Supporting Information

A comparison of exogenous and endogenous CEST MRI methods for evaluating *in vivo* pH

Leila R. Lindeman,[1] Edward A. Randtke,[2] Rachel A. High,[1]
Kyle M. Jones,[3] Christine M. Howison,[2] and Mark D. Pagel[1,2,3,4]

1. Cancer Biology Graduate Interdisciplinary Program, University of Arizona Cancer Center, Tucson, AZ, USA
2. Department of Medical Imaging, University of Arizona, Tucson, AZ, USA
3. Department of Biomedical Engineering, University of Arizona, Tucson, AZ, USA
4. Department of Cancer Systems Imaigng, University of Texas MD Anderson Cancer Center, Houston, TX

*Author to whom correspondence should be addressed
Mark D. Pagel, Ph.D.
Telephone: 713-205-8515
FAX: 713-745-7540
Email: mdpagel@mdanderson.org

Methods

Supporting Table S1 lists the acquisition parameters for each MRI scan.

Supporting Table S1: Parameters for MRI scans, listed by murine model.

Parameter	**Kidney**	**Flank Tumor**	**Lung Tumor**
Anatomical Scans			
Scan Type	MSME	RARE	RARE
TR	1199 ms	1075.57 ms	1075.57 ms
TE	10.6 ms, 21.3 ms	12.7	12.7 ms
Excitation flip angle	180.0°	180.0°	180.0°
In-plane spatial resolution	0.0469 cm/pixel	0.0453 cm/pixel	0.0453 cm/pixel

Matrix size	128 × 128	128 × 128	128 × 128
FOV (cm)	6 × 4	5.8 × 5.8	5.8 × 5.8
Slice Thickness	1 mm	1 mm	1 mm
Number of Slices	10	6	6
RARE Factor	n/a	1	1
Number of averages	1	1	1
Total acquisition time	2:33 (minutes: seconds)	2:17 (minutes: seconds)	2:17 (minutes: seconds)
acidoCEST MRI Scans			
Scan Type	CEST-FISP with respiration gating	CEST-FISP with respiration gating	CEST-FISP with respiration gating
TR	3.7 ms	3.7 ms	3.7 ms
TE	1.6 ms	1.6 ms	1.6 ms
Flip Angle	15°	15°	15°
Spatial Resolution	0.0453	0.0453	0.0453
Matrix Size	128 × 128	128 × 128	128 × 128
FOV (cm)	5.8 × 5.8	5.8 × 5.8	5.8 × 5.8
Slice Thickness	2 mm	2 mm	2 mm
Number of Slices	1	1	1
Number of Averages	1	1	1
Saturation Power	3.5 μT	3.5 μT	3.5 μT
Saturation Time	600 ms	600 ms	600 ms
Number of Saturation Frequencies	40	40	40
Saturation Frequency range (increment), Hz	-3300 to -900 (600), -750 to 750 (150), 810 to 2700 (90), 3000 to 3300 (300)	-3300 to -900 (600), -750 to 750 (150), 810 to 2700 (90), 3000 to 3300 (300)	-3300 to -900 (600), -750 to 750 (150), 810 to 2700 (90), 3000 to 3300 (300)
Number of CEST Spectra	4 pre-injection, 6 post-injection	3 pre-injection, 5 post-injection	4 pre-injection, 6 post-injection
Acquisition time for one CEST spectrum (minutes:seconds)	4:14 (plus additional time caused by variable respiration)	4:14 (plus additional time caused by variable respiration)	4:14 (plus additional time caused by variable respiration)
Total acquisition time (minutes:seconds)	42:22 (plus additional time caused by variable respiration)	33:53 (plus additional time caused by variable respiration)	42:22 (plus additional time caused by variable respiration)

endogenous CEST MRI Scans			
Scan Type	CEST-FISP with respiration gating	CEST-FISP with respiration gating	CEST-FISP with respiration gating
TR	3.7 ms	3.7 ms	3.7 ms
TE	1.6 ms	1.6 ms	1.6 ms
Flip Angle	6.3°	6.3°	6.3°
Spatial Resolution	0.0453	0.0453	0.0453
Matrix Size	128 × 128	128	128 × 128
FOV (cm)	5.8 × 5.8	5.8 × 5.8	5.8 × 5.8
Slice Thickness	2 mm	2 mm	2 mm
Number of Slices	1	1	1
Number of Averages	1	1	1
Saturation Power	1.0, 1.5, 2.0 μT	1.0, 1.5, 2.0 μT	1.0, 1.5, 2.0 μT
Saturation Time	600 ms	600 ms	600 ms
Saturation Frequencies	750, 1050,1350 Hz	750, 1050,1350 Hz	750, 1050,1350 Hz
Number of CEST Spectra	9 (3 powers x 3 freq.)	9 (3 powers x 3 freq.)	9 (3 powers x 3 freq.)
Acquisition time for one CEST spectrum (minutes:seconds)	19.421 s (plus additional time caused by variable respiration)	19.421 s (plus additional time caused by variable respiration)	19.421 s (plus additional time caused by variable respiration)
Total acquisition time (minutes:seconds)	2:55 (plus additional time caused by variable respiration)	2:55 (plus additional time caused by variable respiration)	2:55 (plus additional time caused by variable respiration)