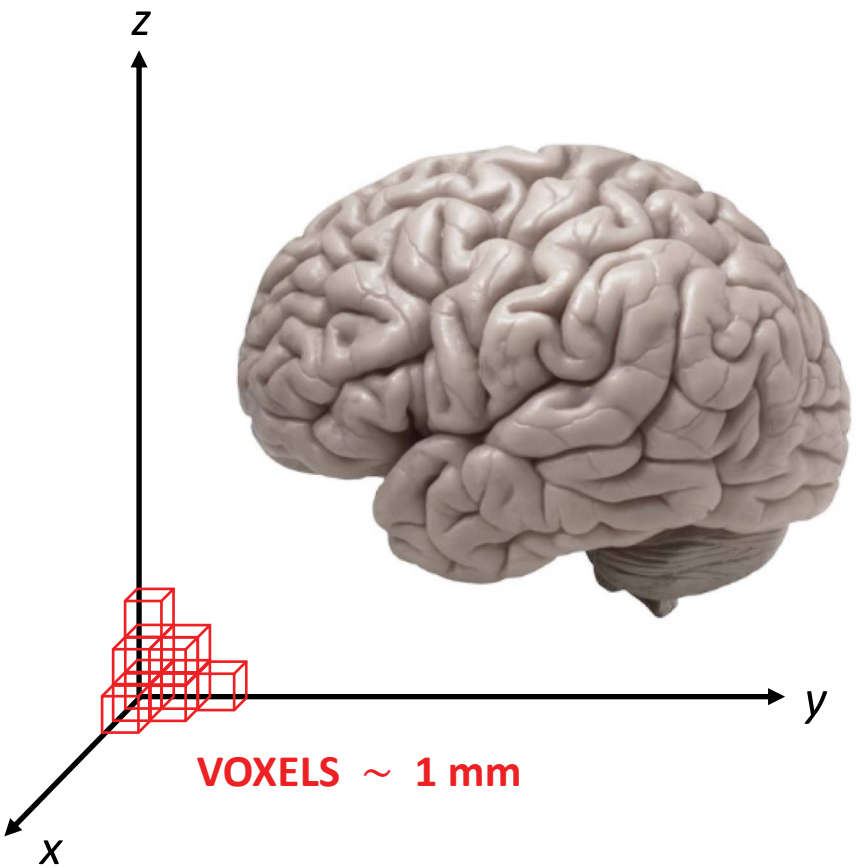
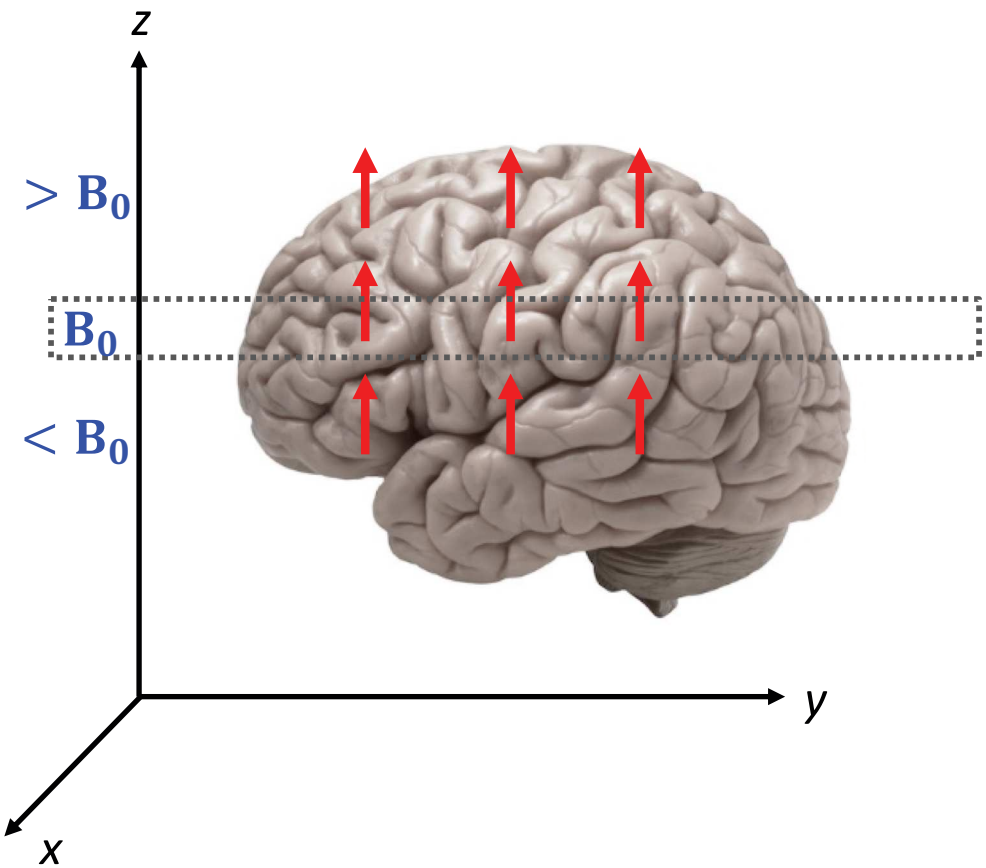
Applications : IRM / SRM

