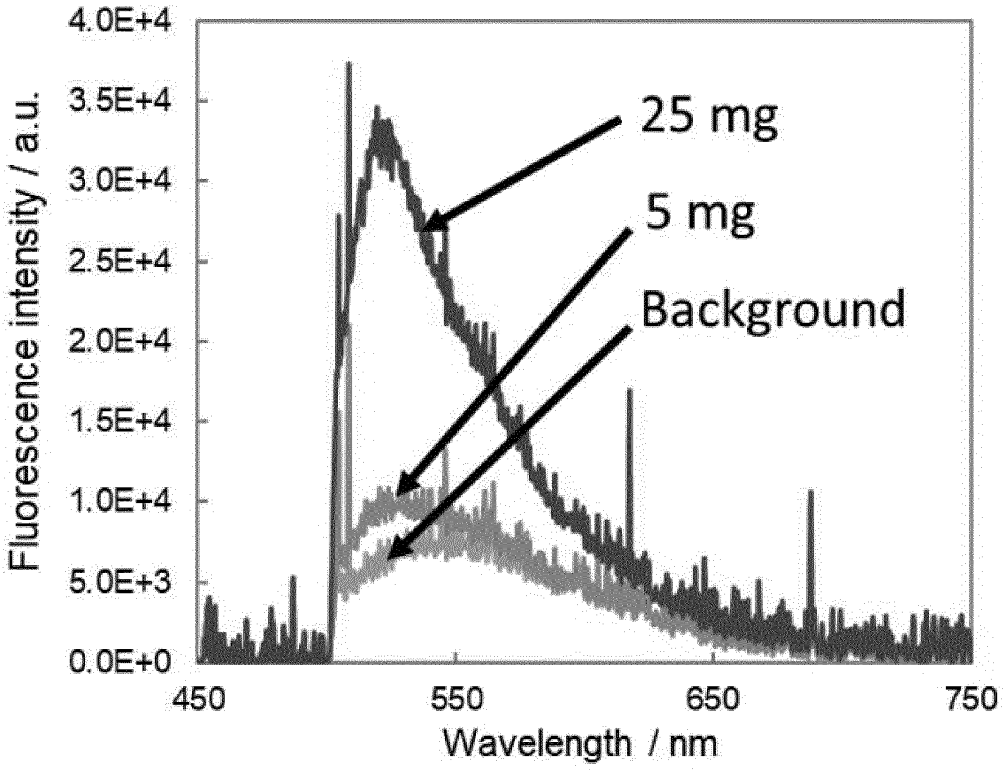

4.0E+4
3.5E+4
3.0E+4
2.5E+4
2.0E+4
1.5E+4
1.0E+4
5.0E+3
0.0E+0
Fluorescence intensity / a.u.
450
550
650
750
Wavelength / nm
25 mg
5 mg
Background

