CLAIMS

1. An injection catheter (1), for delivering a therapeutic agent into a substrate (12), the injection catheter comprising at least one lumen (14) having an open distal end and a curved delivery element (2) which is capable of extending inside the substrate, the lumen (14) serving as a guide for the curved delivery element (2) when it is located outside of the substrate (12), the delivery element (2) comprising a hollow tube with a distal opening (22), and having at least two openings (6) on its distal tip (4), the distal tip (4) being comprised of a distal zone (10) and a proximal zone (8), wherein the specific surface of the openings (6) in the distal zone (10) of the distal tip (4) of the curved delivery element (2) is higher than the specific surface of the openings in the proximal zone (8) of the distal tip (4) of the curved delivery element (2), wherein the delivery element (2) takes its curved shape when deployed into the substrate, and wherein the penetration depth of the curved delivery element in the substrate is controlled by its curvature, the curvature of the curved delivery element (2) being defined by an angle of between 60^{o} and 120^{o} between the longitudinal axis going through the center of the lumen (14) when the injection catheter (1) is positioned on the substrate in use and the longitudinal axis going through the center of the distal opening (22) after deployment of the curved delivery element (2) in the substrate.

2. An injection catheter according to Claim 1, characterized in that the specific surface in the distal zone (10) and in the proximal zone (8) of the distal tip (4) is between 0.01 mm^2/mm and 0.25 mm^2/mm.

3. An injection catheter according to Claim 1 or 2, characterized in that the specific surface increases between the proximal zone (8) and the distal zone (10) by the increase in the mean surface of the openings (6).

4. An injection catheter according to Claim 1 or 2, characterized in that the specific surface increases between the proximal zone (8) and the distal zone (10) by the increase in the total surface of the openings (6).

5. An injection catheter according to Claim 1 or 2, characterized in that the specific surface increases between the proximal zone (8) and the distal zone (10) by the increase in the density of the openings (6).

6. An injection catheter according to any preceding claim, in which the curvature of the curved delivery element (2) is defined by an angle of between 80^{o} and 120^{o} between the longitudinal axis going through the center of the lumen (14) when the injection catheter (1) is positioned on the substrate in use and the longitudinal axis going through the center of the distal opening (22) after deployment of the curved delivery element (2) in the substrate.

7. An injection catheter according to any preceding claim, in which the curvature of the curved delivery element (2) is defined by an angle of between 85^{o} and 100^{o} between the longitudinal axis going through the center of the lumen (14) when the injection catheter (1) is positioned on the substrate in use and the longitudinal axis going through the center of the distal opening (22) after deployment of the curved delivery element (2) in the substrate.

8. An injection catheter according to any preceding claim, characterized in that control of the depth of penetration of the curved delivery element (2) into the substrate (12) is by way of one of the group consisting of: a curved element with shape memory; an element equipped with a stop; or an element detectable by ultrasound or other radiodetectable technique.

9. An injection catheter according to any preceding claim, characterized in that the curved delivery element (2) is a hollow needle (16).

10. An injection catheter according to Claim 9, characterized in that the open surface of the distal tip of the hollow needle (16) is between 2% and 20%.

11. An injection catheter according to any preceding claim, characterized in that the curved delivery element (2) is a sleeve (20) positioned around a piercing element (18).

12. An injection catheter according to Claim 11, characterized in that the open surface of the distal tip of the sleeve (20) is higher than 2%.

13. An injection catheter according to any preceding claim, characterized in that it further comprises a pump to control the injection pressure at the proximal tip of the injection catheter.