

Claims

1. Programming device for programming an implantable medical device for stimulating a human or animal heart, comprising a first processor and a first memory unit,

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characterized

in that the first memory unit comprises a first computer-readable program that causes the first processor to perform the following steps when executed on the first processor:

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- a) allowing to select one of at least two electrode lead configurations of an implantable medical device (1) for stimulating a human or animal heart (7), wherein the at least two electrode lead configurations comprise

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- i) a first electrode lead configuration in which each electrode lead of the implantable medical device is connected to an electrode lead port of the implantable medical device (1), the electrode lead port being configured to receive an electrode lead for stimulating a first cardiac region or detecting an electric signal at the first cardiac region, wherein the first cardiac region is at least one chosen from an atrium, a left ventricle and a right ventricle, wherein each electrode lead is intended to be implanted or is implanted in a cardiac region that corresponds to the first cardiac region of the electrode lead port to which the electrode lead is connected, and

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- ii) a second electrode lead configuration in which at least one electrode lead (4) of the implantable medical device (1) is connected to an electrode lead port (3) of the implantable medical device (1), the electrode lead port being (3) configured to receive an electrode lead (4) for stimulating a second cardiac region or detecting an electric signal at the second cardiac region, wherein the second cardiac region is a part of a ventricular conduction system of the

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heart (7), wherein the at least one electrode lead (4) is intended to be implanted or is implanted in the second cardiac region,

b) generating and releasing a notification signal if the second electrode lead configuration is selected.

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2. Programming device according to claim 1, **characterized** in that the second cardiac region is at least one chosen from a His bundle (6) and a left bundle branch.

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3. Programming device according to claim 1 or 2, **characterized** in that the first computer-readable program causes the first processor not to generate a notification signal if the first electrode lead configuration is selected.

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4. Programming device according to any of the preceding claims, **characterized** in that in the second electrode lead configuration at least one further electrode lead of the implantable medical device is connected to a further electrode lead port of the implantable medical device, the further electrode lead port being configured to receive an electrode lead for stimulating the first cardiac region or detecting an electric signal at the first cardiac region, wherein the at least one further electrode lead is intended to be or is implanted in the first cardiac region.

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5. Programming device according to any of the preceding claims, **characterized** in that the first computer-readable program causes the first processor to make the notification signal permanently available for a user of the programming device.

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6. Programming device according to any of the preceding claims, **characterized** in that the first computer-readable program causes the first processor to transfer the notification signal to an appliance remote from the programming device, the appliance being chosen from the group consisting of a printout, a database, and a home monitoring system.

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7. Programming device according to any of the preceding claims, **characterized** in that the first computer-readable program causes the first processor to enable a first set of

programming functions if the first electrode lead configuration is selected and a second set of programming functions if the second electrode lead configuration is selected.

- 5 8. Programming device according to claim 7, **characterized** in that in the second electrode lead configuration at least one further electrode lead of the implantable medical device (1) is connected to a further electrode lead port of the implantable medical device (1), the further electrode lead port being configured to receive an electrode lead for stimulating the first cardiac region or detecting an electric signal at
10 the first cardiac region, wherein the at least one further electrode lead is implanted or is intended to be implanted in the first cardiac region, and in that the first computer-readable program causes the first processor to adjust the second set of programming functions in dependence on a choice of the first cardiac region.
- 15 9. Computer program product comprising computer-readable code that causes a processor to perform the following steps when executed on the processor:
- a) allowing to select one of at least two electrode lead configurations of an implantable medical device (1) for stimulating a human or animal heart (7),
20 wherein the at least two electrode lead configurations comprise
- i) a first electrode lead configuration in which each electrode lead of the implantable medical device is connected to an electrode lead port of the implantable medical device (1), the electrode lead port being configured to
25 receive an electrode lead for stimulating a first cardiac region or detecting an electric signal at the first cardiac region, wherein the first cardiac region is at least one chosen from an atrium, a left ventricle and a right ventricle, wherein each electrode lead is intended to be implanted or is implanted in a cardiac region that corresponds to the first cardiac region of the electrode
30 lead port to which the electrode lead is connected, and

