

Galileo TMA CK 3500

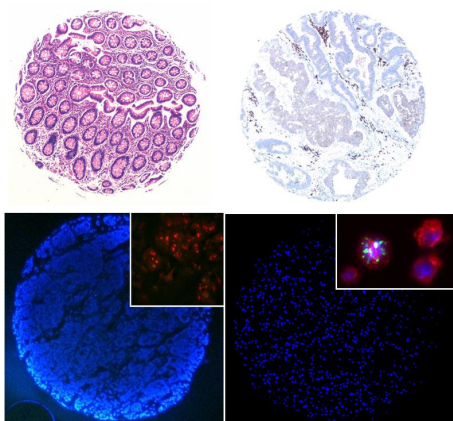
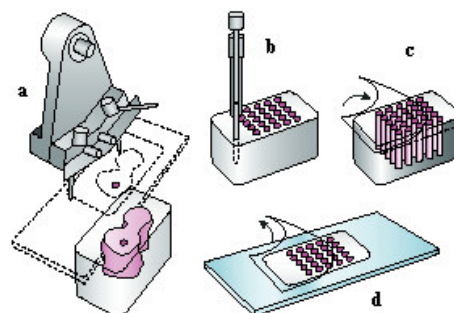
***The ultimate Computer Assisted
Tissue Microarrayer***



***Easy to use
High Throughput Tissue Arrayer***

Tissue Microarray technology

The **Tissue Microarray (TMA)** is a technical procedure that allows **combining tens to hundreds of paraffin-embedded tissue specimens into a single paraffin block**. Cylindrical tissue cores (0.6mm-2.0mm in diameter) are acquired from one or more representative regions of a paraffin-embedded tissue block (donor block) and then precisely arrayed into a new "recipient" paraffin block, using a custom-built instrument. Up to 200 consecutive sections of 4-5mm thickness can be cut from each TMA block, mounted on a microscope slide and processed like ordinary tissue sections with a wide range of techniques. Tests commonly employed include histochemical and immunohistochemical staining and fluorescent in situ hybridization.



The main advantage of TMA consists in fitting several hundreds of samples in a single paraffin block that can be therefore **analyzed at the same time**, thus allowing high throughput screening of expression, providing uniform reaction conditions and avoiding the need to stain and read many individual slides. For this last reason the analysis of TMA is **cost effective**; only a fraction of reagents and antibodies is used. Furthermore, because the cores used are small, this technique allows **saving precious biological samples**; after removal of cores donor blocks usually still retain sufficient residual tissue for adequate pathological interpretation.

From TMA evolved the **cell-line microarray (CMA)** using cell pellet instead of tissue samples. Isolating cells are grown in culture, fixed in formalin, suspended in agarose and embedded in paraffin to create a paraffin block. CMA can become a powerful tool to study genomic-scale cell-based analyses of gene function.

Galileo TMA CK 3500: unique features

- Robust and reliable construction

A **high resolution digital camera** makes the punch area identification on the donor block easier; the operator looks at the images of the donor block and of the pre-marked reference slide on the monitor of its Personal Computer. The Digital Camera allows saving the images of the slides and of the paraffin blocks on the computer HD for later use during virtual alignment in the punch area selection and in digital reports.

An **automated and computer guided needle positioning** helps the operator to construct the array, avoiding errors that could endanger the TMA quality and speeds up the process. The core insertion depth can be set by software; this avoids that target cores transferred to TMA recipient blocks may be placed at varying depths, requiring repeated sectioning of the tissue microarray block to reach a depth at which all cores are represented. Only the punching procedure is left manual to avoid that instrument malfunction (like a problematic block with poor quality of the included specimen, needle rupture, ...) could result in damage to the microarray block under construction.

An **automated tray**, computer assisted, ensures precise positioning of the paraffin blocks while in use. Up to 6 regular cassettes can be mounted on this tray. Using a dedicated holder (*Optional accessory*) one macro-block and up to three regular cassette can be mounted, too.

A **1-block manual tray** (*Optional accessory*) allows both fast needle positioning for homogeneous paraffin donor blocks and the construction of up to 6 TMA block replicas.

