

Imagerie de
diffusion

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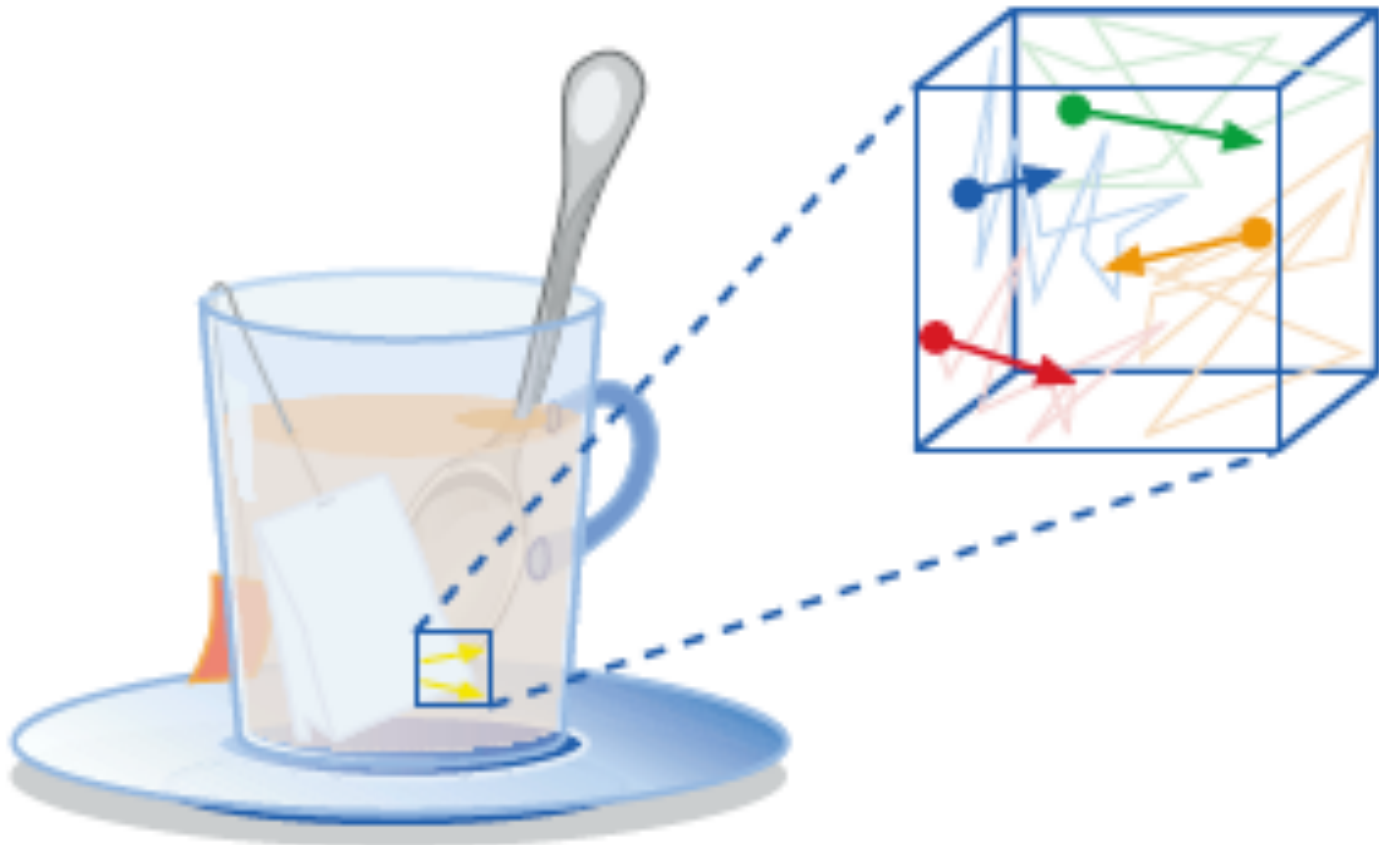
Imagerie de diffusion en IRM

Un excellent moyen de diagnostic méconnu

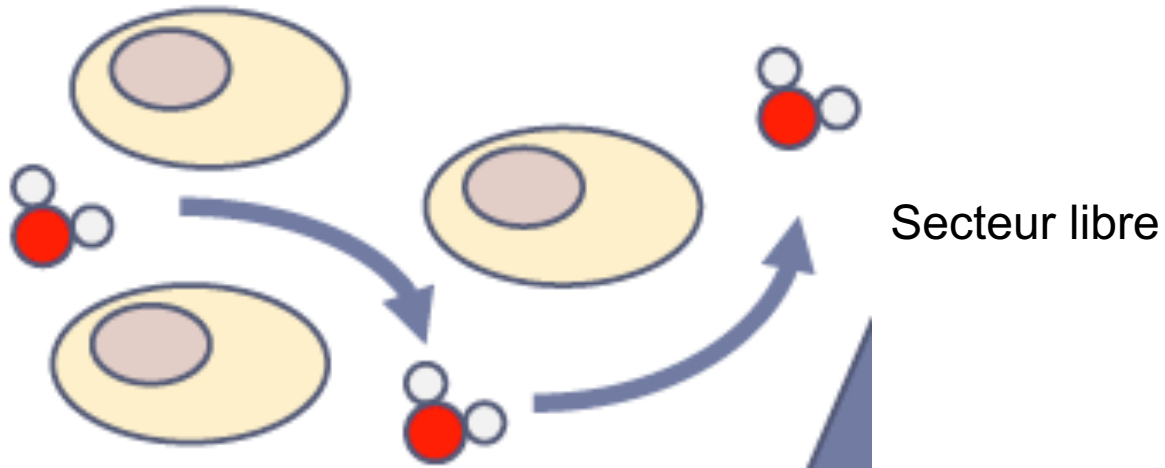
Et si on l'incorporait dans nos examens de routine?