Imagerie : IRM



Applications : IRM / SRM

Imagerie : IRM

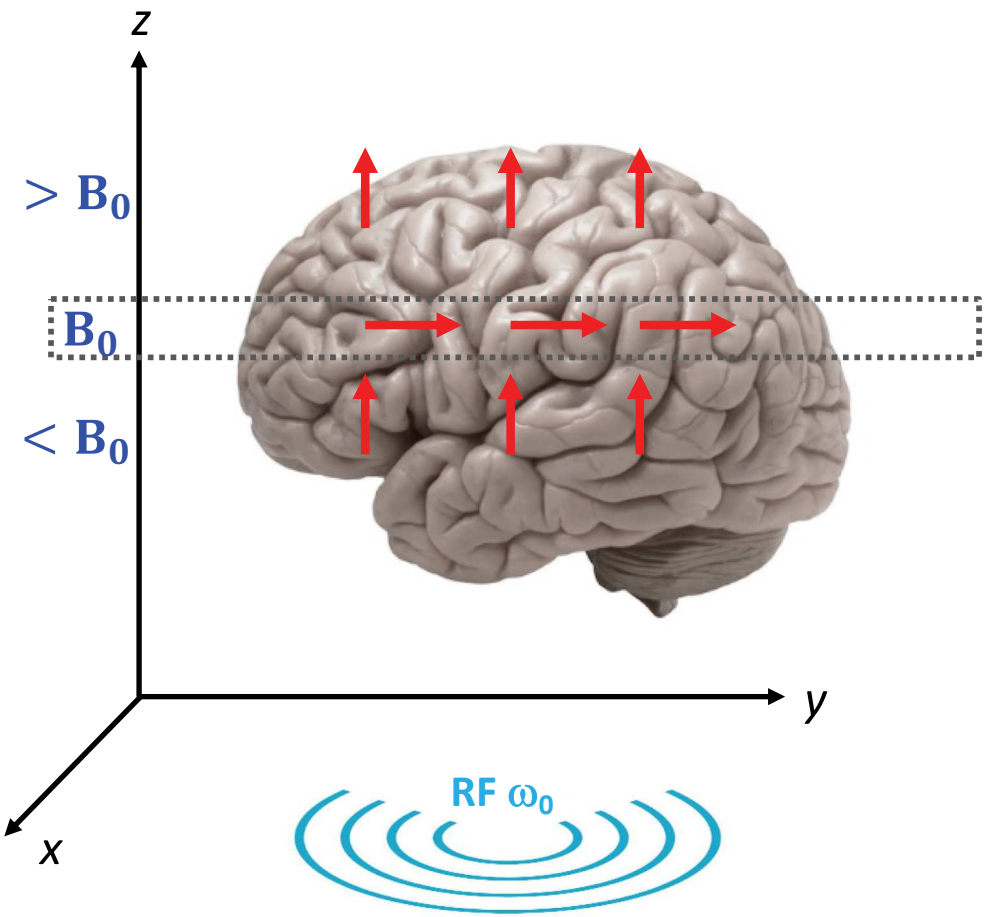


B_0 variable

> gradient d'encodage

Applications : IRM / SRM

Imagerie : IRM

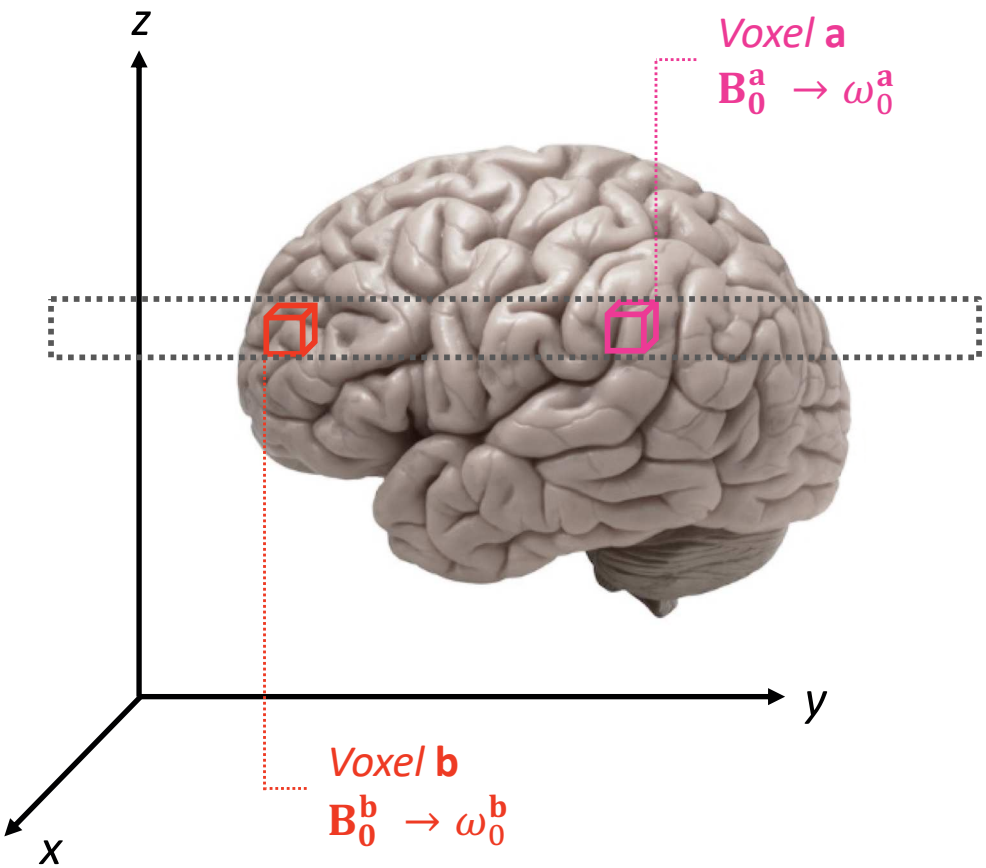


B_0 variable

> *gradient d'encodage*

Applications : IRM / SRM

Imagerie : IRM



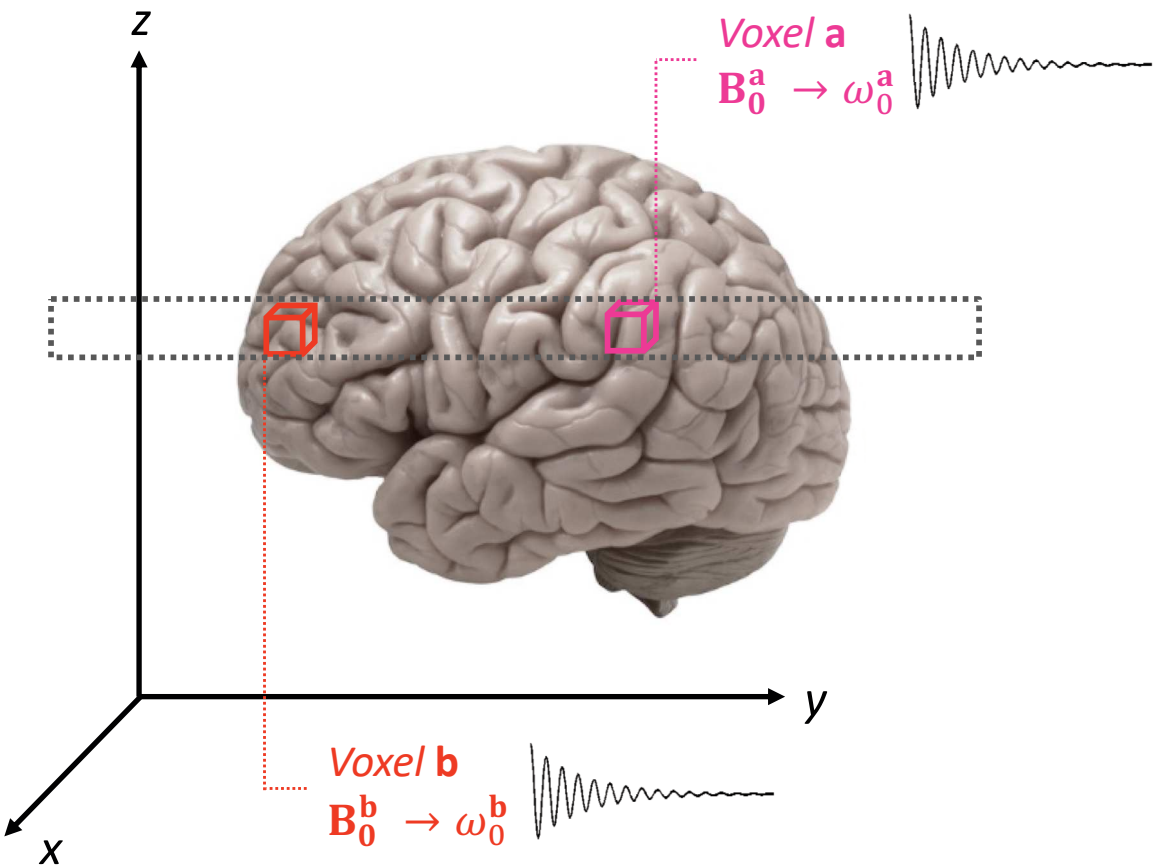
$\mathbf{B_0}$ variable

> *gradient d'encodage*

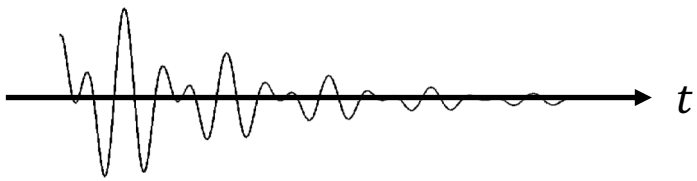
> *gradient de lecture*

Applications : IRM / SRM

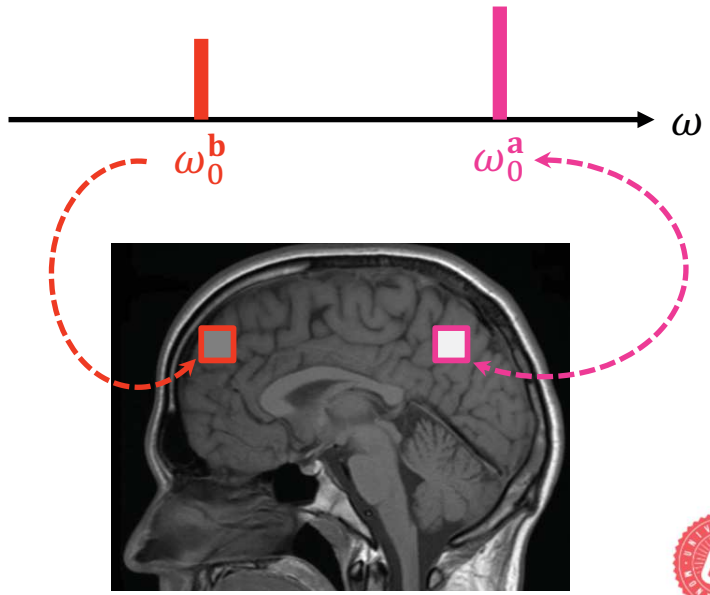
Imagerie : IRM



FID = signal (**a**) + signal(**b**)