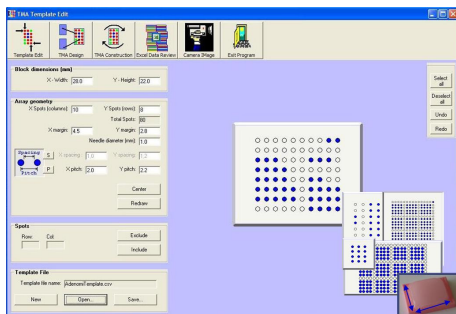
A **LED back-light and reflected illumination** of the paraffin blocks as well as of the glass slides improves the quality of the images.

- Easy to use TMA dedicated software (IseTMA software)

The proprietary **IseTMA software** provides the interface with the equipment and is designed to assist the user in all operating phases of TMA realization, from the building of the array pattern to the final reporting for specimen tracking. Both a report on an Excel spread-sheet and an XML report can be created.

Two dedicated functions help the user in the identification of the punch areas on the donor blocks and allow a great time saving because they give the opportunity to perform only one alignment for each block instead of one alignment for each spot, as in the classical procedure.

The IseTMA software

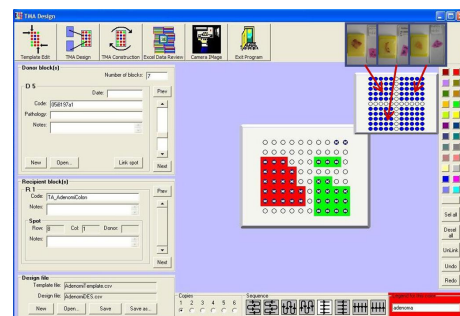


Template Edit

- Create the geometry of the array: define the paraffin size, the needle diameter, the number of spots and the spacing or the pitch between the spots.
- Introduce rows/columns or groups of spots of spacing to separate the various specimens.
- Automatically centre the array in the recipient block.
- Check the template directly on the recipient block.
- Define a library of TMA templates to re-call and re-use for diverse TMA projects.

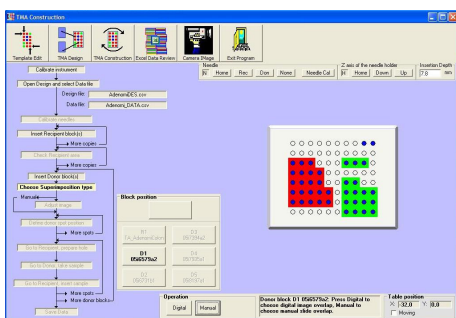
TMA Design

- Define the donor blocks to be used. Donor blocks can be added in every moment of the work.
- Associate each donor block to one or multiple spots of the TMA.
- Define replicas of the created TMA. Up to 6 replicas can be performed.
- Add a note for each donor block, recipient block or spot. These notes will be copied in the final TMA report.
- Associate a color code to each spot to better read the array.
- Perform all these operations remotely from the arrayer.



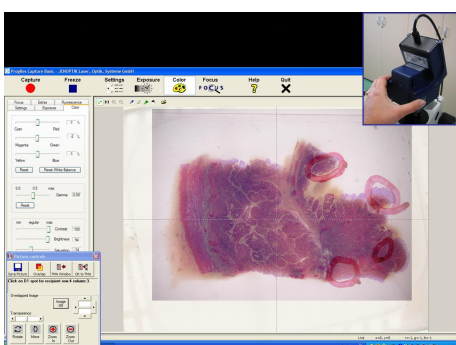
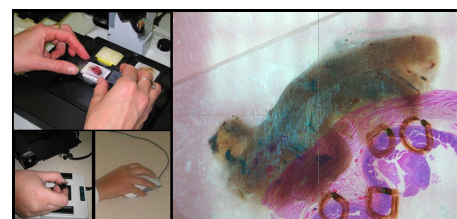
TMA Construction

- Follow the flow to proceed in the TMA construction. It guides you in every step.
- Save all the punch positions for each donor block at the same time. During the sampling they'll be reached automatically.
- Move from one step to the next simply by clicking on the mouse. All the paraffin block movements are automatic.
- Adjust errors and position mismatch in every moment with dedicated functions.
- Create your array step by step. Complete your array later after the array has been started.



