



UNIVERSITÀ DEGLI STUDI DI MILANO

FACOLTÀ DI MEDICINA E CHIRURGIA
SCUOLA DI SPECIALIZZAZIONE IN FISICA MEDICA

Determination of Isocitrate Dehydrogenase (IDH) Status in Brain Gliomas Using Edited in Vivo Magnetic Resonance Spectroscopy (MRS): a Clinical Feasibility Study

Relatore:
Prof.ssa Cristina Lenardi

Candidato:
Paolo Tiberio

Correlatori:
Dott.ssa Antonella Castellano
Dott.ssa Antonella del Vecchio

Anno Accademico 2020-2021

Contents

1	Introduction	6
1.1	MR spectroscopy of brain tumors in adults	6
1.1.1	Brain gliomas and new World Health Organization classification	12
1.2	Fundamentals of Magnetic Resonance Spectroscopy (MRS)	14
1.2.1	Chemical shift	15
1.2.2	J-coupling	17
1.3	Acquisition schemes	23
1.3.1	Single-voxel techniques	23
1.3.2	Multiple-voxel techniques: SI or CSI	26
1.3.3	MEGA-PRESS	30
1.4	Aims of this study	38
2	Materials and Methods	41
2.1	MRS data acquisition and patients' description	41
2.2	Spectral processing	45
2.3	Statistical analysis and tools	49
3	Results	51
4	Discussion	65