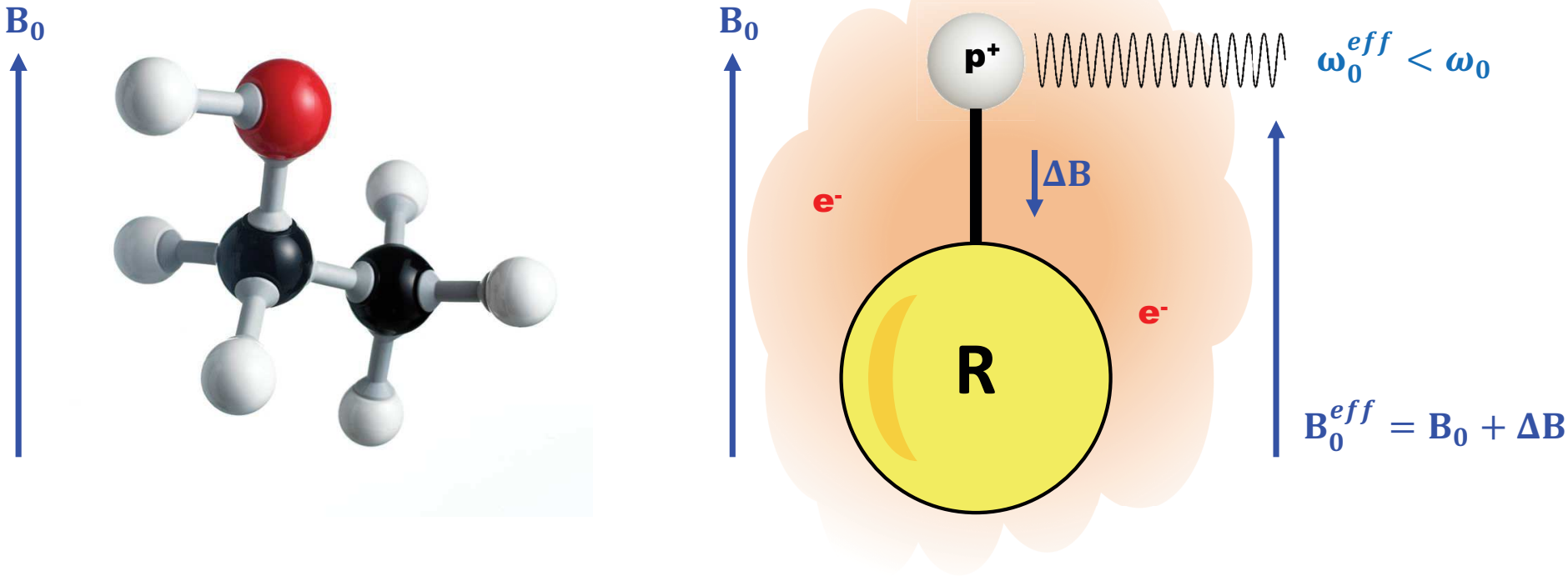
Spectre (**FID**)



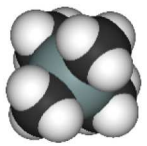
Applications : IRM / SRM

Spectroscopie : SRM

Ethanol **CH_3-CH_2-OH**



Déplacement chimique : $\delta = 10^6 \frac{\omega_0^{eff} - \omega_0^{ref}}{\omega_0}$ [ppm]