Partie théorique

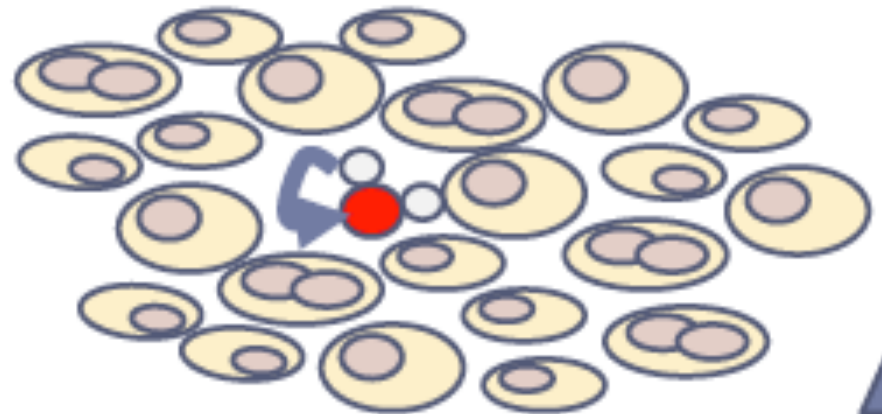
La diffusion



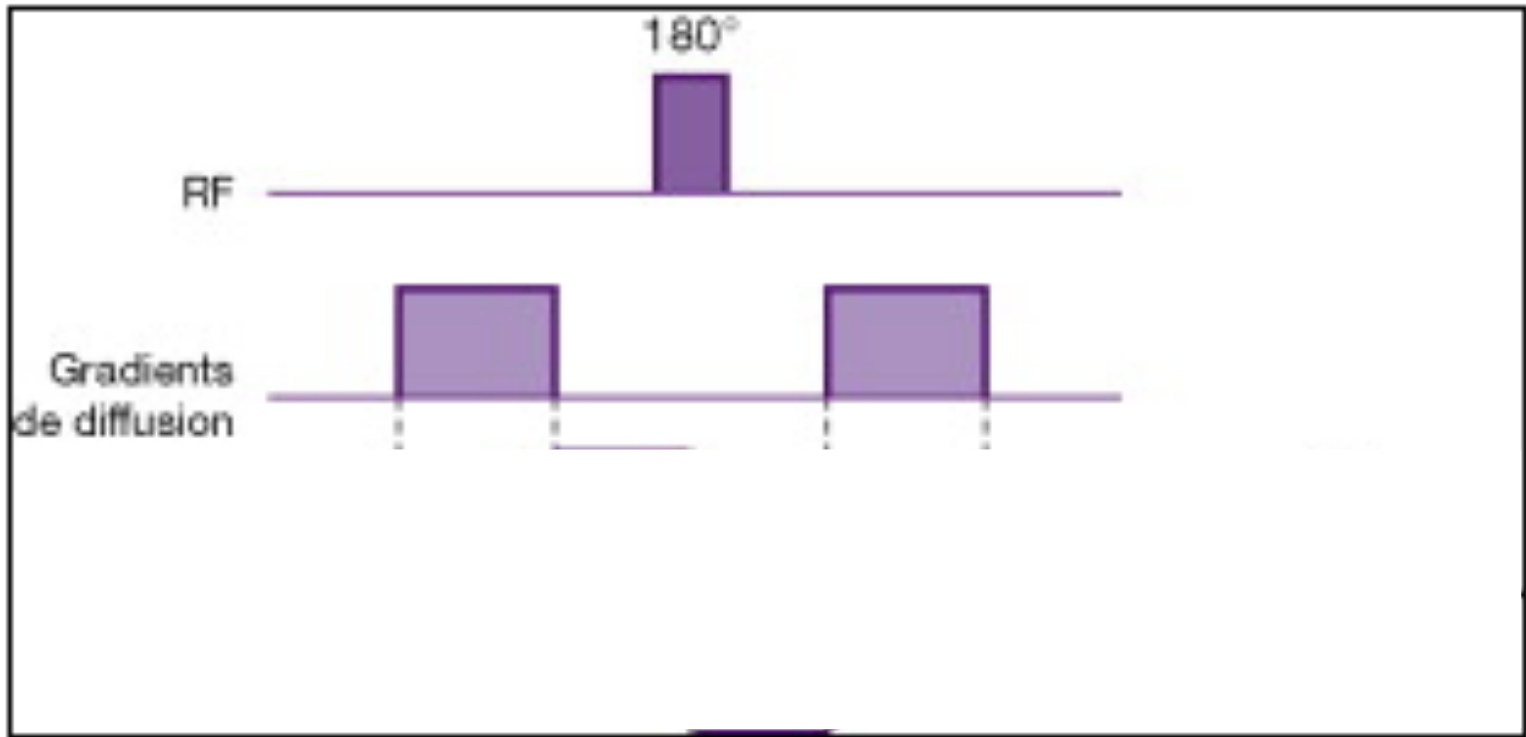
Le mouvement brownien



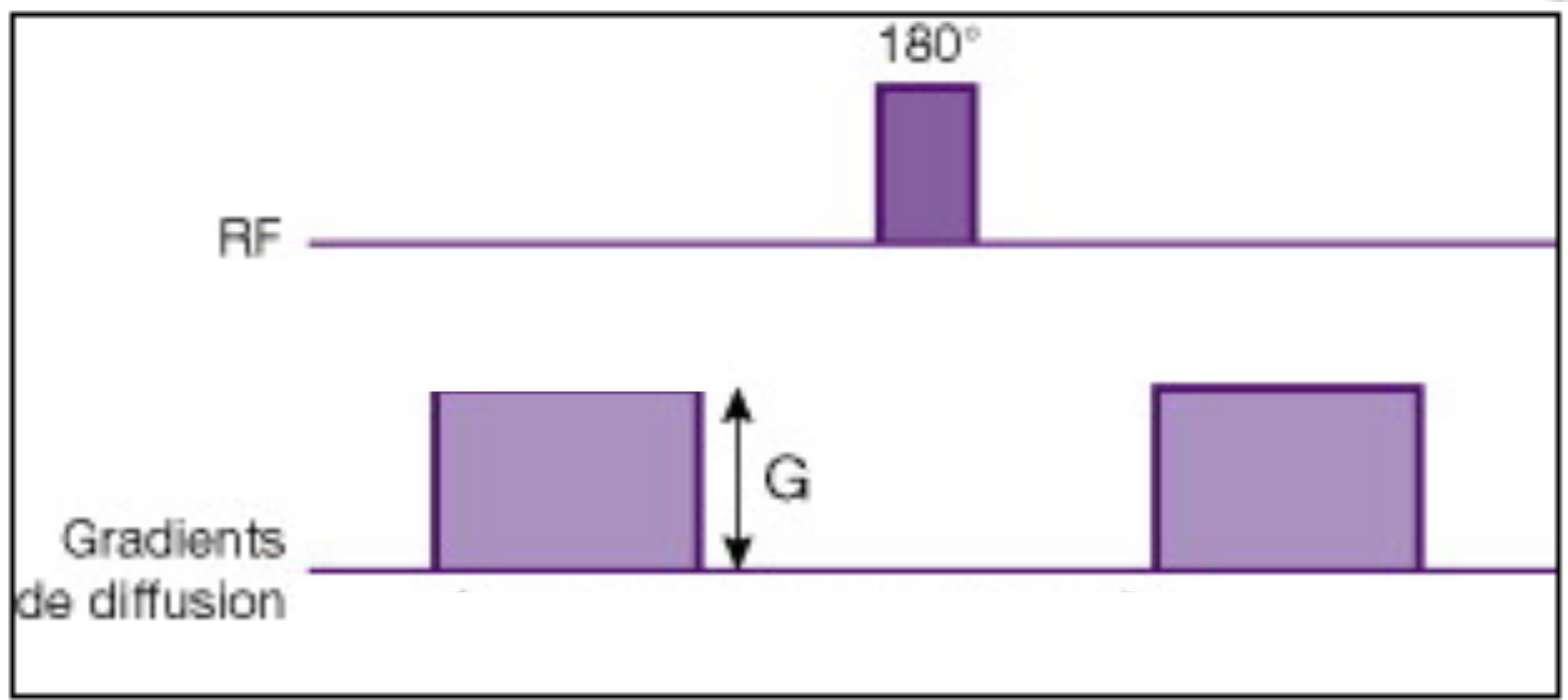
Secteur restreint



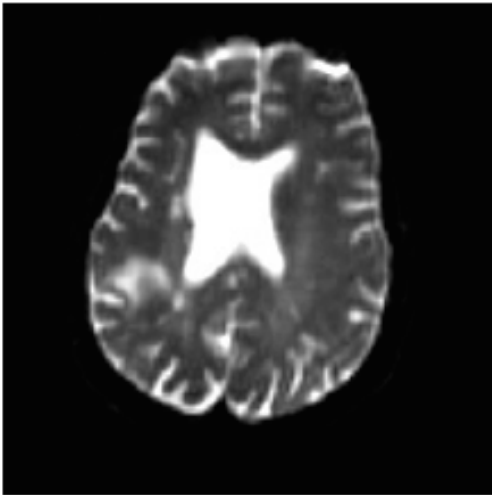
Gradients de diffusion



