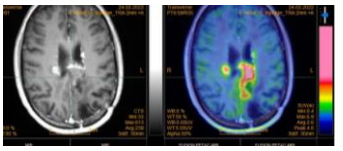
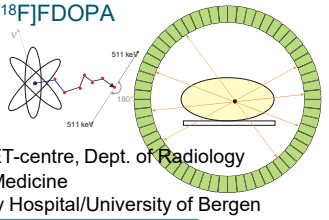
CNS svulster hos barn
Gardermoen 29 Oct 2026

Glioma PET



PET/MR with amino acids [^{11}C]metionin & [^{18}F]FDOPA



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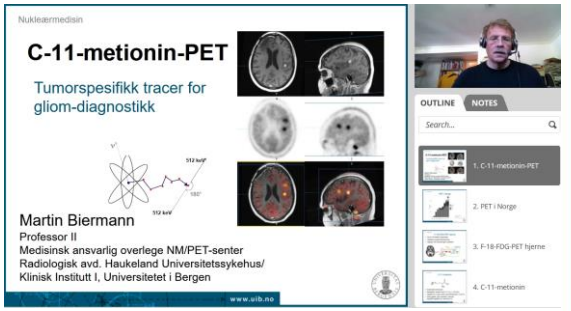
•1

Glioma PET

- PET/CT vs. PET/MR?
- Which tracer?
  - [^{18}F]FDG
  - [^{11}C]metionin
  - [^{18}F]FET, [^{18}F]FDOPA, [^{18}F]FACBC
- Recurrence vs. radionecrosis
- Presurgical imaging for diffuse GBM

•2

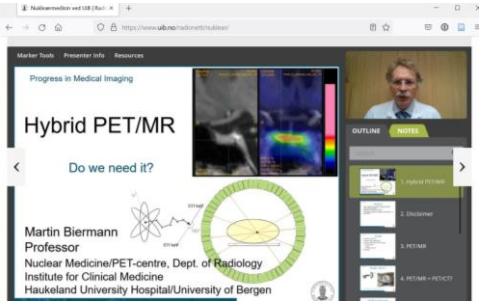
[^{11}C]metionin-PET for glioma



https://uib.no 2017

•3

PET/MR – Is it worth it?



https://uib.no 2022

•4

PET/MR = PET/CT?

PET/MR vs. PET/CT
+ Better soft tissue contrast
+ Perfect co-registration
- Technical complexity



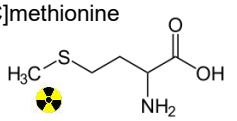
Vandenberghe (2015) Phys Med Biol 60:R115-154

•5

Glioma-PET

Amino acids:

- [^{11}C]methionine



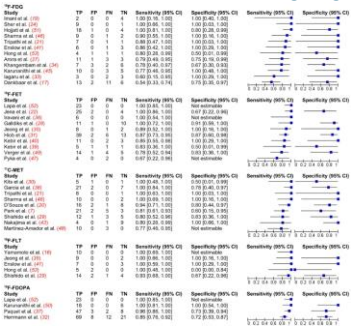
- [^{18}F]FET — Nihashi 2013 AJNR 34:944–50, S1-11
- [^{18}F]FDOPA — Wardak 2014 Eur J Nucl Med 41:1199–209
- [^{18}F]FACBC — Karlberg A 2019 Clin Nucl Med 44:550–9

Santo 2022 Diagnostics (Basel) 12:844
Treglia 2019 Int J Mol Sci 20:E4669

•6

PET/MR

PET for recurrent high-grade glioma



[18F]FDG

[18F]FET

[11C]met

[18F]FLT

[18F]DOPA

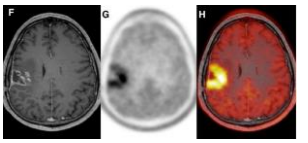
de Zwart 2020 J Nucl Med 61:498–504

•7

PET/MR

Hybrid [11C]methionine PET/MR

50 consecutive patients, Siemens mMR
Recurrence in 35 (70 %)