FIG. 3

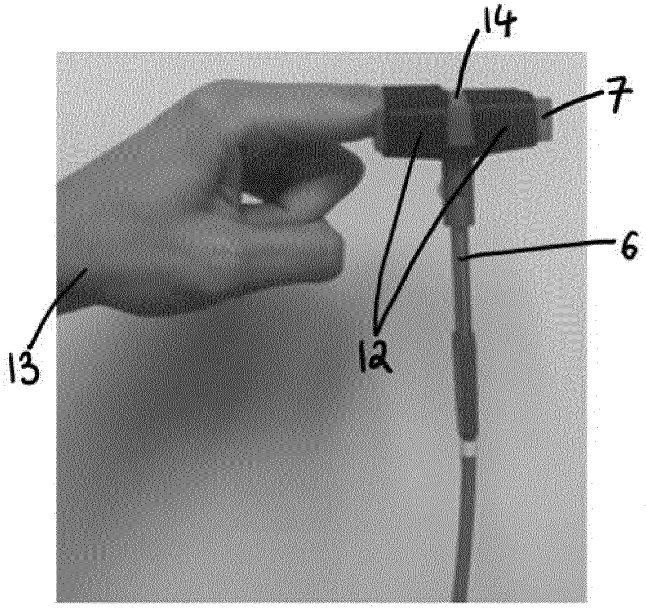


FIG. 4A

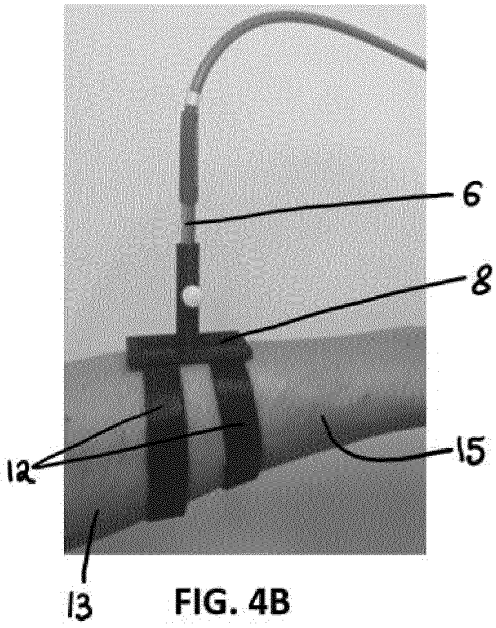


FIG. 4B

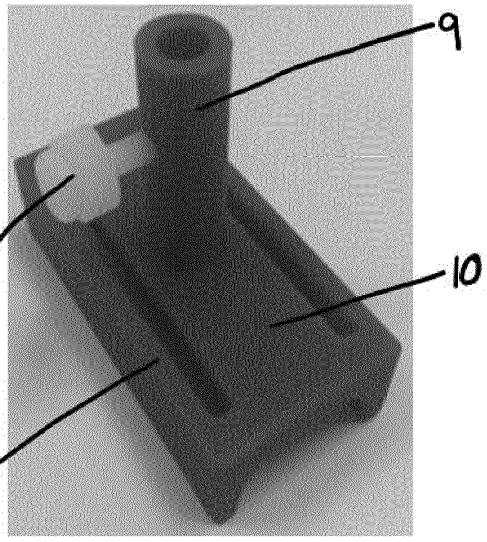


FIG. 5A

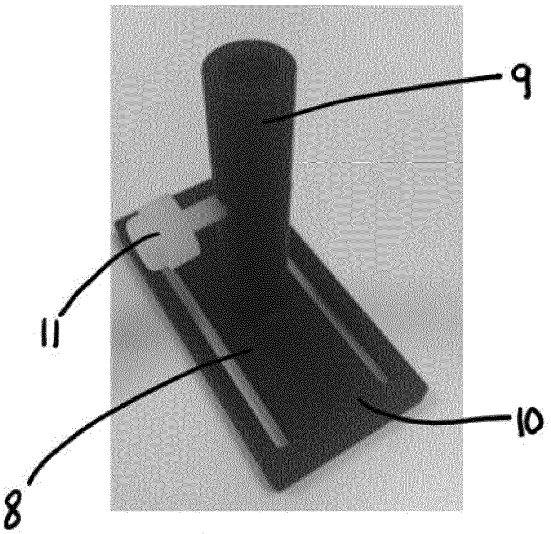


FIG. 5B

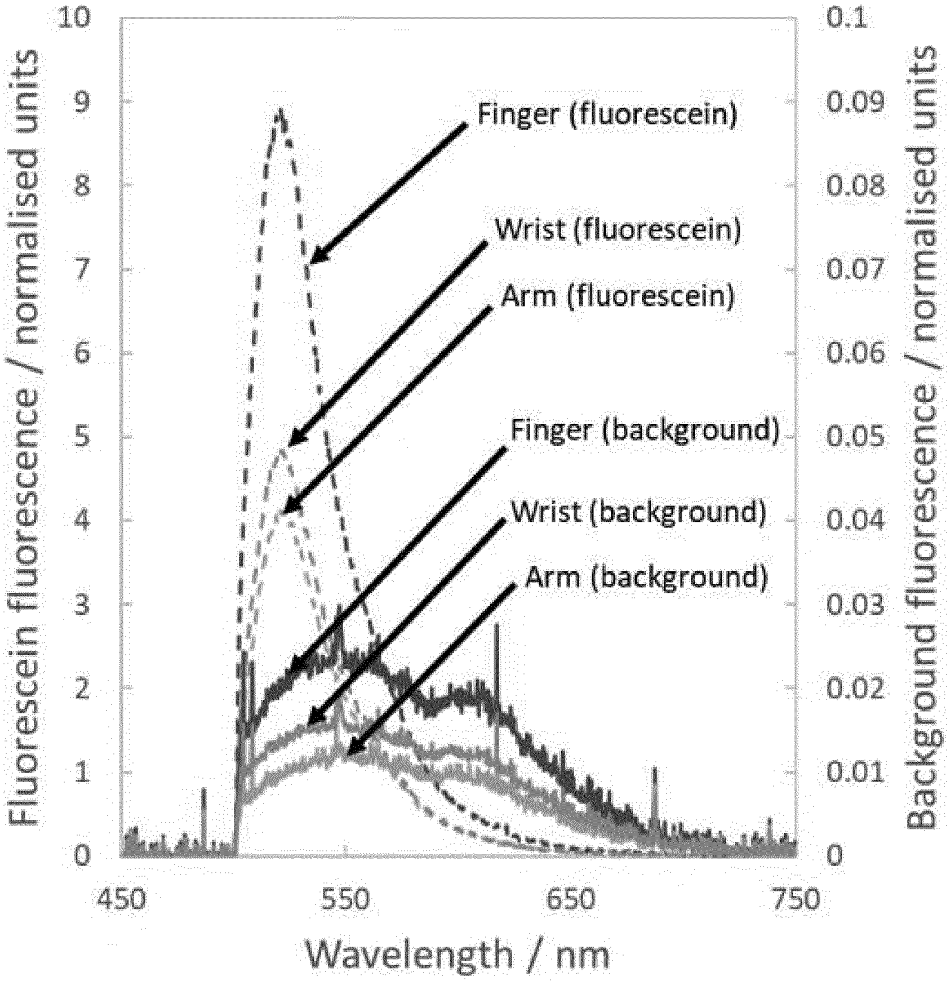

Fluorescein fluorescence / normalised units
Background fluorescence / normalised units
Wavelength / nm
Finger (fluorescein)
Wrist (fluorescein)
Arm (fluorescein)
Finger (background)
Wrist (background)
Arm (background)
0
1
2
3
4
5
6
7
8
9
10
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.1
450
550
650
750

