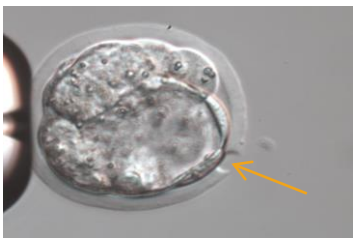
Trophectoderm biopsy for PGD & PGS using Octax Laser Shot™ or Octax NaviLase™

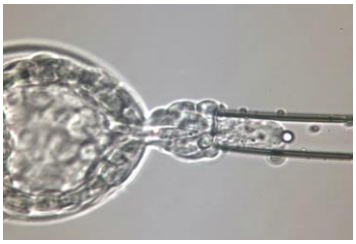
Pre-implantation genetic diagnosis (PGD) as well as pre-implantation genetic screening (PGS) are both methods to assess the genetic status of an early embryo. The most common method to retrieve cells for genetic testing is by trophectoderm biopsy. To simplify the biopsy procedure a laser system is preferably used. It is important that the biopsy does not harm the embryo.
A suggested procedure can be found below.

Step 1:
On day 4 post injection the zona pellucida is opened by one single pulse. An opening of a diameter of about 10 µm is generated opposite the inner cell mass (ICM) of the early blastocyst. The zona should be completely penetrated, the opening allowing for controlled herniation of trophectoderm cells.

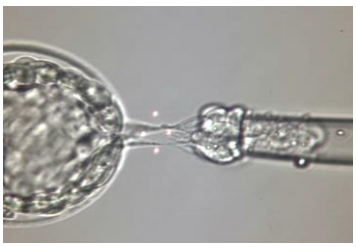


Step 2:
After another 15-24 h of culture a blastocyst showing a protrusion of 5-7 trophectoderm cells is attached to the holding pipette. Protruding cells are oriented in a 3 o'clock position to be accessible for micro manipulation. As individual embryos of a patient do not develop synchronously, zona opening and biopsy may have to be carried out at different time points.

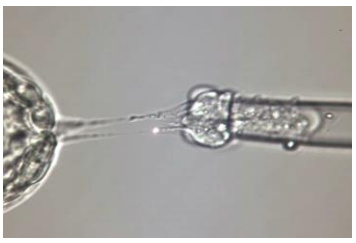
Step 3:
A small number of herniating trophectoderm cells (2-4) is aspirated into a biopsy capillary (capillary inner-Ø approx. 20-30 µm). To separate the biopsied cells from the remaining tissue the biopsy capillary is gently pulled away from the blastocyst to stretch the junctions of the connecting cells. The optional Octax Target Pointer™ (red dot) visualises the laser target.



Step 4:
Trophectoderm cells are kept under tension while moving the cell junctions to the laser impact site using the micro manipulators. The first cell junction is cut by a pulse of Octax Laser Shot or by using the trophectoderm biopsy mode of Octax NaviLase. The pulse length which is required for cutting cell bonds is approximately 2-3 times longer than for the initial zona drilling.



Step 5:
The biopsy pipette is pulled further away from the blastocyst to keep cell junctions under tension. Remaining cell junctions are cut by additional pulses of Octax Laser Shot / Octax NaviLase. It is important to direct the laser to changing positions on cell junctions. Firing to the same spot repeatedly will lead to sticky cells and impair detachment. On average, 2-3 laser pulses are needed for detachment of biopsied trophectoderm.



Step 6:
Trophectoderm biopsy is completed. The blastocyst is placed in a single drop of culture medium for re-expansion. Biopsied trophectoderm cells are processed for subsequent genetic analysis.