#374156: Plasma First - Accelerating Lung Cancer Diagnosis through Liquid Biopsy

Miguel Garcia-Pardo[1], Kasia Czarnecka[2], Jennifer H. Law[1], Alexandra Salvarrey[1,2], Roxanne Fernandes[1], Jason Fan[1], Lucy Corke[1], Lisa W. Le[3], Thomas K. Waddell[2], Kazuhiro Yasufuku[2], Geoffrey Liu[1], Frances A. Shepherd[1], Penelope Bradbury[1], Adrian Sacher[1], Tracy Stockley[4], Prodipto Pal[4], Ming Sound Tsao[4], Karen Howarth[5], Christodoulos Pipinikas[5], Natasha B. Leighl[1]

1. Division of Medical Oncology and Hematology, Princess Margaret Cancer Centre/University Health Network, Toronto, Canada; 2. Division of Thoracic Surgery, University Health Network, Toronto, Canada;
3. Department of Biostatistics, Princess Margaret Cancer Centre, Toronto, Canada; 4.Department of Laboratory Medicine and Pathology, University Health Network, Toronto, Canada; 5. Inivata Ltd, Cambridge, United Kingdom.

BACKGROUND

- Molecular profiling of tumor tissue is the gold standard for treatment decision-making in advanced NSCLC
- Results are often delayed or unavailable
- Time to treatment may be shortened using liquid biopsy

METHODS

- We piloted the use of plasma molecular testing as part of the initial diagnostic work-up for patients with suspected advanced lung cancer
- Time from referral to treatment initiation was analysed and compared to an historical cohort from 2018 of patients with advanced non-squamous NSCLC
- Patients had plasma circulating tumor DNA (ctDNA) testing using InVisionFirst®-Lung, a next-generation sequencing (NGS) assay targeting 37 genes
- Tissue molecular testing was conducted per institutional standard of care including comprehensive next generation sequencing (NGS) or single gene testing (*EGFR, ALK, ROS1*)

Figure 1. Study schema.

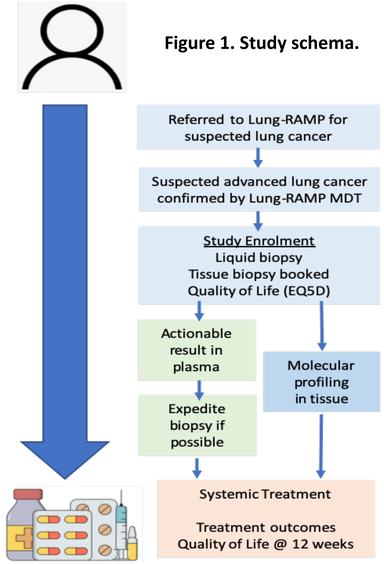

Table 1. Baseline characteristics.

		ACCELERATE COHORT N=60 N (%)	HISTORICAL COHORT N=89 N (%)
Sex	Female	31 (52)	47 (53)
	Male	29 (48)	42 (47)
Median age at diagnosis (years)		70	70
Smoking history	Never smoker	29 (48)	32 (36)
	Former	22 (37)	39 (44)
	Current	9 (15)	18 (20)
Final histological diagnosis	Adenocarcinoma	33 (55)	82 (92)
	Squamous cell	7 (12)	NA
	Large cell	1 (1.5)	4 (5)
	NSCLC NOS	1 (1.5)	3 (3)
	Small cell carcinoma	7 (12)	NA
	Atypical carcinoid	1 (1.5)	NA
	Lymphoepithelioma-like	1 (1.5)	NA
	Not lung primary	6 (10)	NA
	Not biopsied	3 (5)	NA

NOS: not otherwise specified

Liquid biopsy can lead to faster molecular results, increase access to targeted therapy, and shorten time to treatment in NSCLC

Miguel.Garcia@uhn.ca

Table 2. Tissue biopsy and molecular profiling method.