FIG. 6

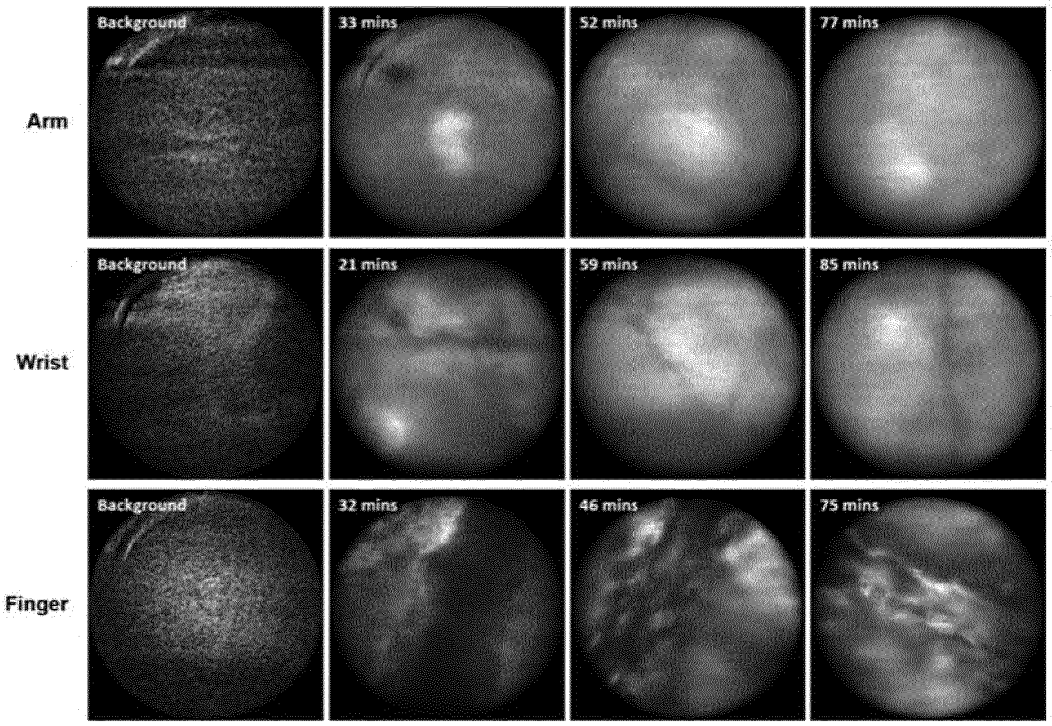

Arm
Wrist
Finger
Background
33 mins
52 mins
77 mins
Background
21 mins
59 mins
85 mins
Background
32 mins
46 mins
75 mins

FIG. 7

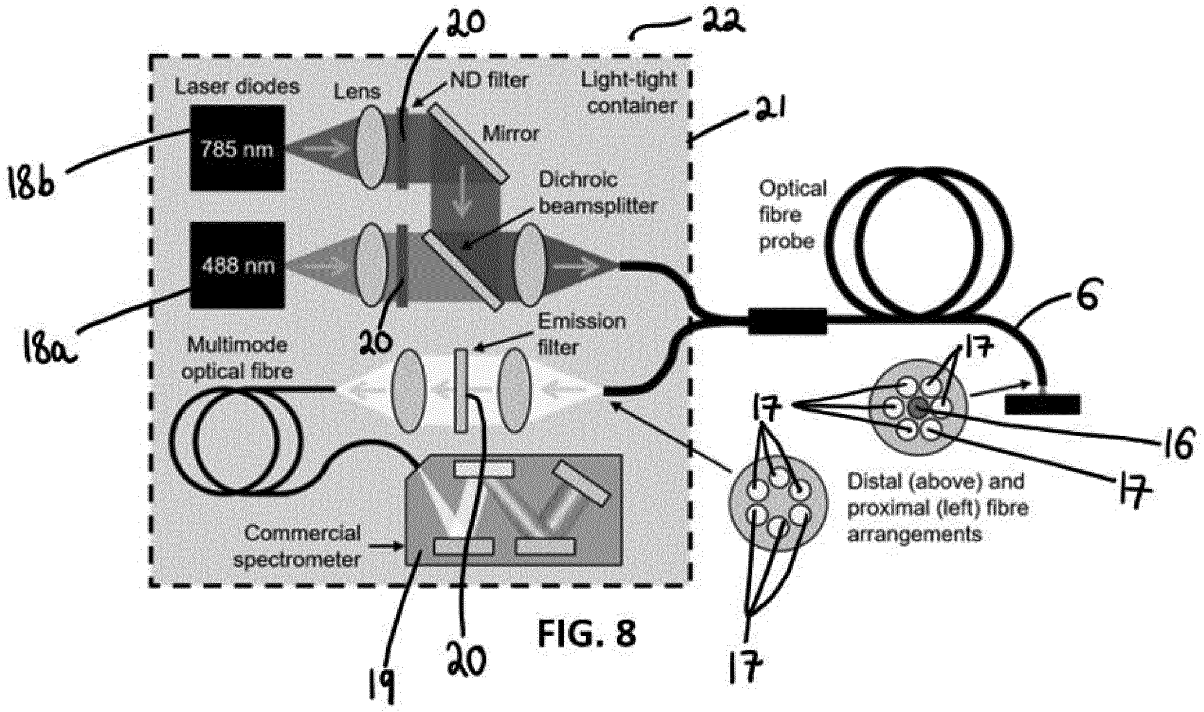

20
22
Laser diodes
Lens
ND filter
Light-tight container
21
785 nm
Mirror
18b
Dichroic beamsplitter
Optical fibre probe
488 nm
6
18a
Emission filter
Multimode optical fibre
17
16
Distal (above) and proximal (left) fibre arrangements
Commercial spectrometer
19
20
17