	MR	PET
Sensitivity	86 %	97 %
Specificity	71 %	74 %

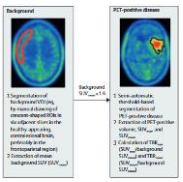
Deuschl (2018) Eur J Nucl Med 45:593-601

•8

PET/MR

PET-based Response AssessmeNt Criteria (RANO 1.0)

- 13 [18F]FET, 9 [11C]met, 1 [18F]FET, 2 [18F]FDOPA
- 12 restrospective, median 34 pts. (range 11-79)
- 12 prospective median 19 pts. (10-40)
- 1 prospective multicentre 107 pts.

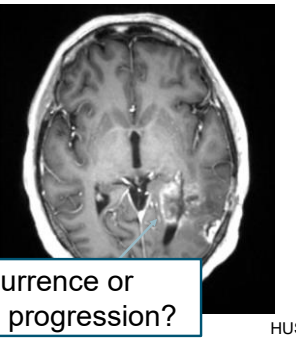


Albert 2024 Lancet Onc e29-e41

•9

PET/MR

[11C]methionine PET/MR glioma m. 65 yrs.



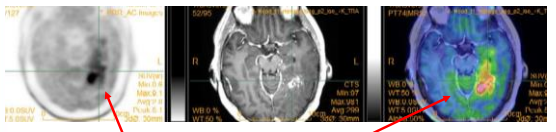
Recurrence or pseudo progression?

HUS_Met_014

•10

PET/MR

[11C]methionine PET/MR glioma m 65 yrs.



Recurrence!

HUS_Met_014

•11

PET/MR

[18F]FDOPA PET/MR glioma f. 49 yrs.



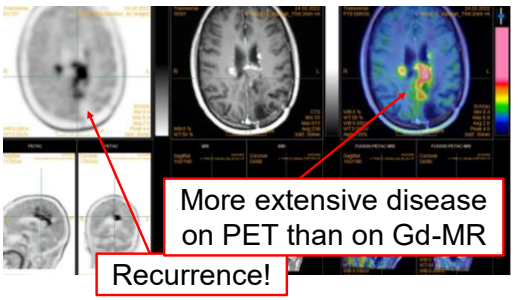
Recurrence or pseudo progression?

HUS_FDOPA_006

•12

PET/MR

[^{18}F]FDOPA PET/MR glioma f. 49 yrs.



HUS_FDOPA_006

•13

PET/MR

[^{11}C]methionine PET vs. MRI for GBM

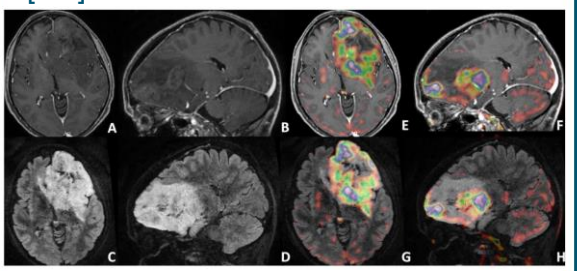
- 47 pts. with preop. PET & MRI 2014 – 1/2021
- Stupp-regimen: Stupp R 2005 N Engl J Med 352:987–96
  Resection of non-eloquent tumour:
  - Just MRI contrast enhancement (CE)?
    CE = tumor
  - FLAIR-ectomy?
    FLAIR = edema and/or tumor
  - [^{11}C]methionine?
    = tumor, both CE and parts of FLAIR

Altieri 2023 J Neurooncol

•14

PET/MR

[^{11}C]methionine PET vs. MRI for GBM



Altieri 2023 J Neurooncol

•15

PET/MR

[^{11}C]methionine PET vs. MRI for GBM

- 47 pts. with preop. PET & MRI 2014 – 1/2021

Table 2 Radiological and Histopathological findings correlations

	EN	FLAIR
PET	>70.21%	>23.4%
5-ALA	Lava-like fluorescence	Faint fluorescence
Pathological evidences	hypercellularity, increased mitotic activity, necro-	white matter tissue with focal to

