Advancing rare cancer research by MALDI mass spectrometry imaging: Applications, challenges and future perspectives in sarcoma

Maren Stillger¹, Mujia Li¹, Pia Hönscheid², Cläre von Neubeck³, and Melanie Föll¹

¹University Medical Center Freiburg Institute of Pathology ²University Hospital Carl Gustav Carus ³University Hospital Essen

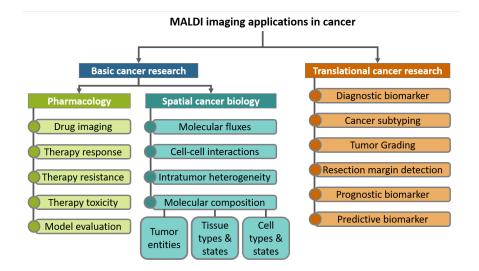
June 12, 2023

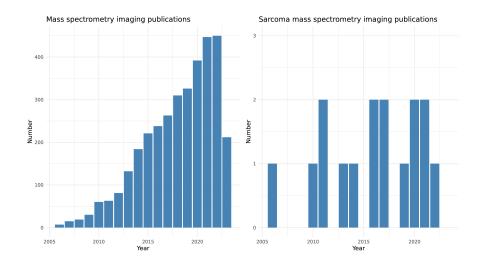
Abstract

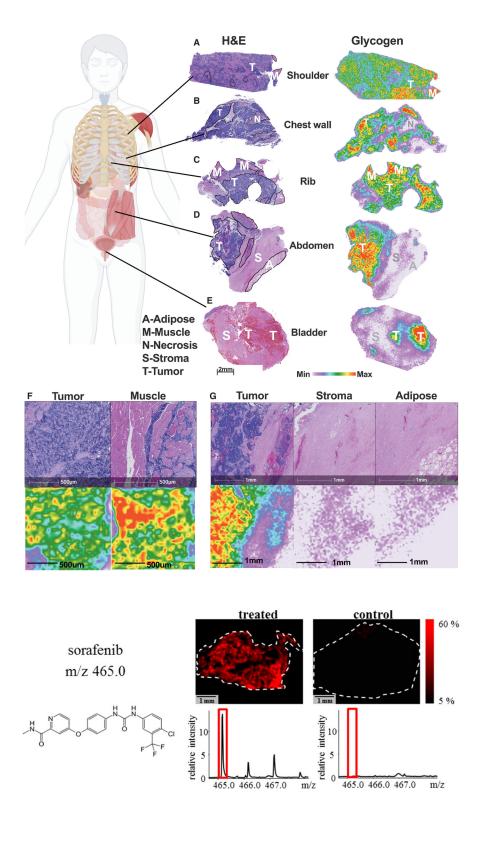
MALDI mass spectrometry imaging (MALDI imaging) is uniquely suited to advance cancer research by measuring spatial distribution of endogenous and exogenous molecules directly from thin tissue sections. These molecular maps provide valuable insights into various aspects of basic and translational cancer research, including spatial tumor and tumor microenvironment biology, pharmacological interventions, and patient stratification. However, despite these advantages, the utilization of MALDI imaging in studying rare cancers, which comprise approximately 20% of all cancers, remains limited. Rare cancers pose unique challenges in medical research, resulting in understudied entities with suboptimal management and outcomes. In this review, we explore the value of MALDI imaging in sarcoma, as an example of a highly heterogeneous and challenging rare cancer. We summarize existing MALDI imaging studies in sarcoma and outline potential future applications. In addition, we address the specific challenges encountered when employing MALDI imaging to rare cancers, and propose solutions, including the utilization of formalin-fixed paraffin-embedded tissues, multi-site studies, implementation of multiplexed experiments, and considerations for data sharing practices. Through this review, we aim to inspire collaboration between MALDI imaging researchers and clinical colleagues, to deploy the unique capabilities of MALDI imaging in rare cancer research, particularly in the context of sarcoma.

Hosted file

manuscript.docx available at https://authorea.com/users/628120/articles/648844-advancingrare-cancer-research-by-maldi-mass-spectrometry-imaging-applications-challenges-andfuture-perspectives-in-sarcoma







	1.e
	ē.
,	8
	ma
	a I
1	
	5
	viewec
	ie.
	rev
	peer
	ЭСП
	ğ
	ä
	ă
	has
	ã
	an
	E
	er.
	prepri
	his a
	2
	5
	5
	36
ł	6
	2
1	
	025.
	20
1	202
	a
	1
1	225
	<u> </u>
	org/10
	loi.
	3
	tps:/
	https:/
	on
	ussion
	ussion
	on
	permission
	ussion
	hout permission. —
	hout permission. —
	without permission. —
	without permission. —
	hout permission. —
	without permission. —
	No reuse without permission. —
	 No reuse without permission. —
	ed. No reuse without permission. —
	erved. No reuse without permission. —
	erved. No reuse without permission. —
	reserved. No reuse without permission. —
	reserved. No reuse without permission. —
	tts reserved. No reuse without permission. —
	rights reserved. No reuse without permission. —
	All rights reserved. No reuse without permission. —
	All rights reserved. No reuse without permission. —
	rights reserved. No reuse without permission. —
	under. All rights reserved. No reuse without permission. —
	All rights reserved. No reuse without permission. —
	under. All rights reserved. No reuse without permission. —
	under. All rights reserved. No reuse without permission. —
	under. All rights reserved. No reuse without permission. —
	e author/funder. All rights reserved. No reuse without permission. —
	under. All rights reserved. No reuse without permission. —
	e author/funder. All rights reserved. No reuse without permission. —
	e author/funder. All rights reserved. No reuse without permission. —
	e author/funder. All rights reserved. No reuse without permission. —
	e author/funder. All rights reserved. No reuse without permission. —
	e author/funder. All rights reserved. No reuse without permission. —
	e author/funder. All rights reserved. No reuse without permission. —
	e author/funder. All rights reserved. No reuse without permission. —
	ight holder is the author/funder. All rights reserved. No reuse without permission. —
	ight holder is the author/funder. All rights reserved. No reuse without permission. —
	ight holder is the author/funder. All rights reserved. No reuse without permission. —
	he copyright holder is the author/funder. All rights reserved. No reuse without permission. —
	The copyright holder is the author/hunder. All rights reserved. No reuse without permission.
	he copyright holder is the author/funder. All rights reserved. No reuse without permission. —
	- The copyright holder is the author/hunder. All rights reserved. No reuse without permission.
	123 - 7 he copyright holder is the author/hunder. All rights reserved. No reuse without permission.
	2023 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
	un 2023 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
	Jun 2023 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
	un 2023 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
	12 Jun 2023 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
	1 on 12 Jun 2023 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
	12 Jun 2023 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
	1 on 12 Jun 2023 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
	1 on 12 Jun 2023 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —

465.0 466.0 467.0

m/z