FIG. 8

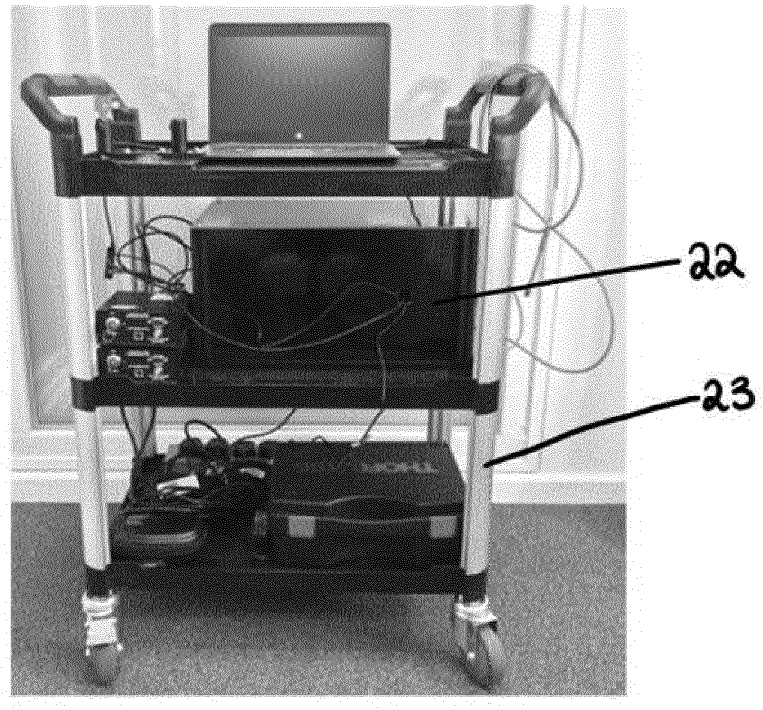

22
23

FIG. 9

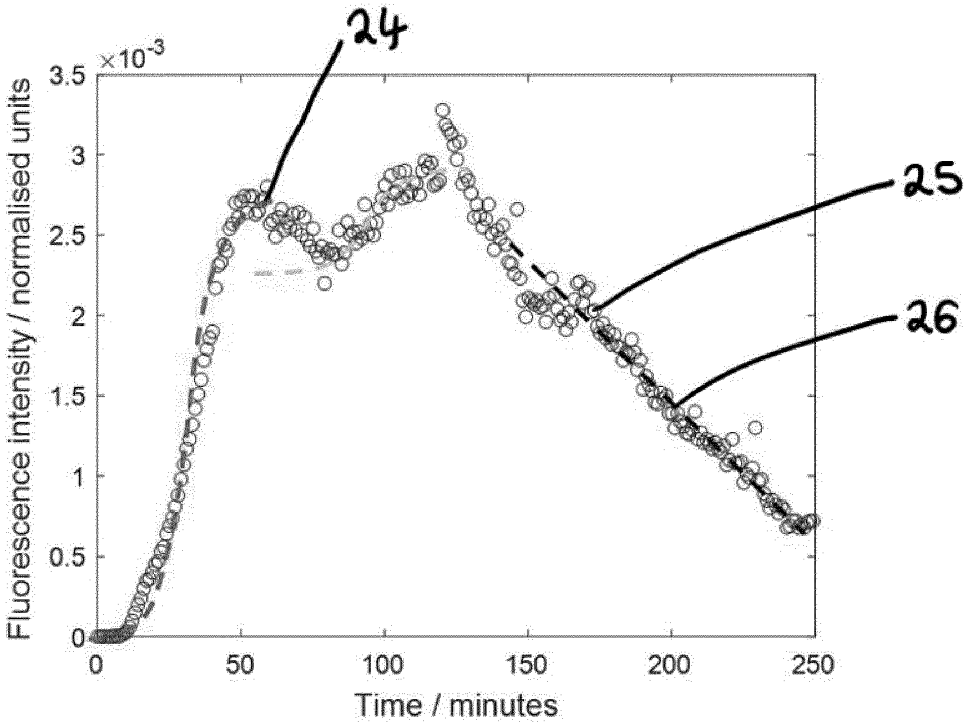

24
25
26
×10-3
3.5
3
2.5
2
1.5
1
0.5
0
0
50
100
150
200
250
Fluorescence intensity / normalised units
Time / minutes