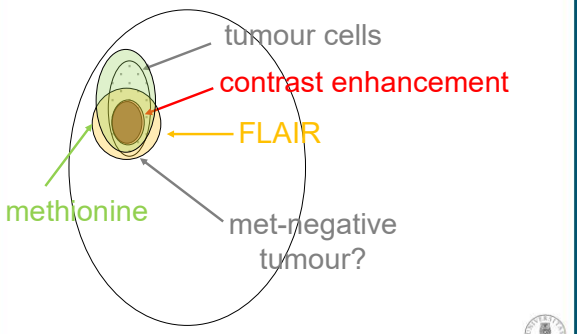
[^{11}C]methionine PET finds extra areas of GBM cell infiltration in 23 % of pts.

Altieri 2023 J Neurooncol

•16

PET/MR

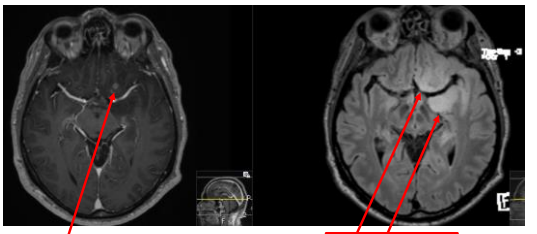
[^{11}C]methionine PET vs. MRI for GBM



•17

PET/MR

[^{11}C]methionine PET/MR m 69 y. seizures

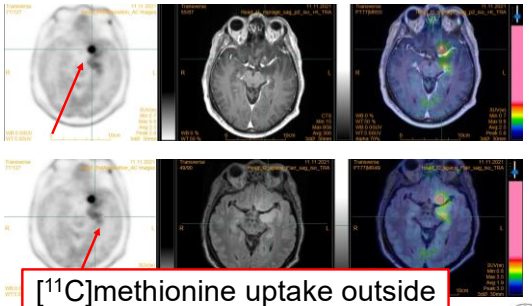


HUS_met_MR_010

•18

PET/MR

[^{11}C]methionine PET/MR m 69 y. GBM



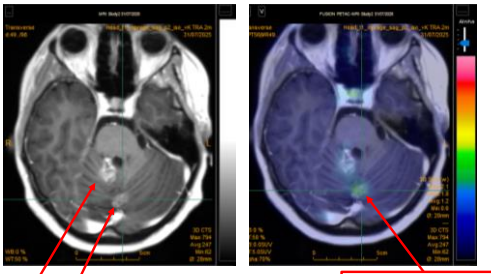
[^{11}C]methionine uptake outside high signal in FLAIR

010

•19

PET/MR

[^{18}F]FDOPA f 17 y. pilocytic astrocytoma



Contrast enhancement

Tracer uptake

HUS_FDOPA_007

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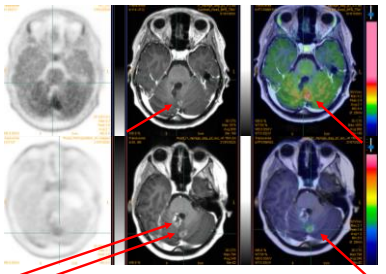
•20

PET/MR

[^{18}F]FDOPA f 17 y. pilocytic astrocytoma

2026

2025



Contrast enhancement

Tracer uptake

HUS_FDOPA_007

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PET/MR

PET for gliomas

- State of the art = PET/MR
- Amino acids superior to [^{18}F]FDG:
  - [^{11}C]metionin most established esp. for children
  - [^{18}F]FET
  - [^{18}F]FDOPA almost as good, but cheaper:
    - Half life ^{18}F 2 hours vs. ^{11}C 20 min
    - More indications: pheochromocytoma, medullary thyroid cancer…
  - [^{18}F]FACBC…
- Indications:
  - Glioma recurrence vs. pseudo progression
  - Preoperative Dx of GBM?

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