		ACCELERATE COHORT N=60 N (%)	HISTORICAL COHORT N=89 N (%)
Tissue biopsy method	EBUS/TBNA	26 (43)	52 (58)
	CT-guided biopsy	21 (35)	22 (25)
	Thoracentesis	7 (12)	9 (10)
	Lymph node FNA	3 (3)	5 (6)
	Brain metastasis resection	0	1 (1)
	Not biopsied	3 (5)	NA
Tissue molecular profiling method	161 comprehensive NGS panel	24 (65)	0
	15-gene NGS panel + IHC	0	63 (71)
	Single gene PCR testing + IHC	5 (13)	23 (26)
	N/A	8 (22)	3 (3)

EBUS: endobronchial ultrasound; TBNA: transbronchial biopsy needle aspirate; FNA: fine needle aspirate; IHC: immunohistochemistry; PCR: polymerase chain reaction

Figure 2. Turn around times for plasma and tissue molecular profiling in both cohorts, and time to treatment initiation.

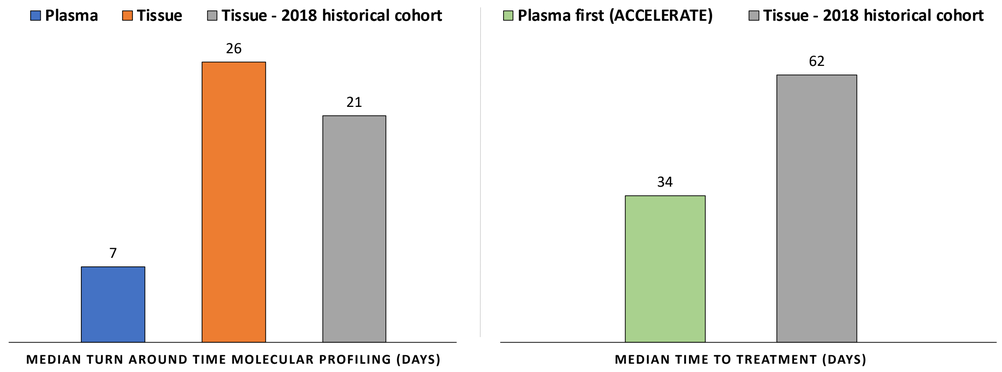

Figure 3. Molecular alterations detected in advanced non-squamous NSCLC using plasma + tissue versus tissue only.

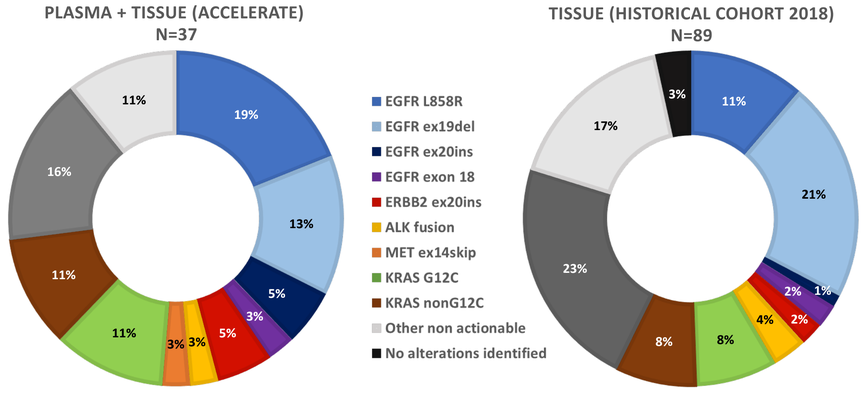

Figure 4. Type of treatment received in each cohort.

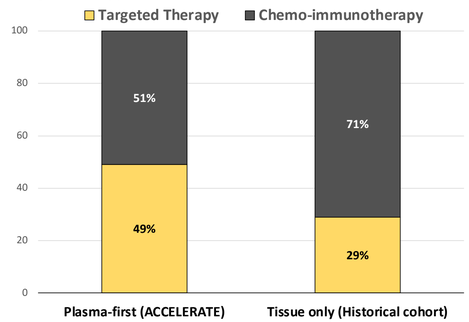

Table 3. Actionable alterations and treatment patterns.

	Stage IV NSCLC ACCELERATE COHORT N=37 N (%)	HISTORICAL COHORT N=89 N (%)
Actionable alteration detected *(EGFR, ALK fusion, METex14skip, ERBB2ex20ins, KRASG12C)*	23 (62)	44 (49)
Targeted therapy	18 (49)	26 (29)
Targeted therapy started prior to tissue NGS (based on plasma)	10 (27)	NA