

Image-Guided Oncologic Surgery: Mass Spectrometry Imaging

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Mass Spectrometry Imaging Applications

Surgical Margins

Tumor versus non-tumor tissue

Molecular Classification of Brain Tumors

- Tumor typeGrade
- Behavior (recurrence/progression)
- > Intraoperative
- > ... prediction of response to targeted therapy

Drug Distribution and Metabolism

Pre-clinical and upcoming clinical studies

To access diseased tissue while preserving healthy surrounding brain.

SURGICAL MARGINS

























3D Visualization in Slicer

Histopathology Tumor cell concentration





Agar, NYR., Golby, AJ, Ligon, KL, Norton, I, Mohan, V, Wiseman, JM, Tannenbaum, A, and Jolesz, FA (2011) Neurosurgery. Development of Stereotactic Mass Spectrometry for Brain Tumor Surgery. 68(2):280-89; discussion 290

MOLECULAR CLASSIFICATION OF BRAIN TUMORS





















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VALIDATION SAMPLES	5	Subtype	•		Grade		Cor	ncentra	tion
				%					
Name WHO Diagnosis	Α	OA	0	Ш	III	IV	low	med	high
G4 A3; med							3	96	1
G6 A4; high	100	0	0				1	84	15
G8 A4; recurrent A4	98	0	2						
*G26 A4; recurrent OA3	100	0	0	0	0	99			
G28 A4				0	8	92			
G32 A4; recurrent A4	94	0	6	16	33	51	48	9	43
*G33 A4; high	45	5	49	21	36	43	1	1	98
G48 A4; focal gliosarcoma	98	1	1	2	91	7		-	-
G35 A4; high							19	20	61
G30 A4-O; recurrent; high	100	0	0				4	14	82
G46 A4-O recurrent A3	30	60	10	2	12	86			
G29 A4-O; recurrent OA3	69	0	31	32	36	32	77	17	6
G5 A4-O; high (80%)	42	32	26				12	84	4
G47_O A4-O; recurrent O2	43	17	40	65	0	35			
G47_1 A4-O; recurrent O2	55	0	45	100	0	0			
G42_0 O2 focal O3; High							1	10	89
G49 O2; gemistocytes	37	14	49	90	10	0			
G41 O2/3; recurrent O2	3	2	96	33	67	0	0	0	100
G20 OA2; residual A2; med (30%)	0	0	100	90	5	5	89	2	9
G13 OA2-3: recurrent OA2-3				2	98	0			











SampleID	Class GL	Class MG	Class A	Class OA	Class O	Class gr2	Class gr3	Class gr4	Class low	Class med	Class high
case2_S10 (B)	96	0	0	0	96	14	57	25	41	55	0
case2_S11 (A)	56	0	0	0	56	15	29	12	23	33	0
case2_S12 (C)	59	5	29	0	35	64	0	0	5	59	0
case2_S13 (D)	40	2	1	0	41	42	0	0	3	37	2
case2_S14	84	257	20	1	320	327	0	14	0	6	335
case2_S15	11	4	6	0	9	8	4	3	0	9	6
case2_S7	223	11	8	0	226	227	7	- G	radè	231	0
case2_S8	239	61	38	4	258	drog	gliom	na 👷	145	133	22
	808	340	¹⁰²	ligo	9641	870	192	86	220	563	365
	Path	1010	gγ.	-							
								Manu	script in	prepara	tion.













CHEMICAL BRAIN MAPPING

r La Contraction de la contrac	17 Brain Regions 4 Subjects 1,768 tissue sections!!
Inferior Temporal	Calcarine
Hippocampus	Medial Orbital Frontal
Substantia Nigra	Mid Frontal
Caudate Head	Superior Frontal
Cingulate	Motor
Posterior Putamen	Ventromedial Prefrontal
Posterior Putamen Amygdala	Ventromedial Prefrontal Posterior Parietal
Posterior Putamen Amygdala Anterior Insula	Ventromedial Prefrontal Posterior Parietal Angular Gyrus











Continued development...

MENINGIOMAS BRAIN METASTASES DRUG DISTRIBUTION AND METABOLISM BREAST CANCER