FIG. 10

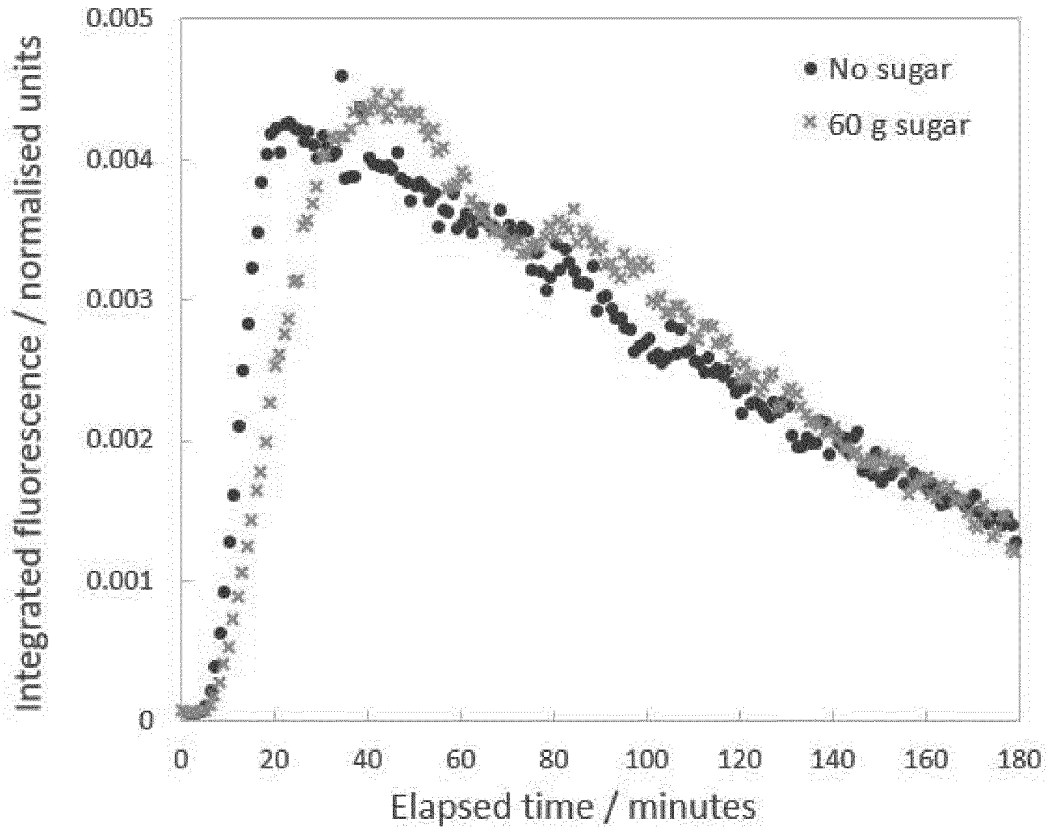

0.005
0.004
0.003
0.002
0.001
0
Integrated fluorescence / normalised units
No sugar
60 g sugar
0
20
40
60
80
100
120
140
160
180
Elapsed time / minutes

FIG. 11

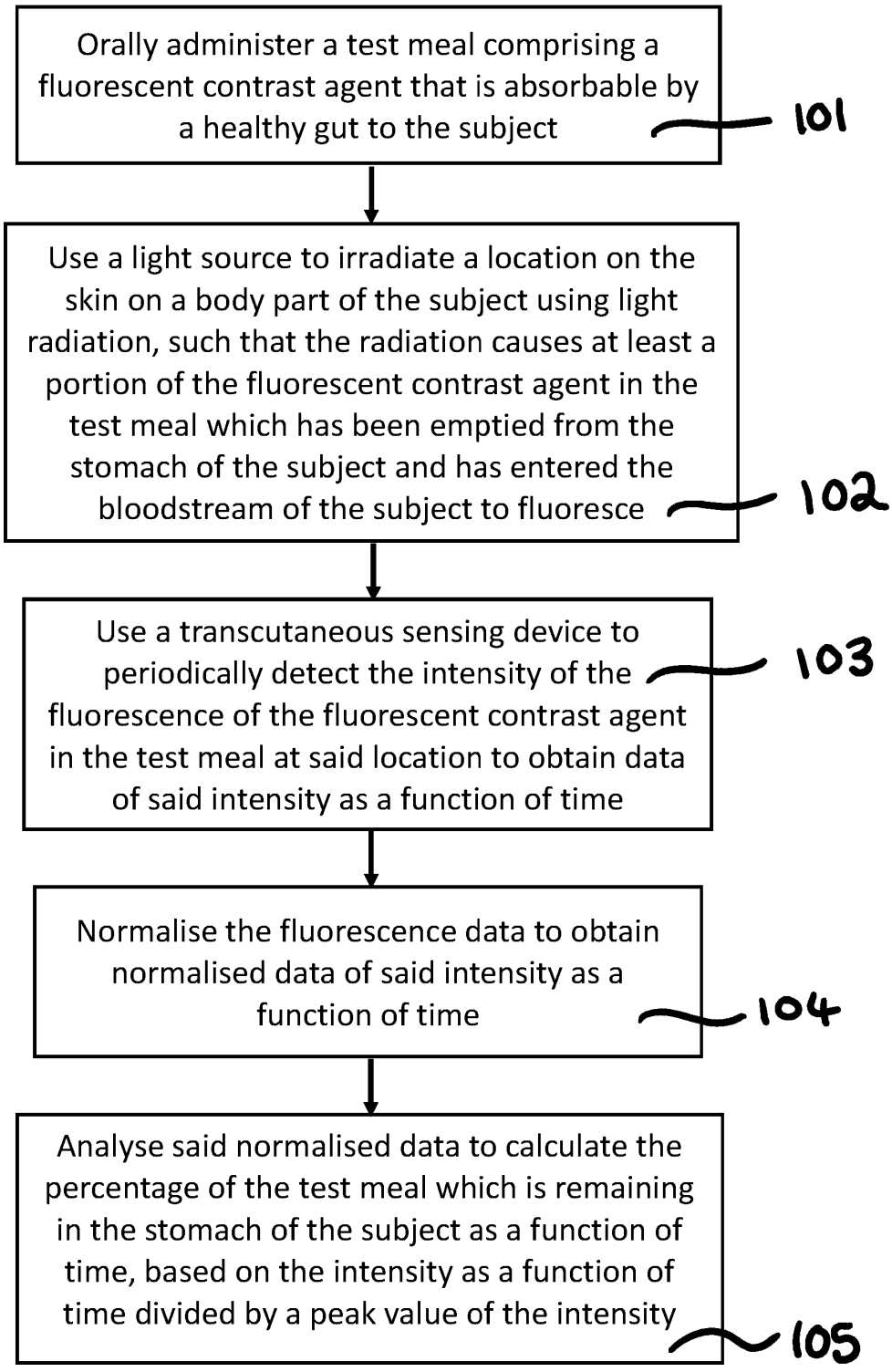

Orally administer a test meal comprising a fluorescent contrast agent that is absorbable by a healthy gut to the subject
101
Use a light source to irradiate a location on the skin on a body part of the subject using light radiation, such that the radiation causes at least a portion of the fluorescent contrast agent in the test meal which has been emptied from the stomach of the subject and has entered the bloodstream of the subject to fluoresce
102
Use a transcutaneous sensing device to periodically detect the intensity of the fluorescence of the fluorescent contrast agent in the test meal at said location to obtain data of said intensity as a function of time
103
Normalise the fluorescence data to obtain normalised data of said intensity as a function of time
104
Analyse said normalised data to calculate the percentage of the test meal which is remaining in the stomach of the subject as a function of time, based on the intensity as a function of time divided by a peak value of the intensity
105