Le facteur b

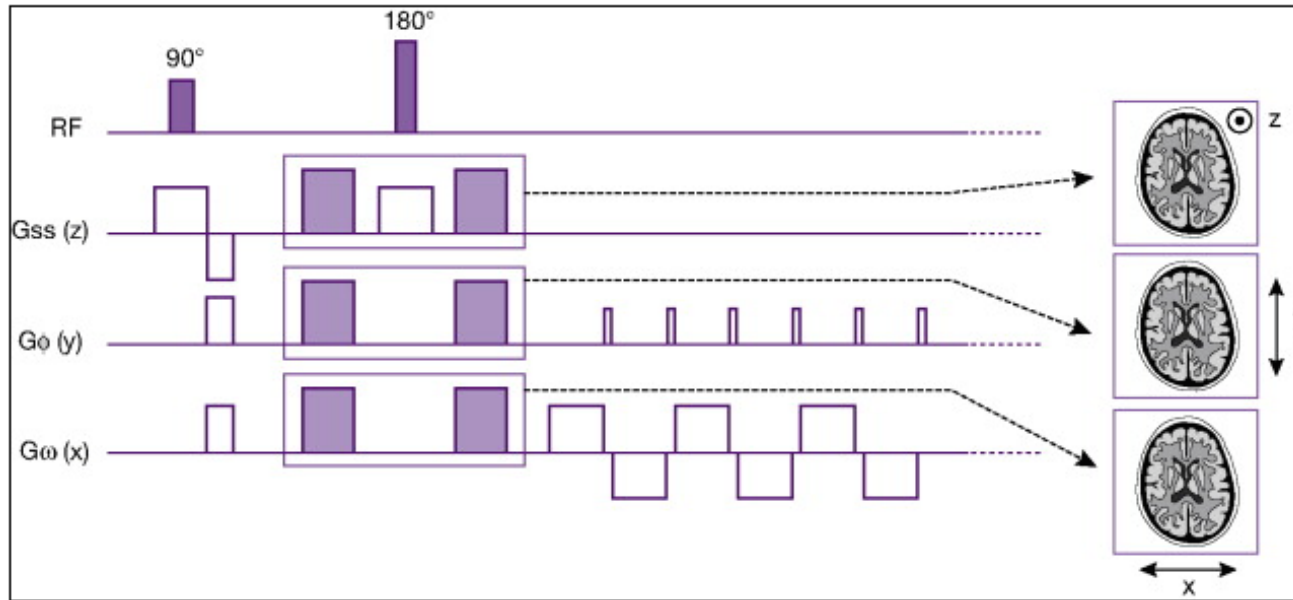


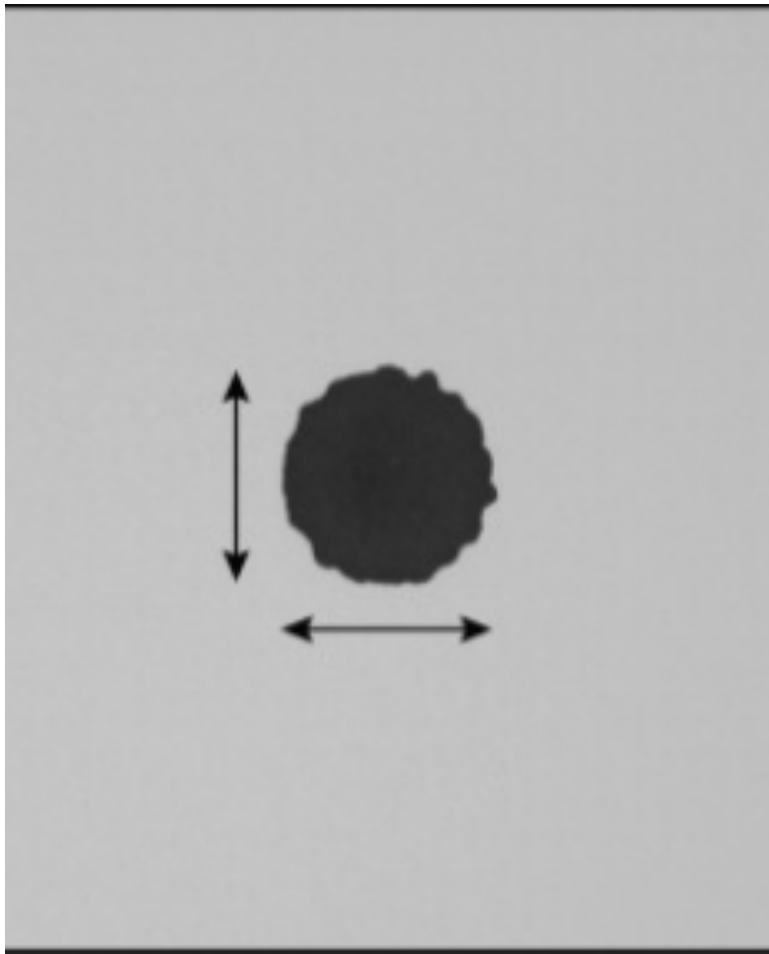
Exemple: Accident vasculaire cérébrale



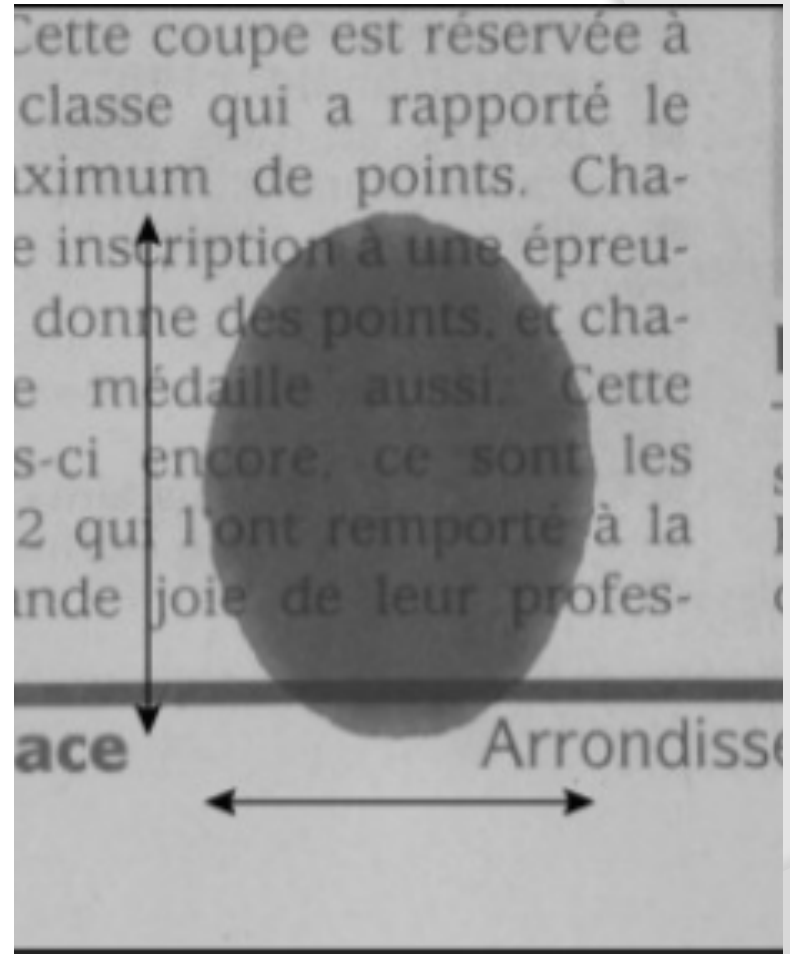
b=0

Séquence de diffusion

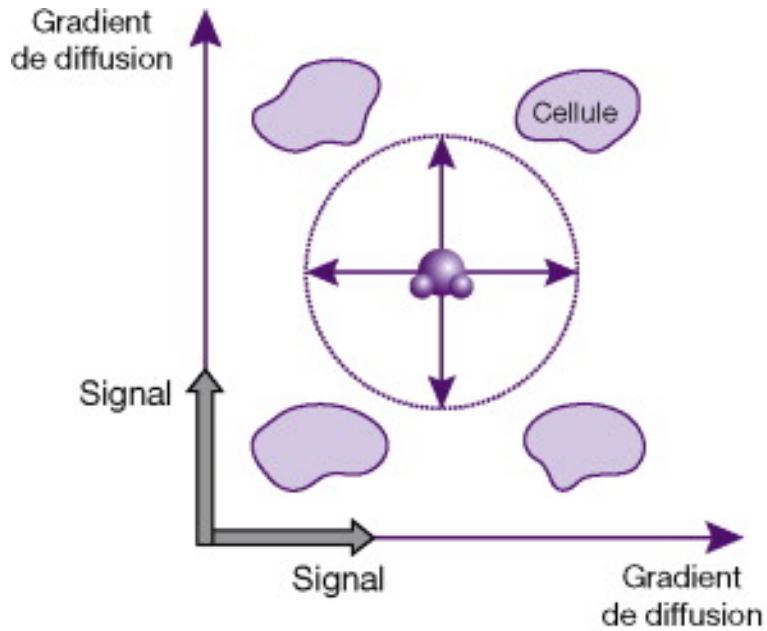




