CLAIMS

~~1. An electrosurgical instrument configured to ablate duodenal mucosal tissue, the instrument comprising:~~

~~a flexible coaxial cable for conveying microwave energy from a generator located externally to the patient to a treatment site located inside a patient's duodenum; and~~

~~an applicator located at a distal end of the flexible coaxial cable, the applicator having an energy delivery structure connected to receive microwave energy from the coaxial cable and to deliver the received microwave energy into biological tissue at the treatment site,~~

~~wherein the applicator includes a radially extendable portion arranged to move the energy delivery structure into contact with duodenal mucosal tissue at the treatment region.~~

~~2. An electrosurgical instrument according to claim 1, wherein the applicator comprises a balloon.~~

~~3. An electrosurgical instrument according to claim 2, wherein the flexible coaxial cable includes an inflation channel arranged to deliver an inflation medium into an volume enclosed by the balloon.~~

~~4. An electrosurgical instrument according to claim 3, wherein the energy delivery structure comprises a portion of an inner conductor of the flexible coaxial cable that protrudes into the volume enclosed by the balloon to form a monopole antenna for launching the microwave energy into biological tissue at the treatment site.~~

~~5. An electrosurgical instrument according to claim 2 or 3, wherein an outer conductive structure is formed on an outer surface of the balloon, the outer conductive structure being electrically connected to an outer conductor of the flexible coaxial cable.~~

~~6. An electrosurgical instrument according to claim 5, wherein the energy delivery structure comprises a bipolar emitting structure formed by the outer conductive structure and an internal conductive element located inside the volume~~

~~enclosed by the balloon, the internal conductive element being electrically connected to an inner conductor of the coaxial cable.~~

~~7. An electrosurgical instrument according to claim 6, wherein the outer conductive structure has a plurality of radiating slots formed therein.~~

~~8. A electrosurgical instrument according to claim 6 or 7, wherein the internal conductive element is electrically connected to the outer conductive structure at a distal end of the balloon.~~

~~9. A electrosurgical instrument according to claim 6 or 7, wherein the internal conductive element is a conductive layer formed on an internal surface of the balloon.~~

~~10. A electrosurgical instrument according to claim 6 or 7, wherein the internal conductive element is a conductive layer formed on an outer surface of an auxiliary inflatable balloon located within the volume enclosed by the balloon.~~

~~11. An electrosurgical instrument according to claim 1, wherein the applicator comprises a paddle and a movement mechanism configured to move the paddle in a radial direction, and wherein the energy delivery structure comprises a bipolar antenna mounted on the paddle.~~

~~12. An electrosurgical instrument according to claim 11, wherein the applicator comprises a plurality of paddles arranged to move in radial directions that are angularly offset from each other.~~

~~13. An electrosurgical instrument according to claim 1, wherein the energy delivery structure comprising a flexible dielectric substrate having:~~

~~a conductive layer formed on a first surface thereof, the conductive layer being electrically connected to an inner conductor of the coaxial cable, and~~

~~a plurality of conductive elements formed on a second surface thereof,~~

wherein the plurality of conductive elements are electrically grounded and dimensioned to act as radiating elements for the microwave energy received by the energy delivery structure.

14. An electrosurgical instrument according to claim 13, wherein the flexible dielectric substrate is in the form of a sheet, and the plurality of conductive elements are arranged in a two-dimensional array on the sheet.

15. An electrosurgical instrument according to claim 13, wherein the flexible dielectric substrate is in the form of a strip, and the plurality of conductive elements are arranged in a row along the strip.

16. An electrosurgical apparatus for ablating duodenal mucosal tissue, the apparatus comprising:

a surgical scoping device having an instrument cord for insertion in a patient to a treatment site located inside the patient's duodenum;

a generator for suppling microwave energy;

an electrosurgical instrument according to any preceding claim,

wherein the flexible coaxial cable is connected at its proximal end to the generator,

wherein the flexible coaxial cable and applicator are insertable together with the instrument cord to the treatment site.

17. An electrosurgical apparatus according to claim 16. wherein the instrument cord has a longitudinal instrument channel running therethrough, and wherein the flexible coaxial cable and applicator are dimensioned to be slidably mounted in the instrument channel.

