Claims

~~[1]~~1. A calculation apparatus for irradiating a tissue having absorbed photo-sensitive pharmaceutical, the photo-sensitive pharmaceutical absorbing an excitation light and emitting fluorescence, with the excitation light emitted from a tip portion of a laser catheter, comprising:

a connector to/from which the laser catheter is capable of being attached/detached;

a light source for outputting the excitation light with at least one of a first intensity and a second intensity which is higher than the first intensity and is selected when therapy is conducted to the laser catheter via the connector; and

a detection unit for detecting intensity of the fluorescence, the fluorescence being entered from the laser catheter to which the excitation light with the first intensity is output via the connector, to calculate concentration of the photo-sensitive pharmaceutical in a tissue, the tip portion of the laser catheter contacting the tissue.

~~[2]~~2. The calculation apparatus according to claim 1, further comprising:

a controller for calculating the concentration of the photo-sensitive pharmaceutical in the tissue, the tip portion of the laser catheter contacting the tissue, based on intensity of the detected fluorescence.

~~[3]~~3. The calculation apparatus according to claim 2, wherein

the controller outputs a signal to prompt to additionally administer the photo-sensitive pharmaceutical based on the calculated concentration.

~~[4]~~4. The calculation apparatus according to claim 2, wherein the controller calculates an excitation-light-irradiation protocol based on the calculated concentration, and outputs a calculation result.

~~[5]~~5. A calculation method, comprising:

irradiating a tissue having absorbed photo-sensitive pharmaceutical, the photo-sensitive pharmaceutical absorbing an excitation light and emitting fluorescence, with the excitation light with an intensity which is lower than an intensity selected when therapy is conducted emitted from a tip portion of a laser catheter;

extracting the fluorescence corresponding to the irradiated excitation light via the laser catheter; and

calculating concentration of the photo-sensitive pharmaceutical in a tissue, the tip portion of the laser catheter contacting the tissue, based on intensity of the extracted fluorescence.

~~[6]~~6. The calculation method according to claim 5, further comprising:

calculating an excitation-light-irradiation protocol based on the calculated concentration, and outputs a calculation result.

~~[7]~~7. A calculation method using photo-sensitive pharmaceutical absorbing an excitation light and emitting a fluorescence, a laser catheter capable of emitting the excitation light from a tip portion, and a calculation apparatus including a connector to/from which the laser catheter is capable of being attached/detached and a light source for outputting the excitation light with at least one of a first intensity and a second intensity which is higher than the first intensity and is selected when therapy is conducted to the laser catheter via the connector, comprising:

absorbing, in a tissue, the photo-sensitive pharmaceutical;

leading the tip portion of the laser catheter to the tissue having absorbed the photo-sensitive pharmaceutical, the laser catheter being attached to the connector;

irradiating the tissue having absorbed the photo-sensitive pharmaceutical with the excitation light emitted from the tip portion of the laser catheter, the excitation light with the first intensity being output from the light source;

extracting the fluorescence corresponding to the irradiated excitation light via the laser catheter; and

calculating concentration of the photo-sensitive pharmaceutical in a tissue, the tip portion of the laser catheter contacting the tissue, based on intensity of the extracted fluorescence.

~~[8]~~8. The calculation method according to claim 7, further comprising:

calculating an excitation-light-irradiation protocol based on the calculated concentration, and outputs a calculation result.