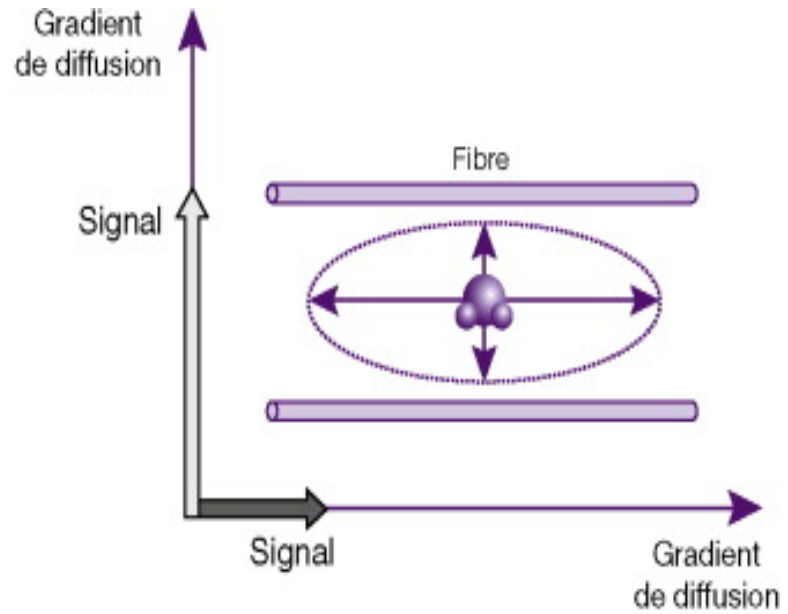
Isotropie



Anisotropie

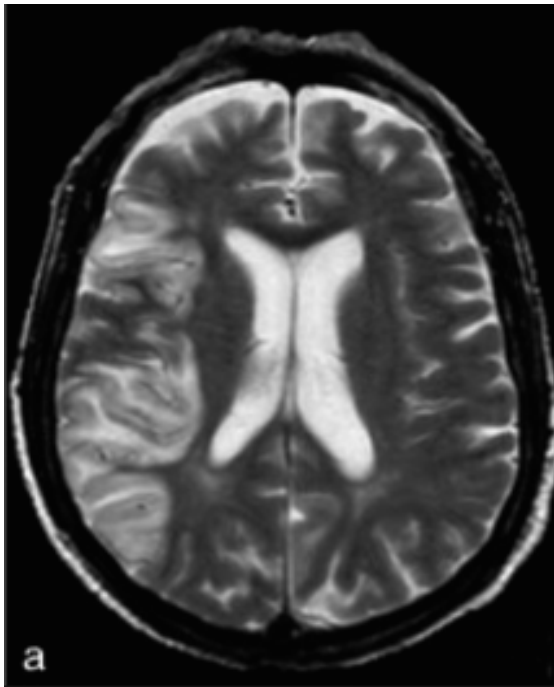


Isotropie



Anisotropie

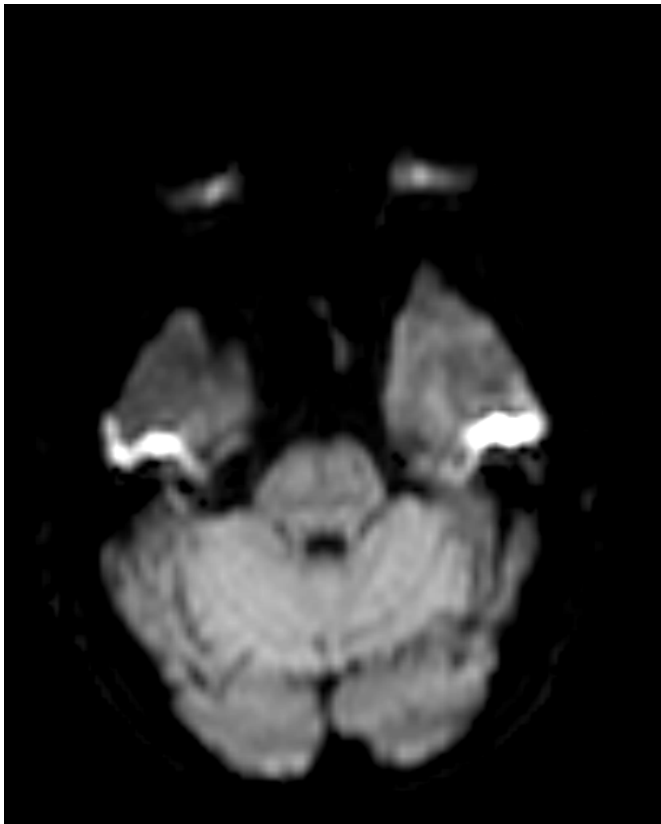
Coefficient de diffusion CDA



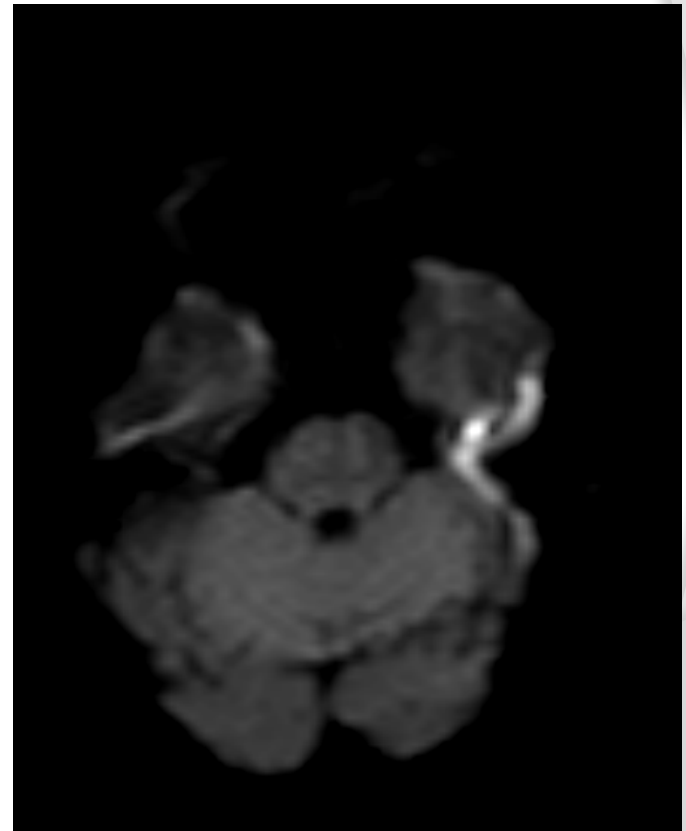
T2