18. An electrosurgical instrument for delivering energy to resurface biological tissue in a patient's gastrointestinal tract, the instrument comprising:

a flexible coaxial cable for conveying microwave energy from a generator located externally to the patient to a

~~treatment site located inside the patient's gastrointestinal tract; and~~

~~an applicator located at a distal end of the flexible coaxial cable, the applicator having an energy delivery structure connected to receive microwave energy from the coaxial cable and to deliver the received microwave energy into biological tissue at the treatment site,~~

~~wherein the applicator comprises a rotatable radiating structure that is rollable along biological tissue at the treatment site.~~

~~19. An electrosurgical instrument according to claim 18, wherein the applicator comprises a probe housing that encloses the coaxial cable, wherein the radiating structure is rotatably mounted at a distal end of the probe housing.~~

~~20. An electrosurgical instrument according to claim 18 or 19, wherein the radiating structure is in the shape of a cylinder having a laterally oriented rotation axis.~~

~~21. An electrosurgical instrument according to claim 20, wherein the radiating structure comprises:~~

~~an inner conductive ring electrically connected to an inner conductor of the coaxial cable,~~

~~a dielectric annular element mounted to cover the inner conducive ring around the circumference of the radiating structure, and~~

~~a plurality of grounded conductive patches formed on an outer surface of the annular element.~~

~~22. An electrosurgical instrument for delivering energy to resurface biological tissue in a patient's gastrointestinal tract, the instrument comprising:~~

~~a flexible coaxial cable for conveying microwave energy from a generator located externally to the patient to a treatment site located inside the patient's gastrointestinal tract; and~~

~~an applicator located at a distal end of the flexible coaxial cable, the applicator having an energy delivery structure connected to receive microwave energy from the coaxial cable; and~~

a gas feed arranged to convey gas to the applicator from a gas supply located externally to the patient,

wherein the applicator is arranged to deliver the received microwave energy into the gas received at the applicator to strike or sustain a plasma for delivery to biological tissue at the treatment site.

23. An electrosurgical instrument according to claim 22, wherein the applicator comprises a probe housing that encloses the coaxial cable and defines a gas flow path in communication with the gas feed, the probe housing having one or more gas exit apertures at its distal end.

24. An electrosurgical instrument according to claim 23, wherein the probe housing is electrically connected to an outer conductor of the coaxial cable, and wherein the energy delivery structure comprises a conductive element extending within the probe housing away from a distal end of the coaxial cable and electrically connected to an inner conductor of the coaxial cable, wherein the conductive element is electrically connected to a distal tip of the probe housing.

25. A surgical instrument for delivering energy to a surface of a patient's gastrointestinal tract, the instrument comprising:

a flexible energy feed cable for conveying energy from an energy source locating externally to the patient to a treatment site; and

an applicator located at a distal end of the flexible energy feed cable,

wherein the flexible energy feed cable comprises a bundle of graphene cables, and

wherein the applicator comprises an array of graphene cable terminations for delivering thermal energy into biological tissue at the treatment site.

26. A surgical instrument for delivering energy to a surface of a patient's gastrointestinal tract, the instrument comprising:

~~a flexible energy feed cable for conveying energy from an energy source locating externally to the patient to a treatment site; and~~

~~an applicator located at a distal end of the flexible energy feed cable,~~

~~wherein the applicator comprises a thermoelectric device arranged to introduce a thermal gradient at the treatment site thereby to deliver thermal energy into biological tissue at the treatment site.~~

1. An electrosurgical instrument for delivering energy to resurface biological tissue in a patient's gastrointestinal tract, the instrument comprising:

a flexible coaxial cable (206) for conveying microwave energy from a generator located externally to the patient to a treatment site located inside the patient's gastrointestinal tract; and

an applicator (320) located at a distal end of the flexible coaxial cable, the applicator having an energy delivery structure connected to receive microwave energy from the coaxial cable and to deliver the received microwave energy into biological tissue at the treatment site,

wherein the applicator comprises a rotatable radiating structure (324) that is rollable along biological tissue at the treatment site, and

CHARACTERISED IN THAT the applicator comprises a probe housing (322) that encloses the coaxial cable, wherein the radiating structure is rotatably mounted at a distal end of the probe housing.

2. An electrosurgical instrument according to claim 1, wherein the radiating structure is in the shape of a cylinder having a laterally oriented rotation axis.

3. An electrosurgical instrument according to claim 2, wherein the radiating structure comprises:

an inner conductive ring (330) electrically connected to an inner conductor (212) of the coaxial cable,

a dielectric annular element (332) mounted to cover the inner conducive ring around the circumference of the radiating structure, and

a plurality of grounded conductive patches (334) formed on an outer surface of the annular element.

4. An electrosurgical instrument according to any preceding claim, further comprising a sleeve (202), and wherein the probe housing is slidable with the sleeve such that the radiating structure can be extended outside the sleeve and retracted inside the sleeve.