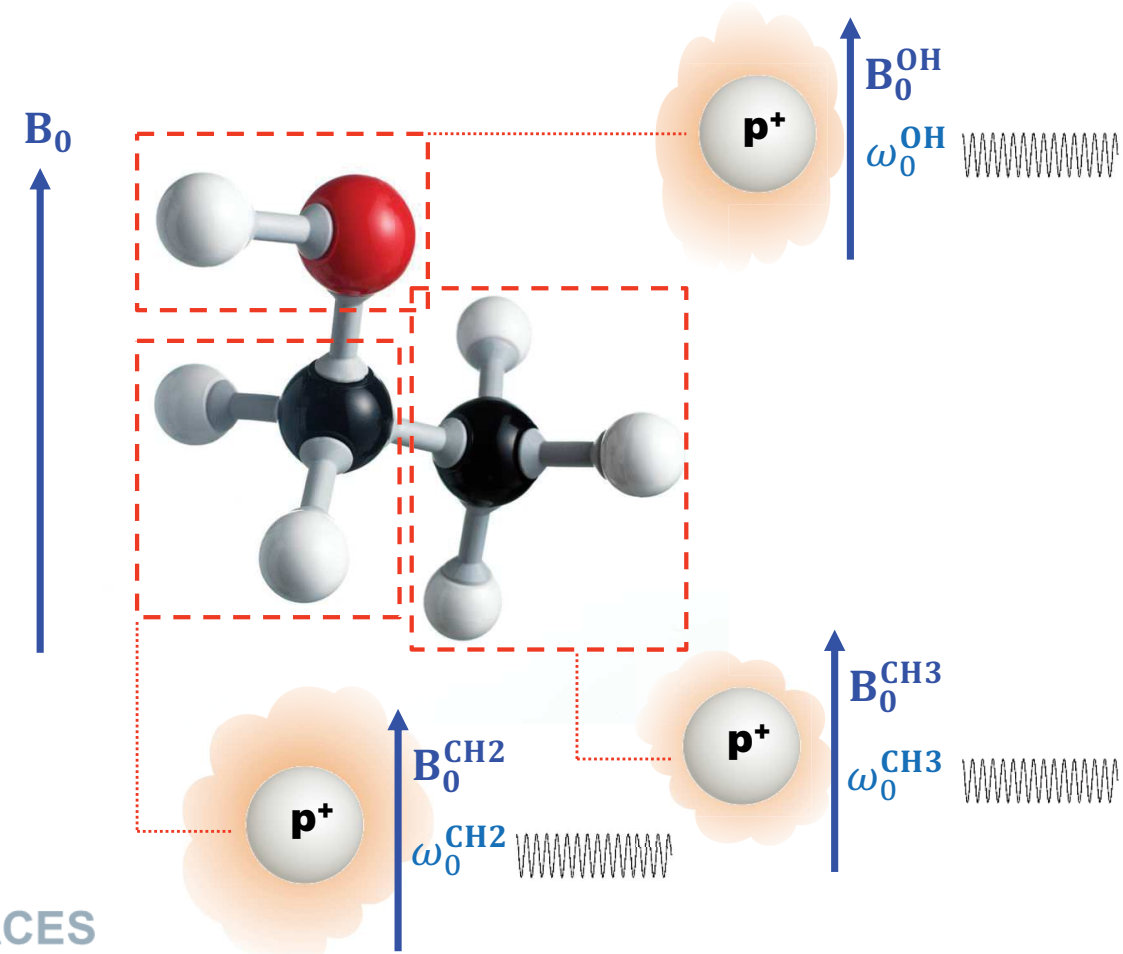


ω_0^{ref}

Applications : IRM / SRM

Spectroscopie : SRM

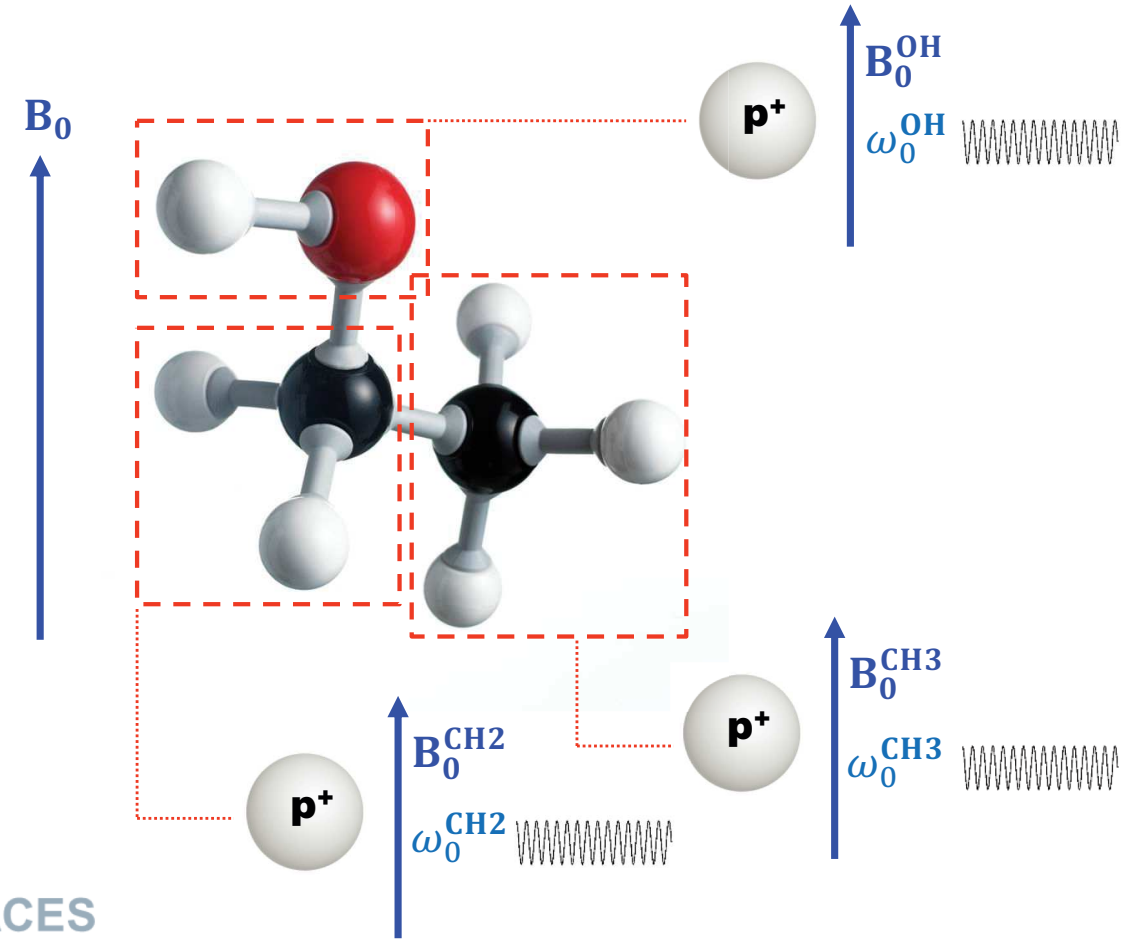
Ethanol **CH_3-CH_2-OH**



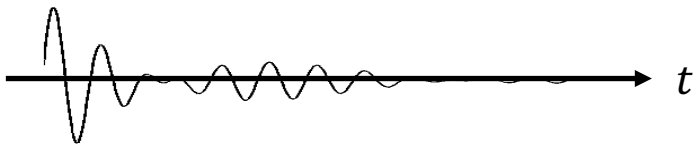
Applications : IRM / SRM

Spectroscopie : SRM

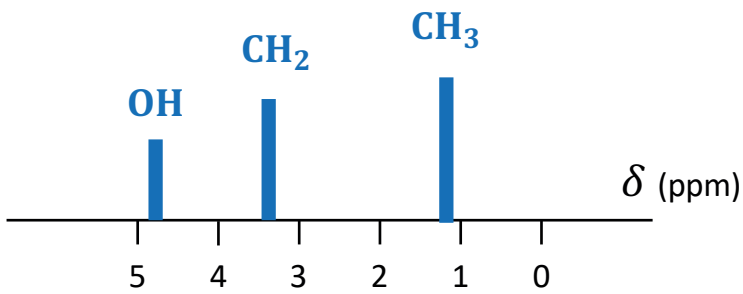
Ethanol **CH_3-CH_2-OH**



FID = signal (**OH**) + signal(**CH_2**) + signal(**CH_3**)

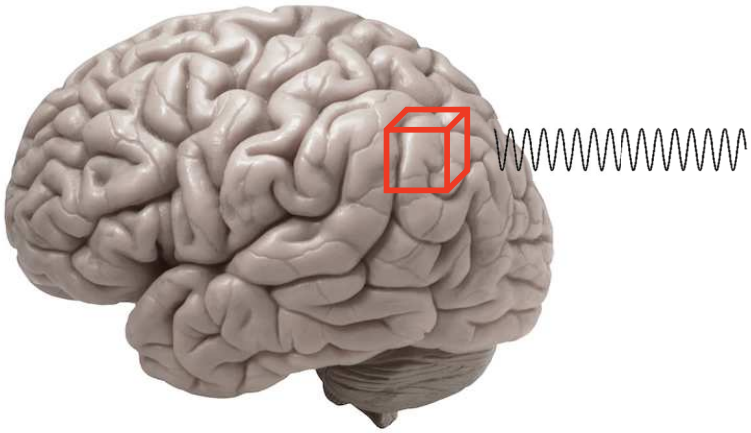


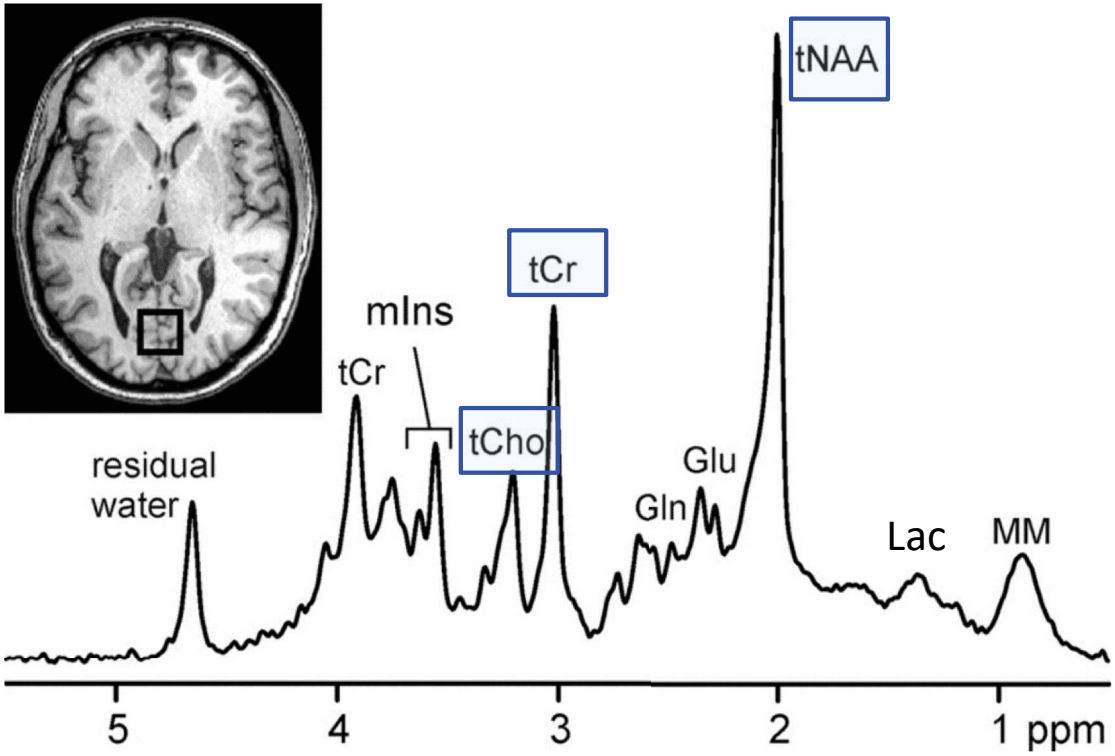
Spectre (**FID**)