Punch area selection: Manual overlapping

- Align the pre-marked glass slide with the donor block by looking at the monitor
- Once aligned, save the punch positions using a joystick or by clicking on the mouse.

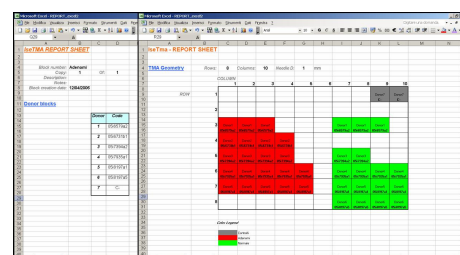


Punch area selection: Digital overlapping

- Overlap the digitized pre-marked glass slide to the live block image.
- Modify the transparency of the digitized slide to better see the donor block morphology.
- Align the images rotating the camera and using specific commands (digitized image transparency, drag & drop of the digital image, etc.).
- Once aligned, save the punch positions simply by clicking on the mouse. Target icon marks are drawn in scale and software check of overlapped spots is performed.

TMA Reporting

- Create the final report of the array on an Excel spread-sheet.
 - Each spot is properly identified during subsequent analysis.
 - Relate each spot to the corresponding information.
 - Personalize the report, for example adding the results of the analysis or images of the donor blocks and the spots.
- Create the final TMA report as xml file (Optional - Order Code: CK-XML)
 - Interface with other equipment (like digital robotic scanners) is possible.

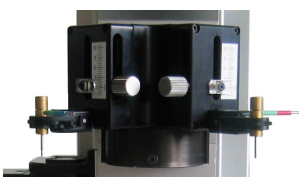


Technical specification



High resolution optics

- Optics: Navitar Zoom6000
- Jenoptik ProgRes™ C3 camera
 - CCD sensor: 1/2" 3.3 Megapixel Color CCD
 - Pixel size: $3.45 \times 3.45 \mu\text{m}^2$
 - A/D Conversion: 3×12 bit RGB
 - Image resolution: up to 2080×1542 pixels
- 42X magnification optic with a 19" wide display



Needle holder

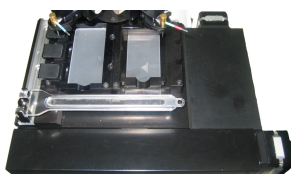
- Automated and computer guided needle positioning
- Accurate and automated regulation of the core insertion depth
- Easy needle mounting



Automated tray

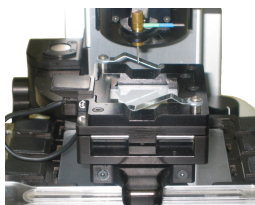
- Prior Scientific ES 111 Optiscan Upright Stage
 - Resolution: $1\mu\text{m}$
 - Repeatability: $\pm 5\mu\text{m}$
 - Speed range: $1\mu\text{m/s} - 8\text{mm/s}$
 - Drive mechanism: Zero backlash precision lead screw
 - Travel range: $125\text{mm} \times 77\text{mm}$
- Adjustable LED back-light illuminated
- 6-block holder (horizontal mounting of the blocks)

Optional accessories



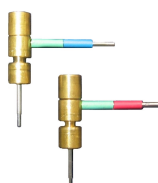
Macro-block holder (Order Code: CK-MBH)

- Easy switch from the 6-block holder to the macro-block holder
- Possibility to mount simultaneously one macro-cassette and up to three standard cassette on the automated tray
- Quick and easy mounting of the macro-block on its holder
- Possibility to use the macro-block both as donor and recipient block



Manual tray (Order Code: CK-LMT)

- Manual tray for one donor block
- Both horizontal and vertical mounting of the block
- Adjustable LED back-light illumination



Needles

- Set of two punches: one for the donor block and another one for the recipient block
- Available diameters:
 - 0.6 mm (Order Code: CK-MP06)
 - 1.0 mm (Order Code: CK-MP10)
 - 1.5 mm (Order Code: CK-MP15)
 - 2.0 mm (Order Code: CK-MP20)