

CLAIMS

1. An electrosurgical generator comprising:
an electromagnetic signal supply unit for generating
5 radiofrequency (RF) or microwave energy;
an output port configured to be connectable to a probe
for delivering the RF or microwave energy from a distal end
thereof;
a feed structure for conveying the RF or microwave energy
10 to the output port; and
an electroporation waveform supply unit arranged to
generate energy having an electroporation waveform for causing
reversible or irreversible electroporation (IRE) of biological
tissue,
15 wherein the electroporation waveform supply unit is
connected to the feed structure to convey the electroporation
waveform to the output port for delivery to the probe, and
wherein the feed structure comprises a common signal
pathway for conveying the electroporation waveform and the RF
20 or microwave energy to the output port.
2. The electrosurgical generator of claim 1, wherein
the electromagnetic signal supply unit comprises:
a radiofrequency (RF) signal generator for generating RF
25 electromagnetic (EM) radiation having a first frequency;
a microwave signal generator for generating microwave EM
radiation having a second frequency that is higher than the
first frequency,
wherein the feed structure comprises an RF channel for
30 connecting the output port to the RF signal generator, and a
microwave channel for connecting the output port to the
microwave signal generator, the RF channel and microwave
channel comprises physically separate signal pathways from the
RF signal generator and microwave signal generator
35 respectively,
wherein the feed structure includes a combining circuit
having a first input connected to receive the RF EM radiation
from the RF channel, a second input connected to receive the
microwave EM radiation from the microwave channel, and an
40 output in communication with the first and second inputs for

transferring the RF EM radiation and the microwave EM radiation to the common signal pathway.

5 3. The electrosurgical generator of claim 2, wherein the electroporation waveform supply unit is connectable to the common signal pathway via the RF channel.

10 4. The electrosurgical generator of claim 3 comprising a switch connected on the RF channel, wherein the RF signal generator and the electroporation waveform supply unit are selectively connectable to the RF channel by the switch.

15 5. The electrosurgical generator of any one of claims 2 to 4 comprising a waveguide isolator connected to isolate the microwave channel from the RF EM radiation.

20 6. The electrosurgical generator of any preceding claim, wherein the electroporation waveform supply unit comprises:
 a DC power supply;
 a pulse generator connected to the DC power supply and configured to output one or more pulses of DC power as the electroporation waveform.

25 7. The electrosurgical generator of claim 6 including a pulse signal module connected to the pulse generator and arranged to transmit one or more pulse trigger signals to the a pulse generator, wherein the pulse generator is configured to output a pulse of DC power upon receiving a pulse trigger
30 signal.

 8. The electrosurgical generator of claim 7, wherein a duration of each pulse of DC power is set by the pulse trigger signal.

35 9. The electrosurgical generator of claim 8, wherein the pulse signal module is controllable to permit adjustment of the duration of each pulse of DC power.

10. The electrosurgical generator of claim 8 or 9, wherein the duration of each pulse of DC power is in the range 1 ns to 10 ms.

5 11. The electrosurgical generator of any one of claims 6 to 10, wherein the DC power supply comprises:
 an adjustable voltage supply; and
 a DC-DC converter for up-converting the voltage of the adjustable voltage supply,
10 wherein an amplitude of each pulse of DC power is controllable via the adjustable voltage supply.

 12. The electrosurgical generator of any one of claims 6 to 11, wherein the pulse generator comprises a push-pull
15 circuit.

 13. The electrosurgical generator of claim 11 or 12, wherein a maximum amplitude of each pulse of DC power is in the range 10 V to 10 kV.
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 14. The electrosurgical generator of claim 13, wherein the maximum amplitude of each pulse of DC power is equal to or greater than 400 V.

25 15. The electrosurgical generator of any preceding claim, wherein the electroporation waveform comprises a plurality of pulses having a duty cycle equal to or less than 50%.