Applications : IRM / SRM

Spectroscopie : SRM

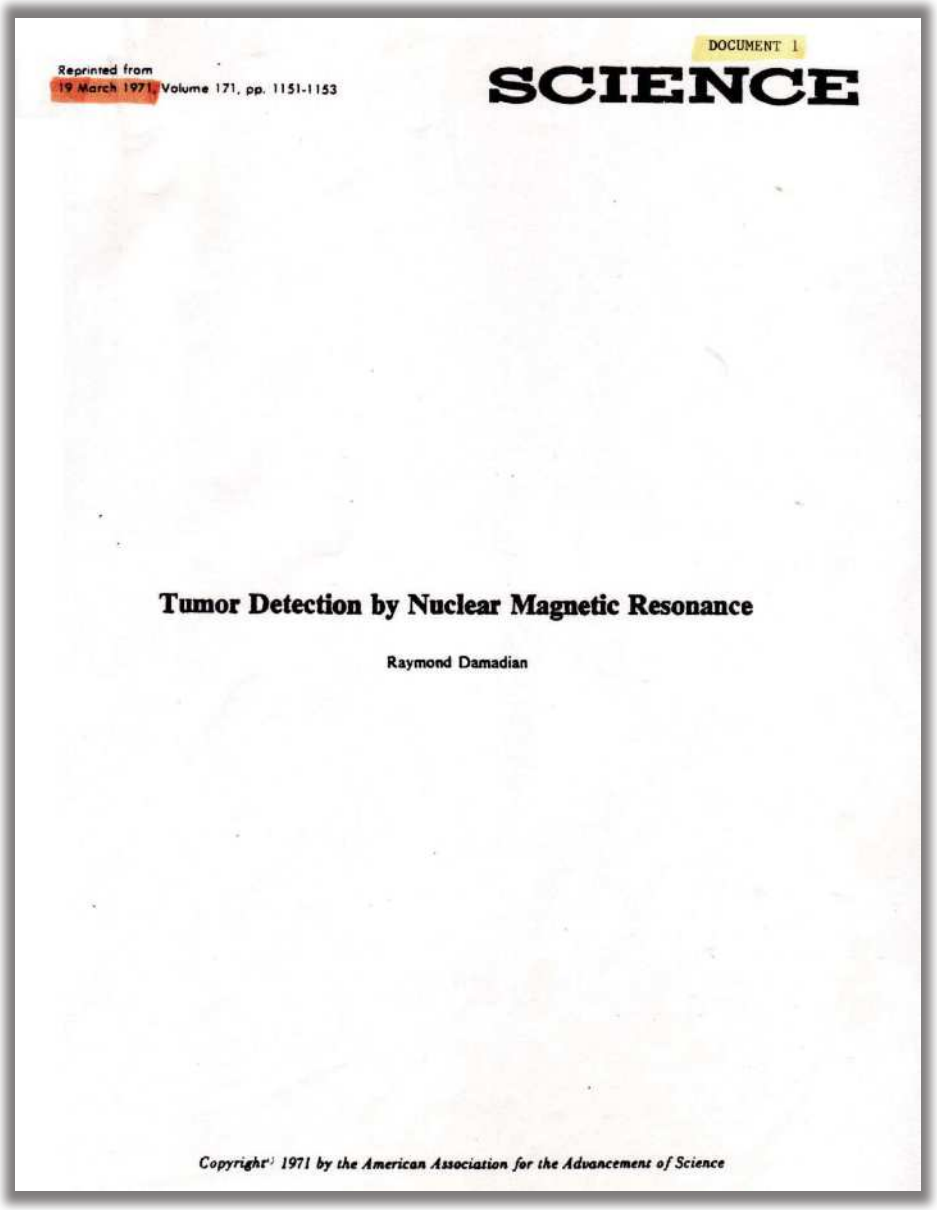




Gülin et al. Radiology 2014.

Cho : choline - catabolisme membranaire
Cr : créatine - métabolisme aérobie
NAA : N-acétylaspartate - viabilité cellulaire
Lac : lactates - métabolisme anaérobie
MM : macro-molécules

IRM – exemples



DOCUMENT 1

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19 March 1971, Volume 171, pp. 1151-1153

SCIENCE

Tumor Detection by Nuclear Magnetic Resonance

Raymond Damadian

IRM – exemples

Table 1. Spin-lattice (T_1) and spin-spin (T_2) ... sues.

Rectus muscle T_1	Rectus muscle T_2	Liver T_1	Liver T_2	Kidney T_1	Brain T_1
0.493	0.050	0.286	0.050	44	0.573
548	050	322	060	03	573
541	050	241	050	23	596
576 (0.600)*	070	306 (0.287)*	048	41 (0.530)*	620 (0.614)
531		300		89	612
0.538 ± 0.015	0.055 ± 0.005	0.293 ± 0.010	0.052 ± 0	480 ± 0.026	0.595 ± 0.007

relaxation time after the specimen stood overnight at room

Table 2. Spin-lattice (T_1) and spin-spin (T_2) relaxation times (in seconds) in tumors.

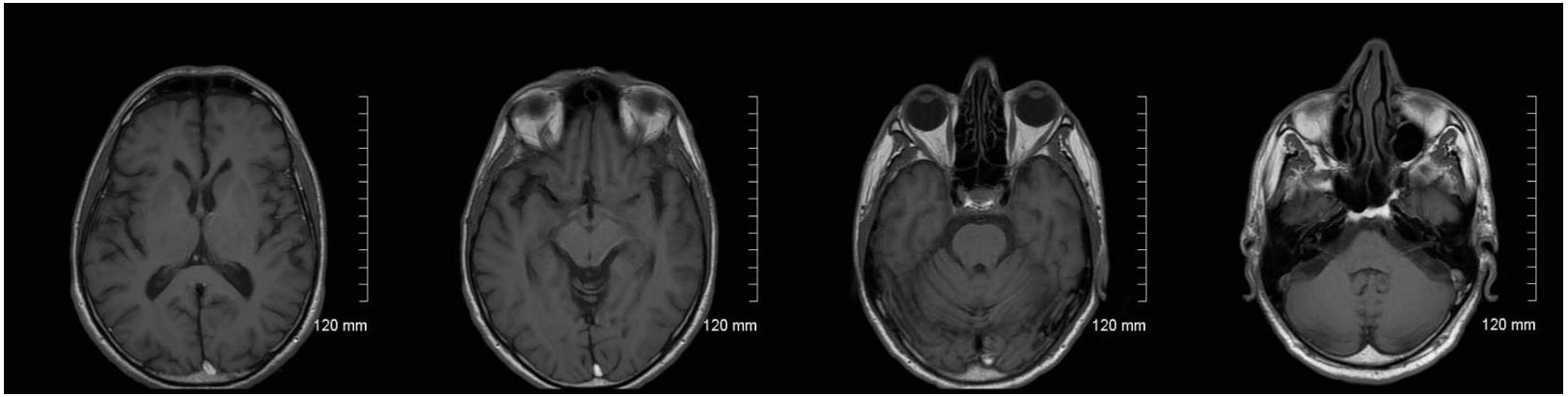
Rat No.	Weight (g)	T_1	T_2
		Walker sarcoma	
6	156	0.700	0.100
7	150	.750	.100
8	495	.794 (0.794)*	.100
9	233	688	
10	255	750	
Mean and S.E.		0.736 ± 0.022	.100
P		< .01†	
		Novikoff hepatoma	
11	155	0.798	0.120
12	160	.852	.120
13	231	827	115
Mean and S.E.		0.826 ± 0.013	0.118 ± 0.002
P		< .01†	
		Fibroadenoma (benign)	
14		0.448	
15		.537	
Mean		.492	
		Distilled water	
		2.691	
		2.690	
		2.640	
Mean and S.E.		2.677 ± 0.021	

* Spin-lattice relaxation time after the specimen stood overnight at room temperature. † The P values are the probability estimates of the significance of the difference in the means of T_1 for the malignant tumor and for brain.