FIG. 12

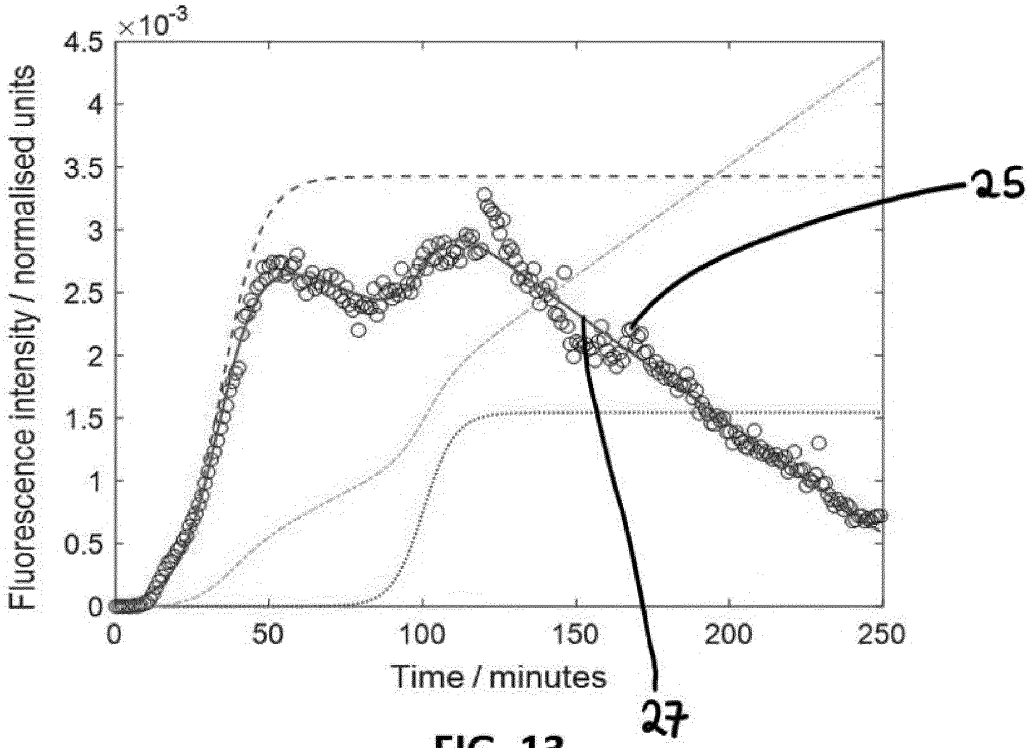


FIG. 13

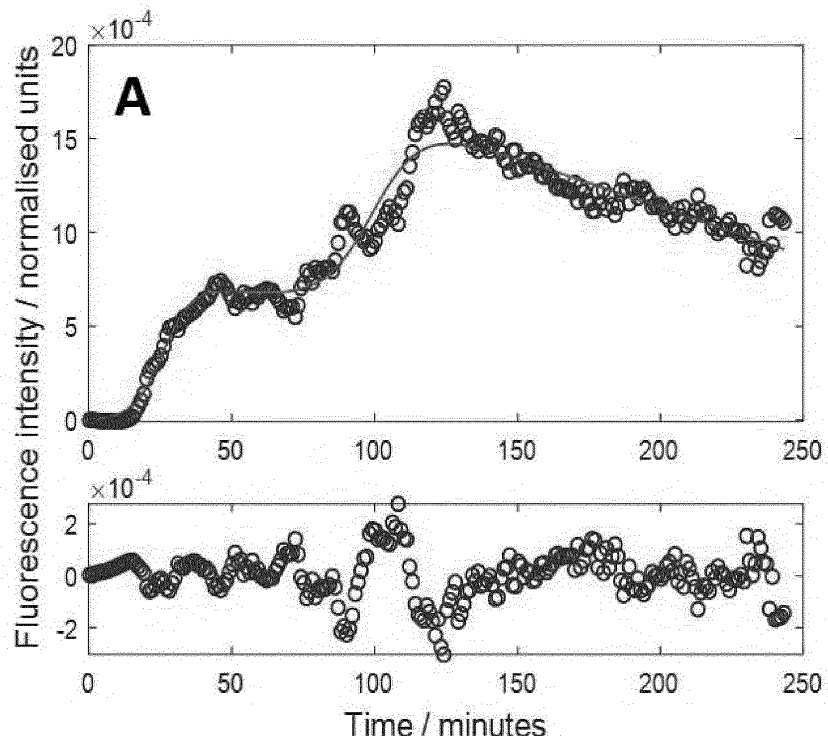


FIG. 14A

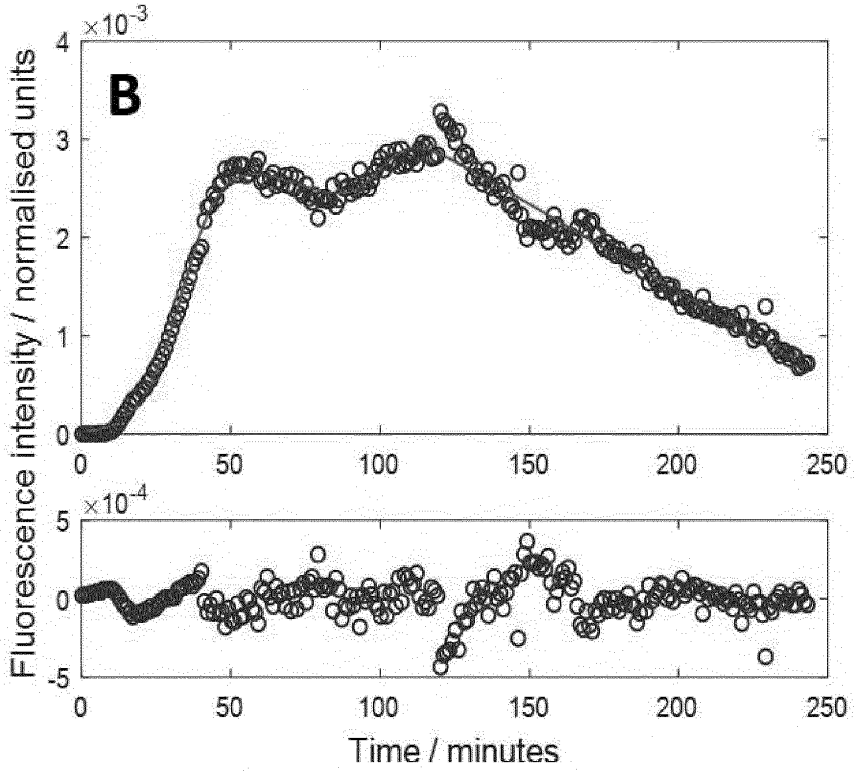


FIG. 14B

