TESTS THAT MAY HELP INFORM A PERSONAL TREATMENT PLAN

	TEST TYPE	PURPOSE	WHEN*	SAMPLE REQUIRED	LEAD TIME FOR RESULTS	PROS	CONS
functional drug testing	**In vivo PDX mouse model (Patient Derived Xenograft)**	Patient's tumor tissue is implanted in mice. Drugs are then tested on the mice to measure effectiveness.	At any resection	Fresh tumor tissue^	6-18 months. Highly variable as not all tumors grow. Tumor must first grow and then be transplanted to other mice. Success rate for tumor growth is ~50-60%.	• May provide comparative data on drug effectiveness on patient tumor tissue. • Even if genetic testing doesn't reveal any actionnable targets, you can test therapies recommended by your oncologist. • Clinically relevant treatment suggestions, independent of histology or genetic testing.	• Tumor tissue may not grow successfuly in the mice. • Long lead time • Expensive • Immunotherapy drugs can't be tested since testing is done on immune deficient mice, though some monoclonal antibody drugs can be tested. • Results ex vivo may not translate to humans; does not account for tumor microenvironment factors. • Does not support high-throughput drug testing.
	Ex vivo PDO - Patient Derived Organoid (3D cultures)	Patient's tumor cells are added to a mixture of proteins that solidifes to a jello like substance, allowing the tumor cells to grow in in a 3D model and recapitulate the structure of cells that grow in the body. Drugs are then tested on the organoid to measure effectiveness.	At any resection	Fresh tumor tissue^	~2-6 weeks	• May provide comparative data on drug effectiveness on patient tumor tissue. • Even if genetic testing doesn't reveal any actionnable targets, you can test therapies recommended by your oncologist. • Clinically relevant treatment suggestions, independent of histology or genetic testing. • Tests againsts a panel of many drugs.(~40-100) • Faster turnaround than PDX.	• Tumor tissue may not grow successfuly into an organoid. • Immunotherapy drugs and antibodies cannot be tested. • Results ex vivo may not translate to humans; does not account for tumor microenvironment factors. • Test method lacks a microenvironment (how tumor cells interact with other cells in the tumor and surrounding tissue) which contributes to essential cellular functions in migration proliferation, differentiation and survival.
	Ex vivo drug senstivity testing (2D cultures)	Patient's tumor tissue is tested in vitro against a panel of drugs to determine which are most effective against cancer cells while least toxic to healthy cells	At any resection	Fresh tumor tissue†	~1 month	• May provide comparative data on drug effectiveness on patient tumor tissue. • Even if genetic testing doesn't reveal any actionnable targets, you can test therapies recommended by your oncologist. • Clinically relevant treatment suggestions, independent of histology or genetic testing. • Supports high throughput drug testing. (200+) • Faster turnaround than PDX. • Report highlights drugs that not only kill cancer cells but minimize toxicity to healthy cells.	• Immunotherapy drugs and antibodies cannot be tested. • Results ex vivo may not translate to humans; does not account for tumor microenvironment factors. • Test method lacks many crucial signaling factors, such as cell-cell and cell-matrix interactions, which contribute to essential cellular functions in proliferation, differentiation and survival.

**For tissue samples, resection specimens post-chemo should be the last possible choice for sample selection because often most of the tumor cells are dead.*

^Fresh tumor tissue needs to be sent overnight on ice directly from OR to the lab. Labs will specify how much tissue is required but PDX usually requires at minimum 1 cm3.

†Tissue can be sent overnight directly from OR or can be frozen as per lab protocol on dry ice.

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