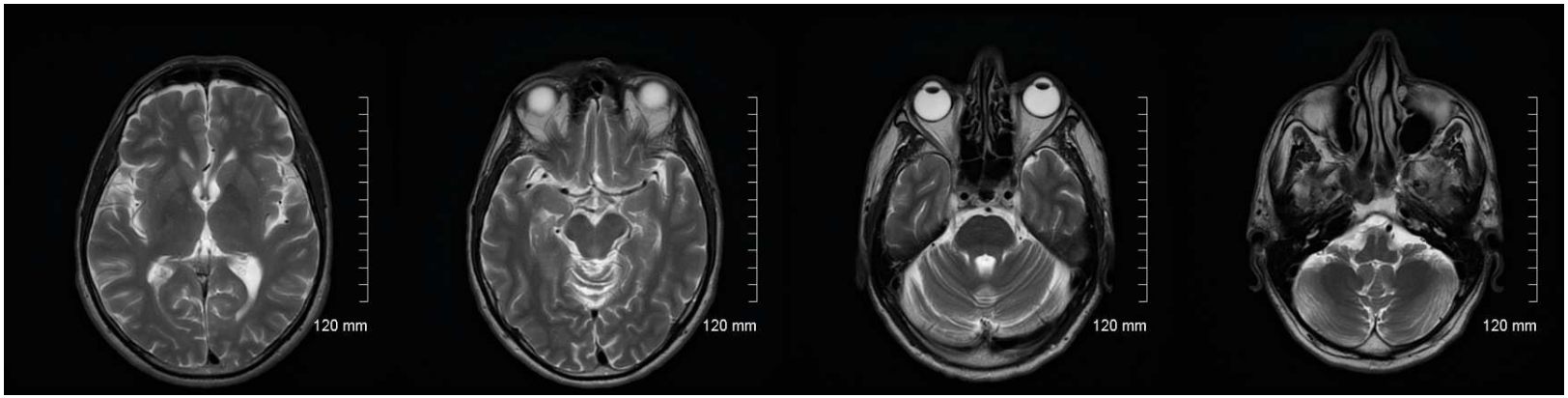
IRM – exemples

T_1 : contraste anatomique
T_2 : contraste « inversé »

T_1



T_2



IRM – exemples

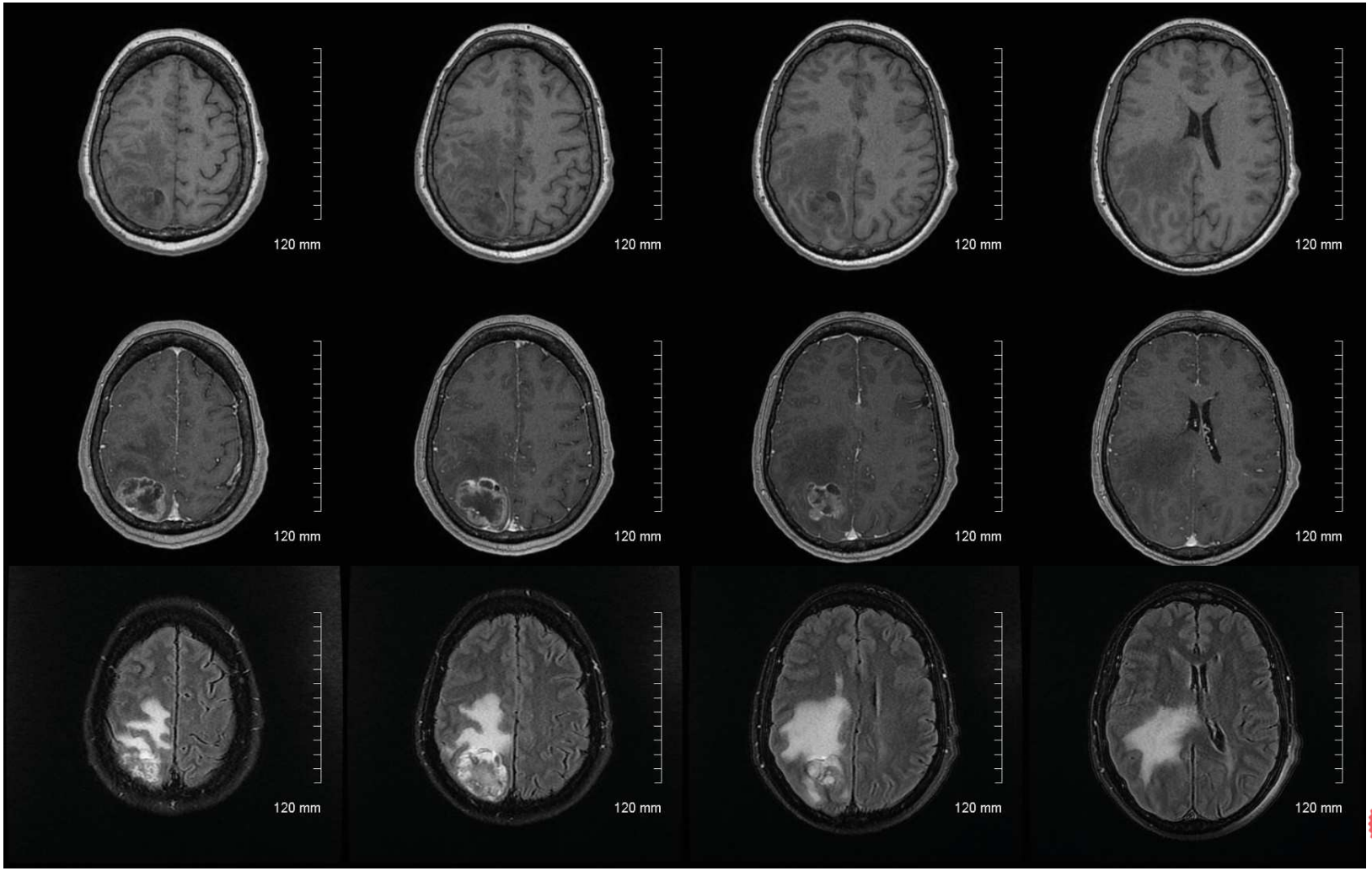
Métastase cérébrale

- Rupture BHE
- Effet de masse
- Œdème

T_1

T_1 gado.