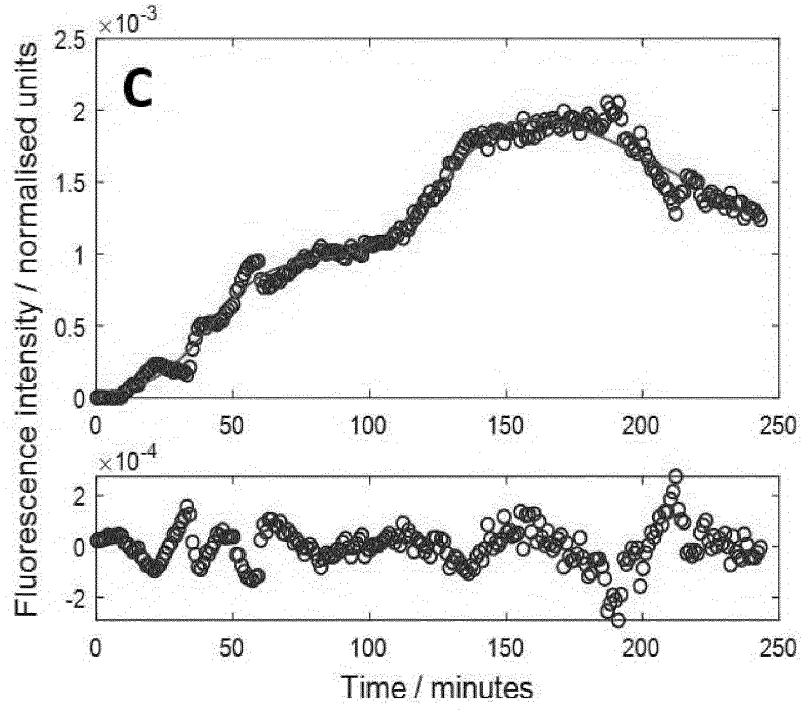


FIG. 14C

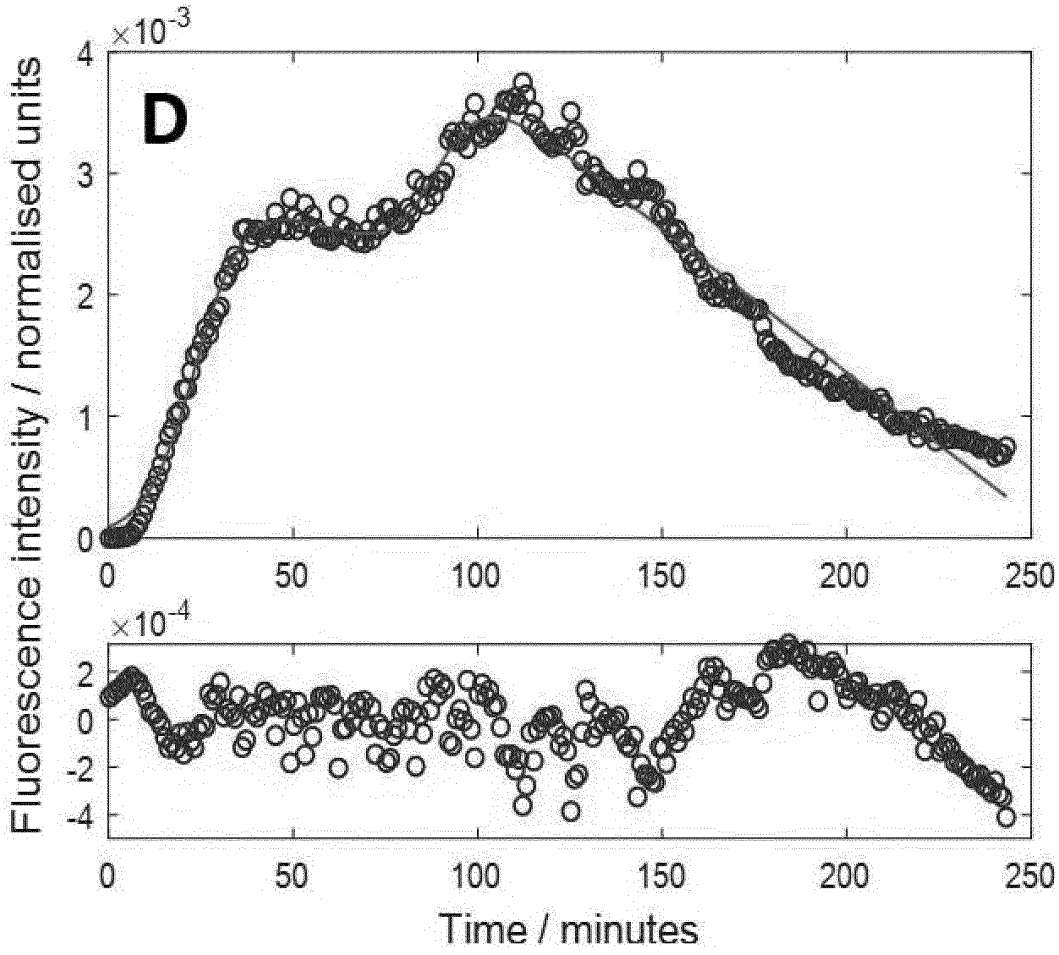

D
×10^-3
4
3
2
1
0
0
50
100
150
200
250
×10^-4
2
0
-2
-4