- 5 ii) a second electrode lead configuration in which at least one electrode lead (4) of the implantable medical device (1) is connected to an electrode lead port (3) of the implantable medical device (1), the electrode lead port being (3) configured to receive an electrode lead (4) for stimulating a second cardiac region or detecting an electric signal at the second cardiac region, wherein the second cardiac region is a part of a ventricular conduction system of the heart (7), wherein the at least one electrode lead (4) is intended to be implanted or is implanted in the second cardiac region,
- 10 b) generating and releasing a notification signal if the second electrode lead configuration is selected.
10. Arrangement comprising a programming device (2) according to any of claims 1 to 8 and an implantable medical device (1) for stimulating a human or animal heart (7),
15 wherein the programming device (2) comprises a first data communication unit and wherein the implantable medical device (1) comprises a second processor, a second memory unit, a second data communication unit, a stimulation unit configured to stimulate a cardiac region of a human or animal heart (7), and a detection unit configured to detect an electric signal at the cardiac region of the same heart (7),
20 wherein the stimulation unit and the detection unit comprise an electrode lead (4).
11. Arrangement according to claim 10, **characterized** in that the first data communication unit and the second data communication unit serve for transferring data from the programming device (2) to the implantable medical device (1) and/or
25 for transferring data from the implantable medical device (1) to the programming device (2).
12. Arrangement according to claim 10 or 11, **characterized** in that the second memory unit comprises a second computer-readable program that causes the second processor
30 to perform the following steps when executed on the second processor:

- a) receiving, with the second data communication unit, a dataset comprising an appropriate sensing parameter and/or stimulation parameter for an electrode lead configuration selected on the programming device (2);
- 5 b) setting a sensing parameter of the detection unit and/or a stimulation parameter of the stimulating unit by using the received dataset.
13. Arrangement according to any of claims 10 to 12, **characterized** in that the second memory unit comprises a second computer-readable program that causes the second processor to perform the following steps when executed on the second processor:
- 10 a) automatically detecting a presence of a second cardiac region electrode lead (4) configured to stimulate a second cardiac region or to detect an electric signal at the second cardiac region, wherein the second cardiac region is a part of a ventricular conduction system of the heart (7), wherein the second cardiac region electrode lead is intended to be implanted or is implanted in the second cardiac region,
- 15 b) causing the second data communication unit to transfer a dataset indicating the presence of the second cardiac region electrode lead (4) to the first data communication unit.
- 20 14. Arrangement according to claim 13, **characterized** in that the first computer-readable program causes the first processor to perform the following steps:
- 25 a) receiving, with the first data communication unit, the dataset indicating the presence of the second cardiac region electrode lead (4);
- 30 b) automatically selecting the second electrode lead configuration in response to receiving this dataset.

15. Method for programming an implantable medical device for stimulating a human or animal heart with a programming device (2) according to any of claims 1 to 8, wherein the programming device (2) comprises a first data communication unit and wherein the implantable medical device (1) comprises a second processor, a second memory unit, a second data communication unit, a stimulation unit configured to stimulate a cardiac region of a human or animal heart (7), and a detection unit configured to detect an electric signal at the cardiac region of the same heart (7), wherein the stimulation unit and the detection unit comprise an electrode lead, the method comprising the following steps:
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- a) generating, with the programming device (2), a dataset comprising an appropriate sensing parameter and/or stimulation parameter for an electrode lead configuration selected on the programming device (2);
 - 15 b) transmitting, with the first data communication unit, the dataset to the implantable medical device (1);
 - c) receiving, with the second data communication unit, the dataset;
 - 20 d) setting a sensing parameter of the detection unit and/or a stimulation parameter of the stimulation unit by using the received dataset.