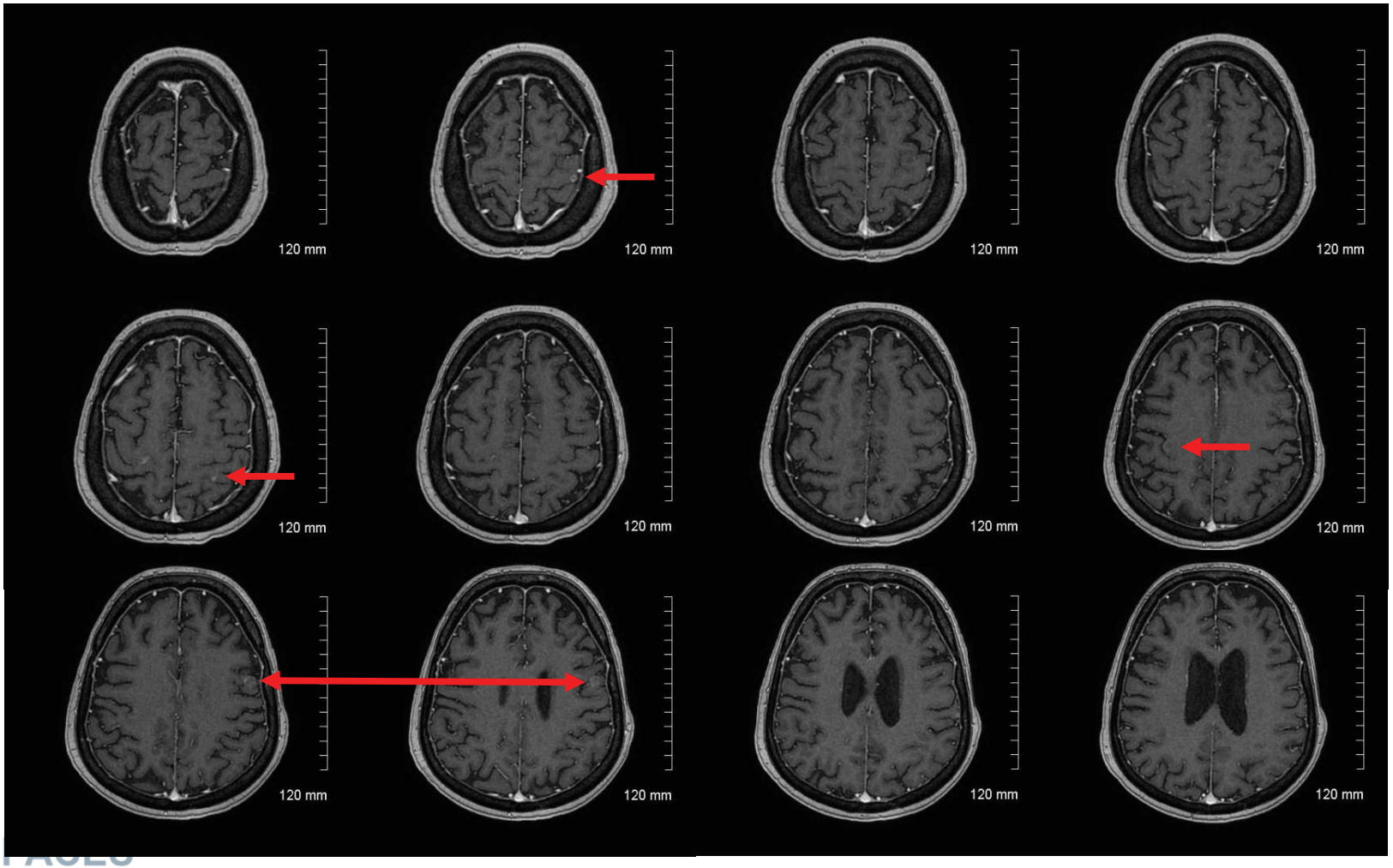
T_2 FLAIR



IRM – exemples

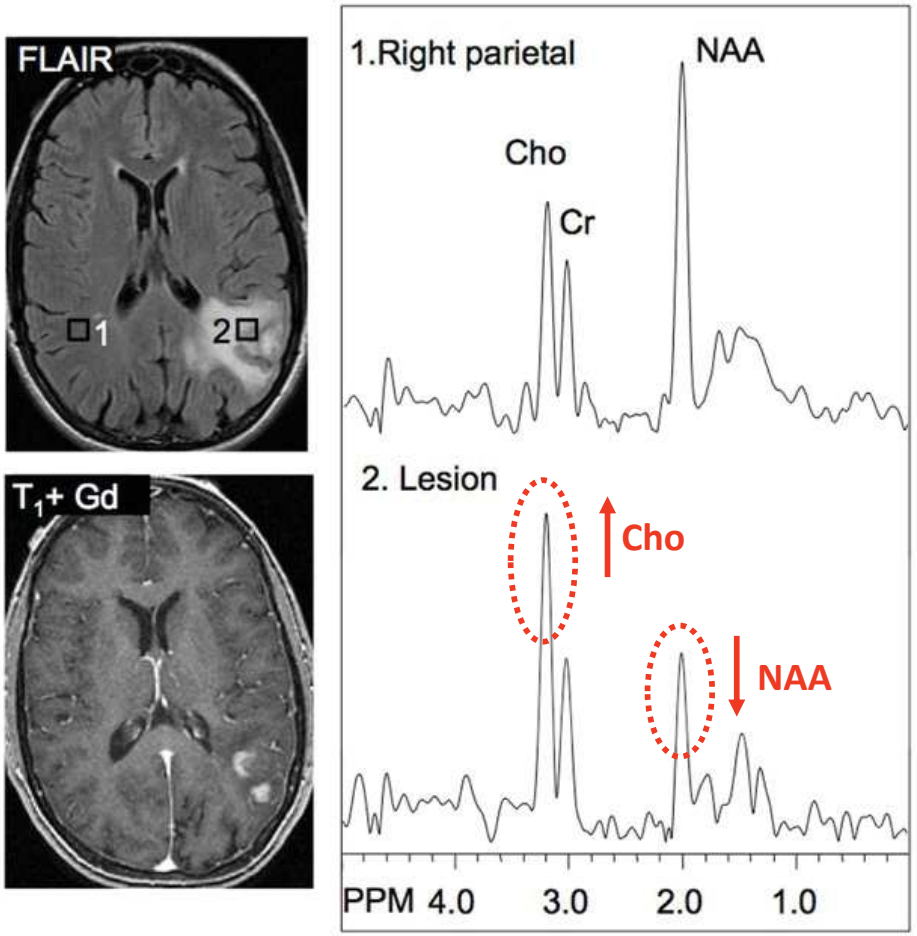
Bilan initial ADK pulmonaire

T_1 gado.