Fluorescence intensity / normalised units
Time / minutes

FIG. 14D

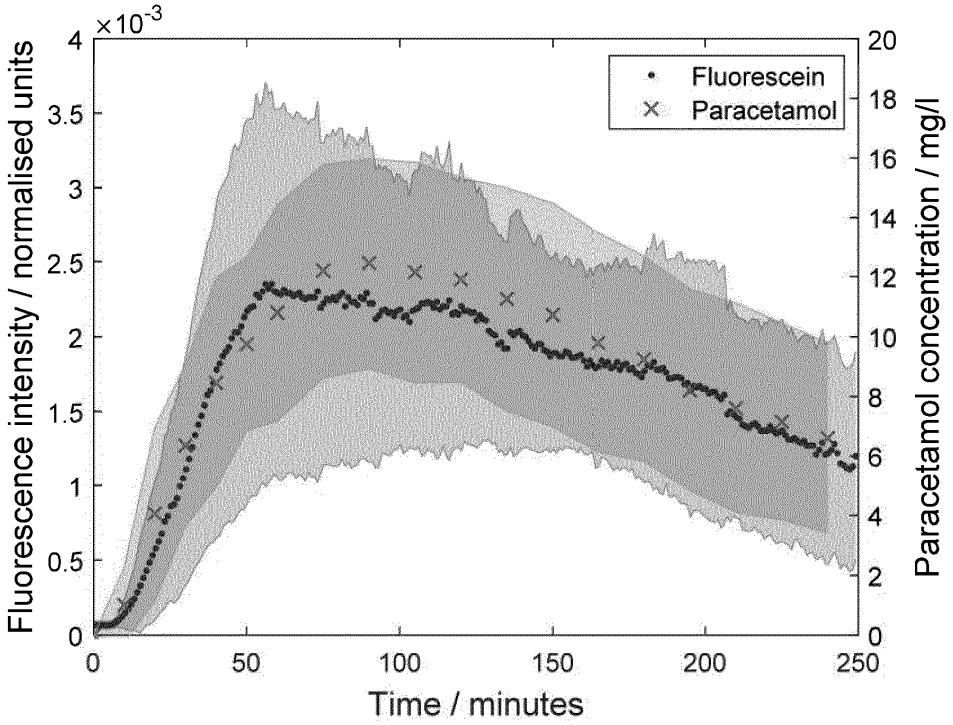


FIG. 15A

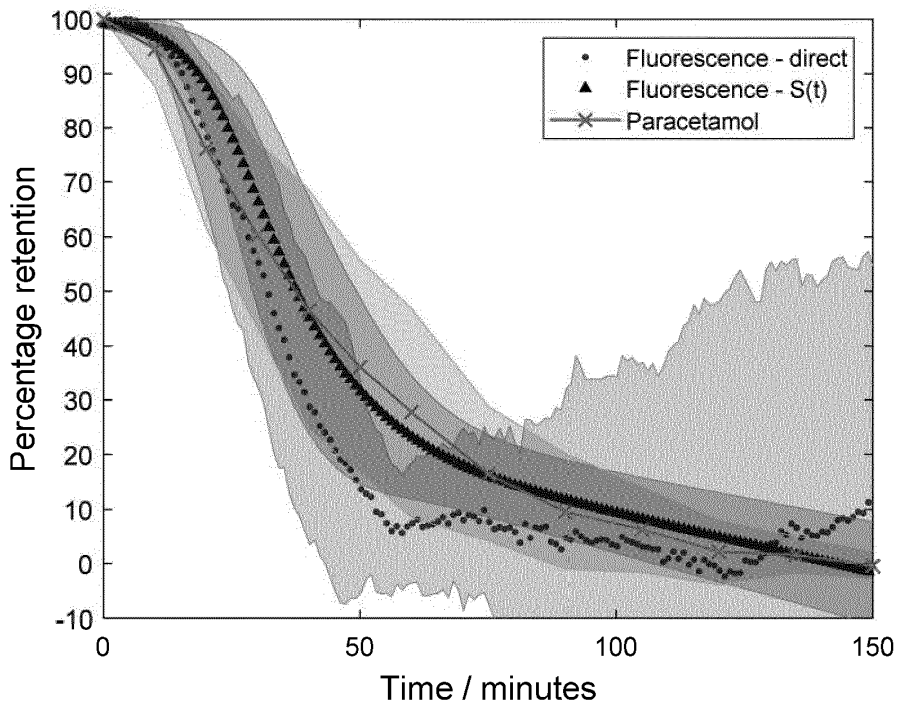


FIG. 15B