Artéfacts et limites en séquence de diffusion

Encodage de phase:



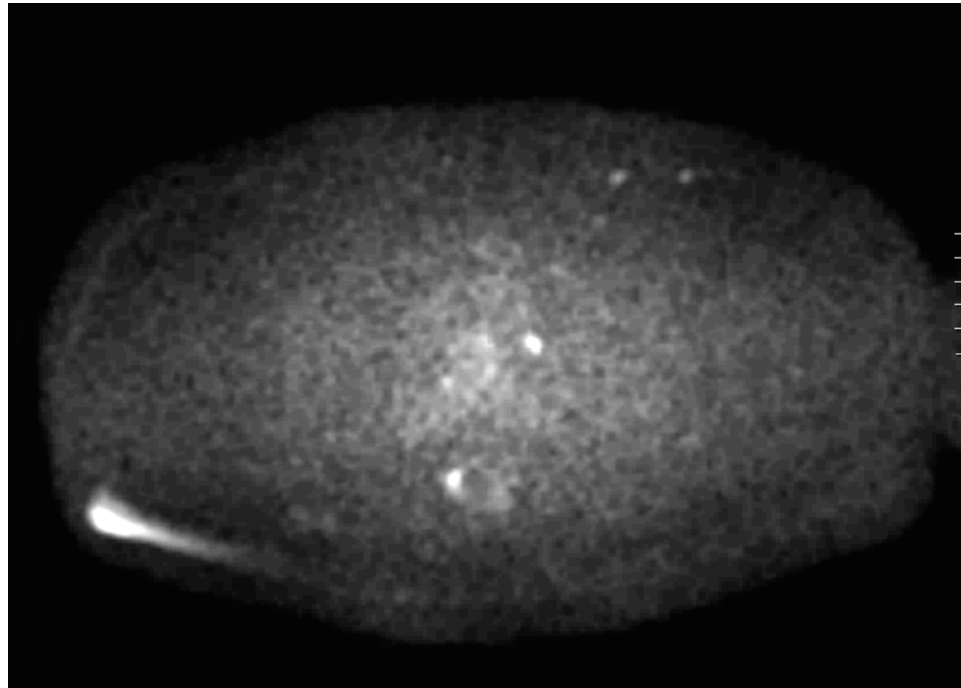
adéquat



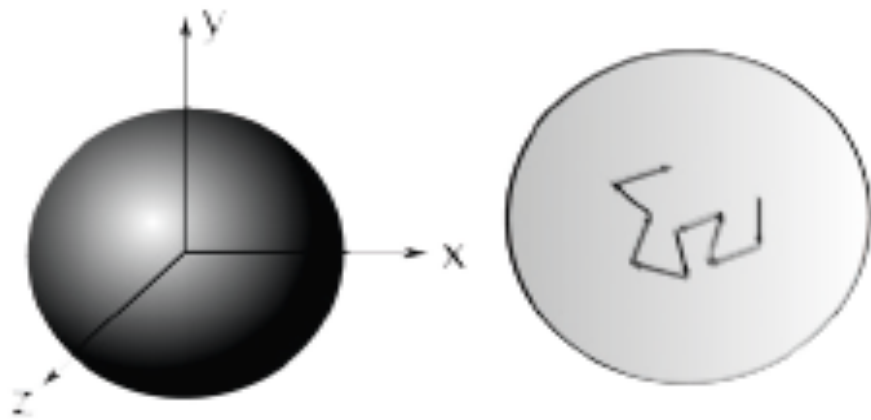
inadéquat

Artéfacts et limites en séquence de diffusion

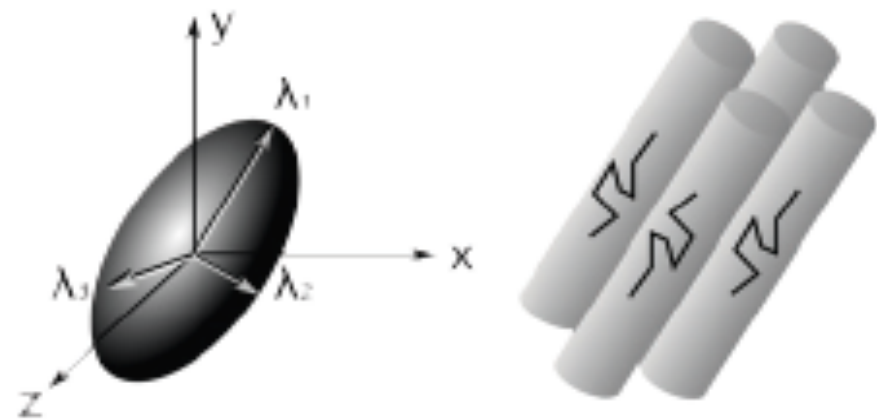
Facteur b:



Imagerie du tenseur de diffusion DTI

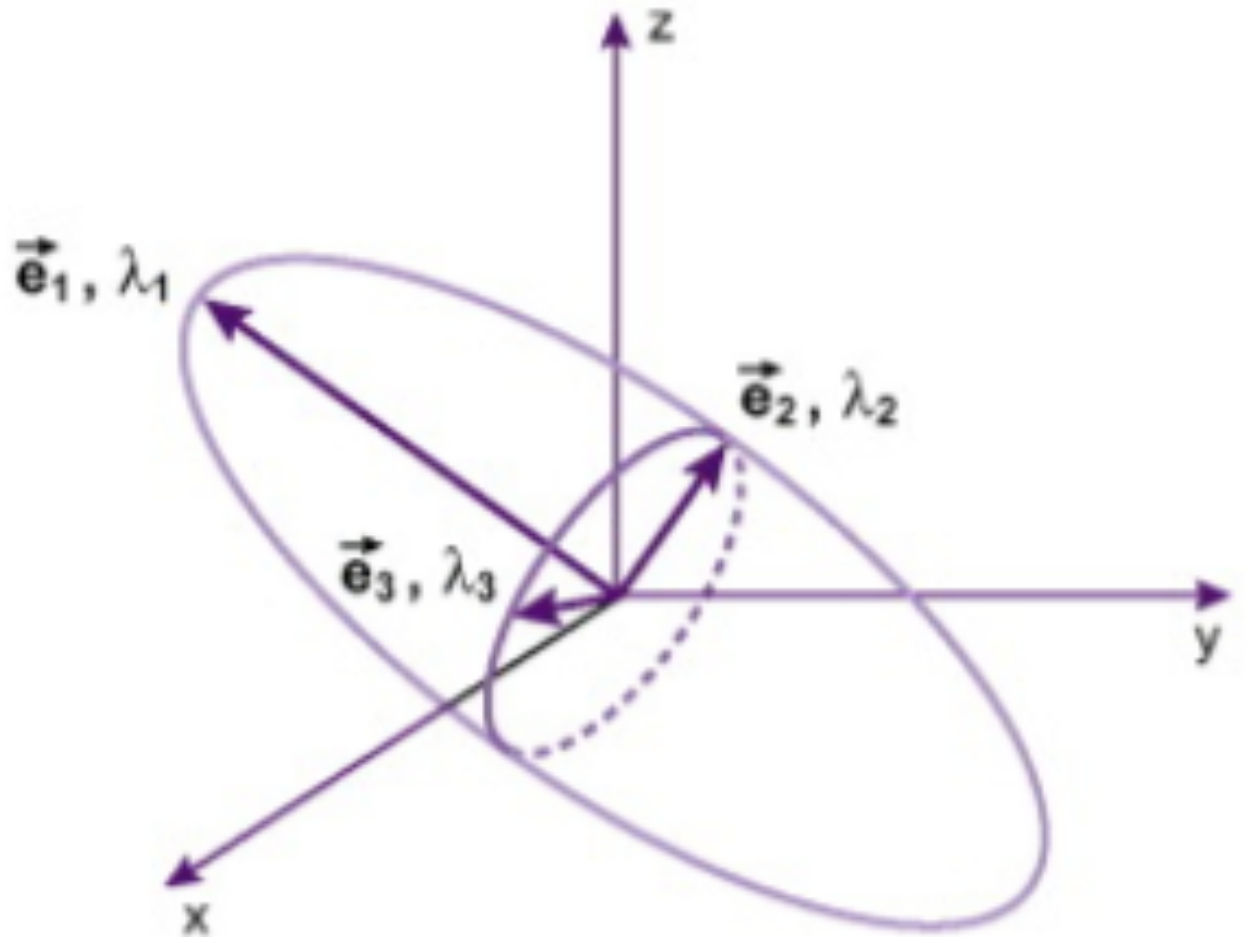


Isotropie

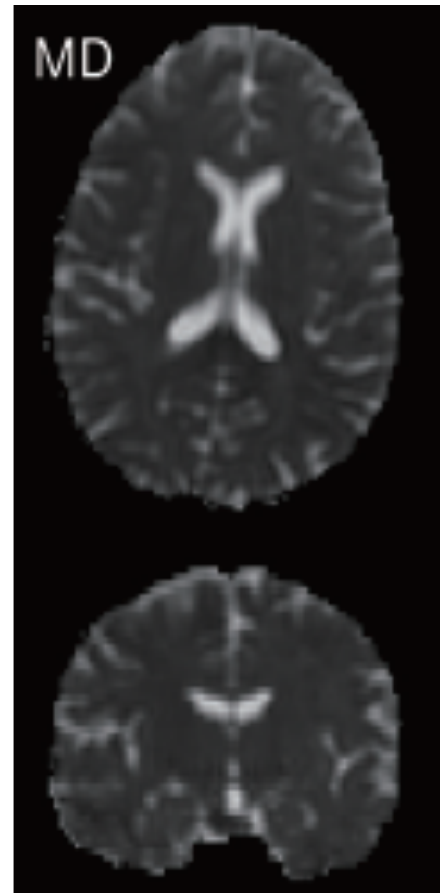


Anisotropie

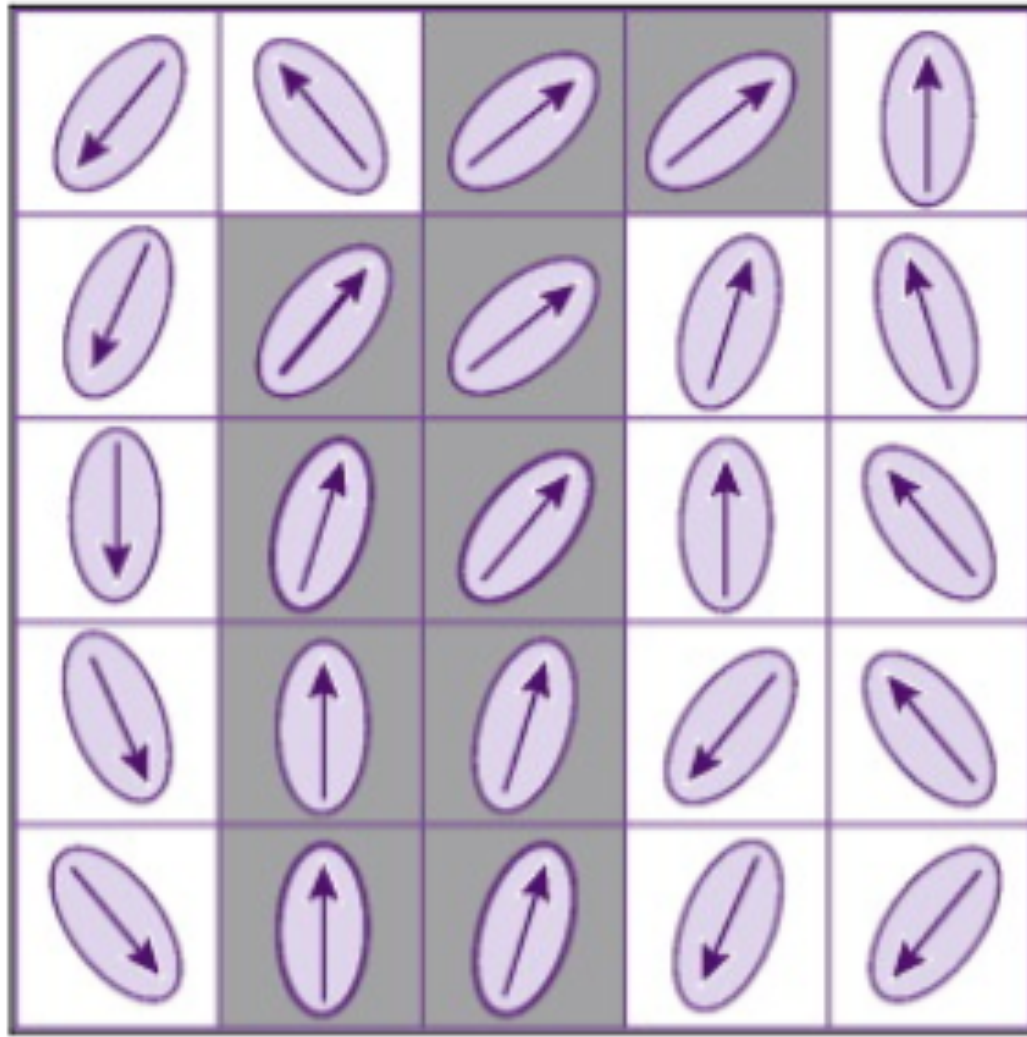
Tenseur de diffusion



Example:

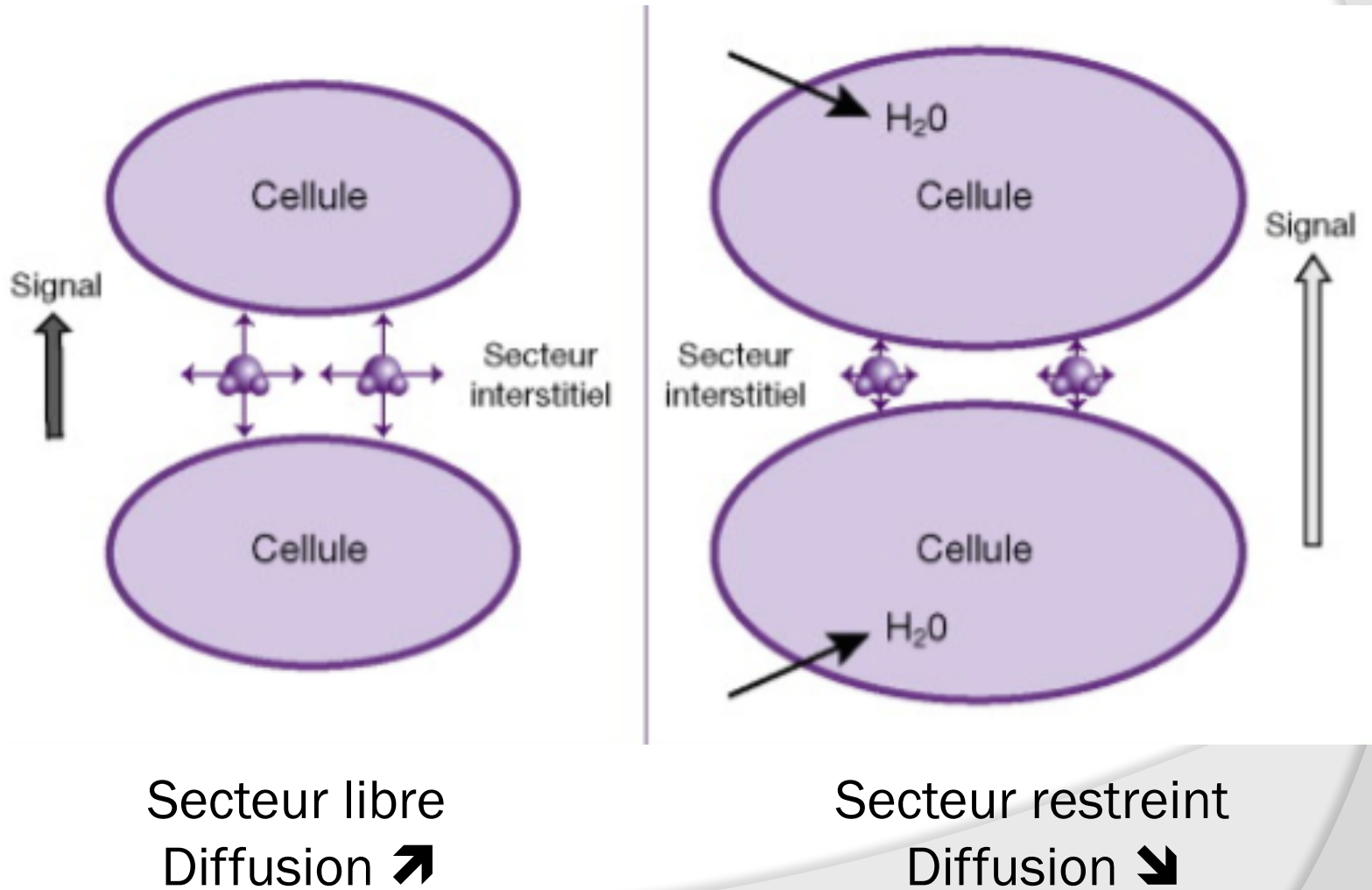


Fiber Tractographie

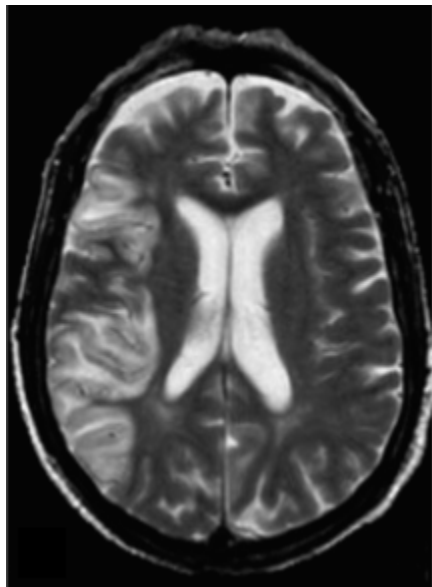


Application

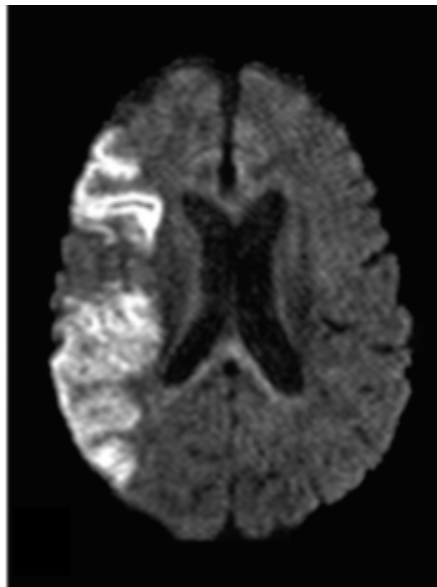
Accident vasculaire cérébral



AVC
aiguë