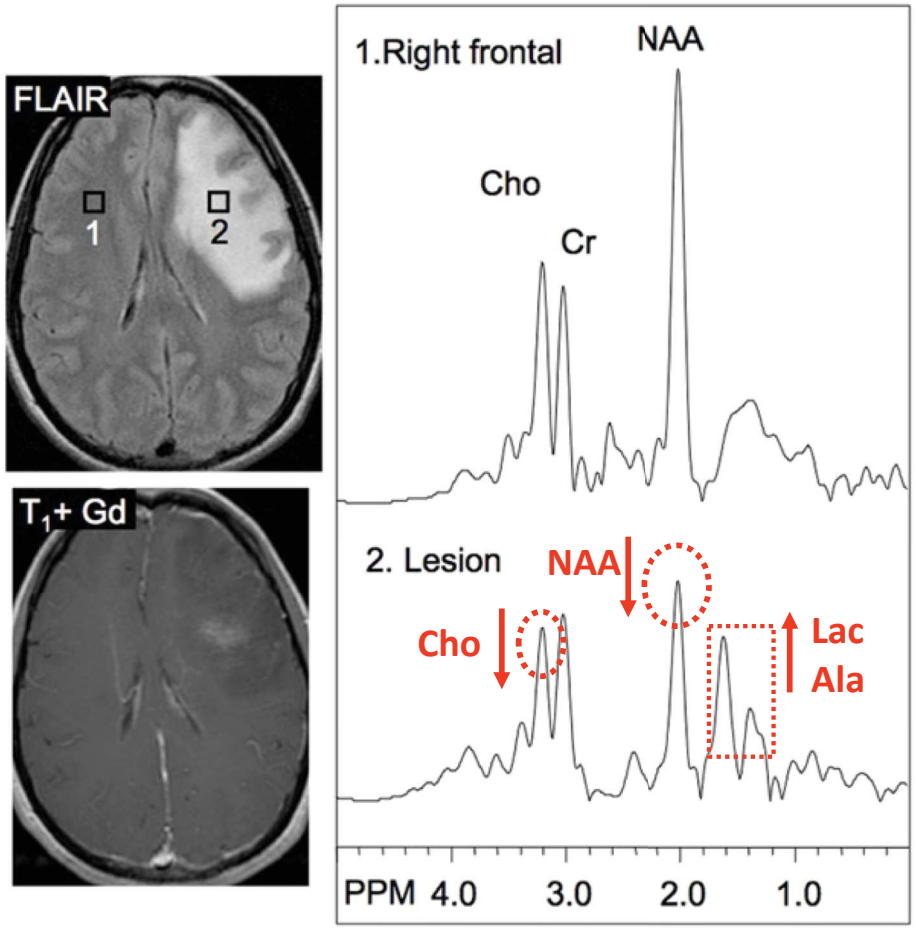


IRM – exemples

Lymphome cérébral



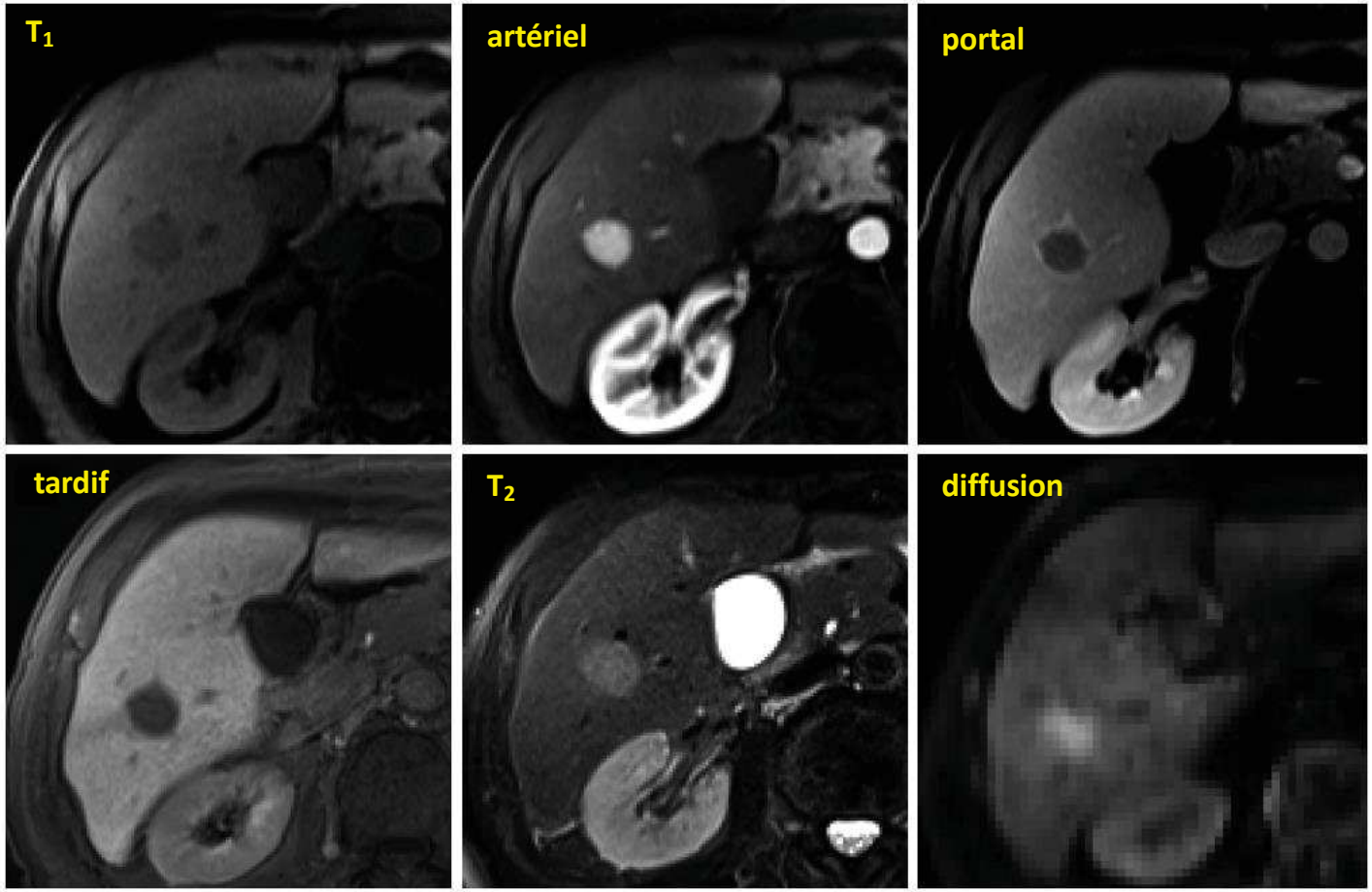
Méningoencéphalite



Horská et al. Neuroimaging Clin N Am 2010.

IRM – exemples

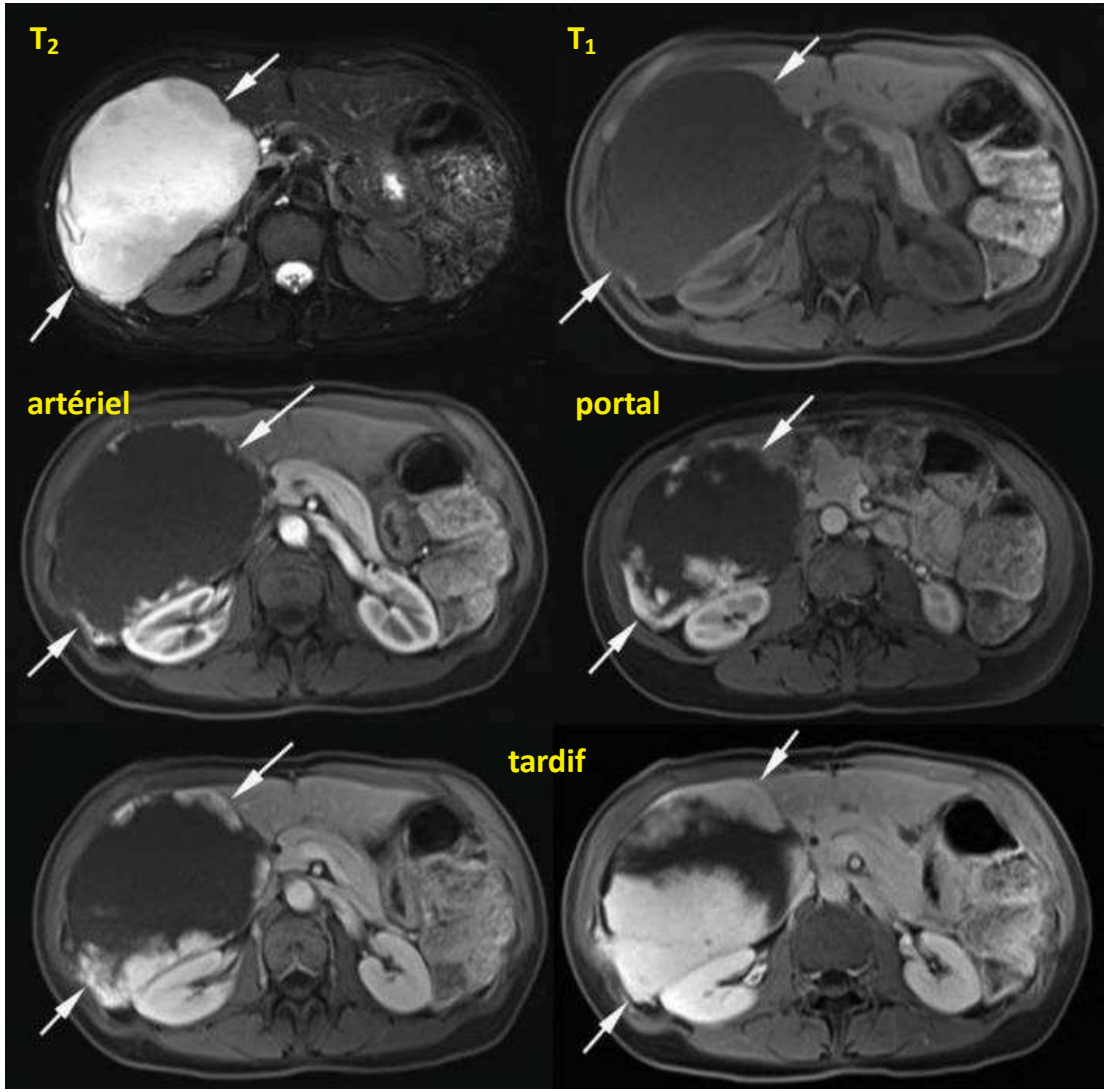
Carcinome hépatocellulaire



Park et al. World J Gastroenterol 2016.

IRM – exemples

Angiome hépatique



SIDES