

Evaluation of an automated microdissection workflow for FFPE tissue samples

E.M.P. Steeghs¹, R. Wimberger-Friedl², D. van Egmond¹, D. Dijkhuizen¹, T. van Wezel¹, V.T.H.B.M. Smit¹

¹Department of Pathology, Leiden University Medical Center (LUMC), Leiden, The Netherlands

²Xyall b.v., Eindhoven, The Netherlands

Introduction

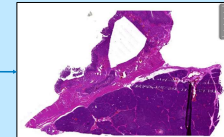
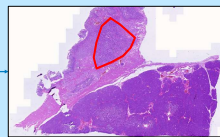
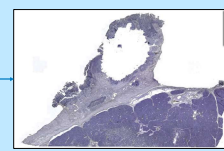
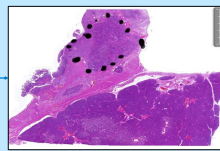
Microdissection is essential in molecular oncology diagnostics for enriching tumor cell purity to meet the required sensitivity of NGS tests. Manual microdissection is a tedious, time-consuming process with limited precision. Here, we compare our manual method with a novel, fully automated workflow, combining digital pathology with robotic microdissection on a pilot series of challenging cases having few cells and scattered tumor fields, including cytology, and Mola pregnancy.

Methods

Manual workflow
Manual annotation +
manual microdissection

N=20

Automated workflow
Digital Annotation +
robotic microdissection



Maxprep® TNA
isolation



**Cancer hotspot
NGS CHPv6:**
Mutations in:
KRAS, EGFR,
GNA11, BRAF
PIK3CA, TP53
CNV/LOH
TCR / IgH
Mola

Xyall Tissector TT¹⁾



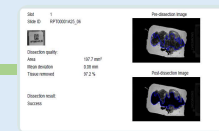
Digital annotation



Automatic annotation transfer



Robotic scraping



Automatic QC

Key features Tissector TT

Throughput ²⁾	30 slides/hour
	72 slides
Storage capacity	12 scraping heads
	12 sample tubes
Accuracy	< 0.2 mm < dev _{abs}

²⁾ depending on annotation

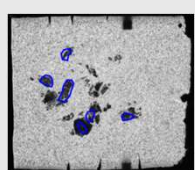
¹⁾ Tissector TT is for research use only

Results

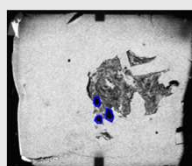
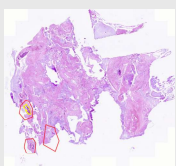
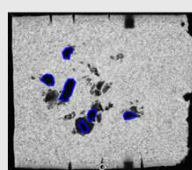
Annotated reference
H&E image



Transferred annotation
on dissection slide



Post-dissection image
with annotation

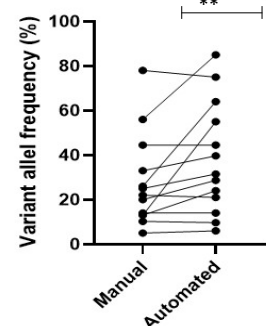


Dissection accuracy

Case	Tissue of origin	area [mm ²]	# of ROI	Avg. area per ROI	<dev> [mm]
1	Lymph node FNA	18.7	3	1.25	0.09
2	hypopharynx	30.5	2	3.05	0.07
3	pancreas	20.8	1	4.16	0.11
4	vulva	33.4	1	6.68	0.07
5	sinus piriformis	67.4	6	2.25	0.07
6	pancreas	146	1	29.20	0.07
7	adnex	86.2	3	5.75	0.12
8	bone marrow	144.3	1	28.86	0.13
9	bone marrow	96.3	1	19.26	0.1
10	stomach	76.7	1	15.34	0.1
11	tonsil	106.2	3	7.08	0.08
12	eye	43.6	1	8.72	0.09
13	eye	97.8	1	19.56	0.13
14	rectum	107.8	1	21.56	0.11
15	placenta flakes	41.5	1	8.30	0.11
16	placenta flakes	52.5	1	10.50	0.1
17	placenta flakes	139.3	1	27.86	0.15
18	placenta flakes	292.4	2	29.24	0.1

Molecular testing

NGS mutation analysis



Conclusions

All results are concordant.

A fully automated microdissection workflow is feasible, with the potential to improve tumor purity, enhance quality and traceability.