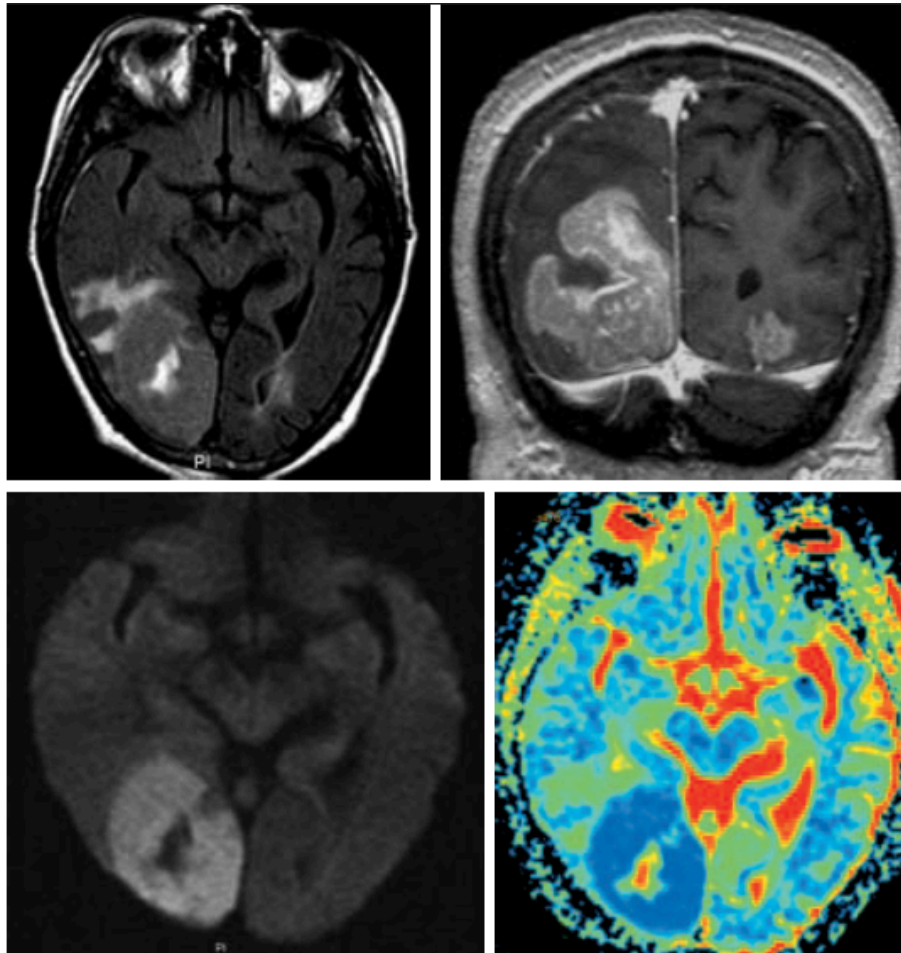
T2



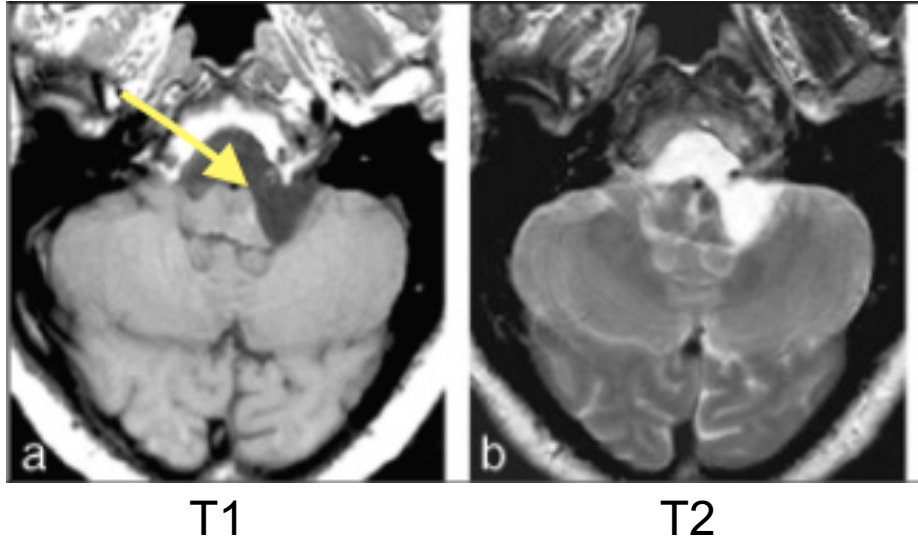
b=1000

CDA

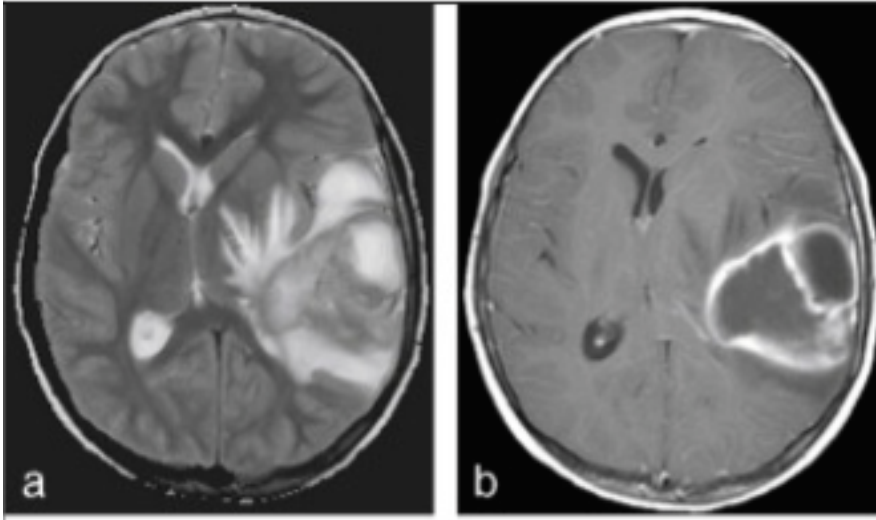
Pathologie tumorale : Lymphome



Kyste épidermoïde vs Kyste arachnoïde



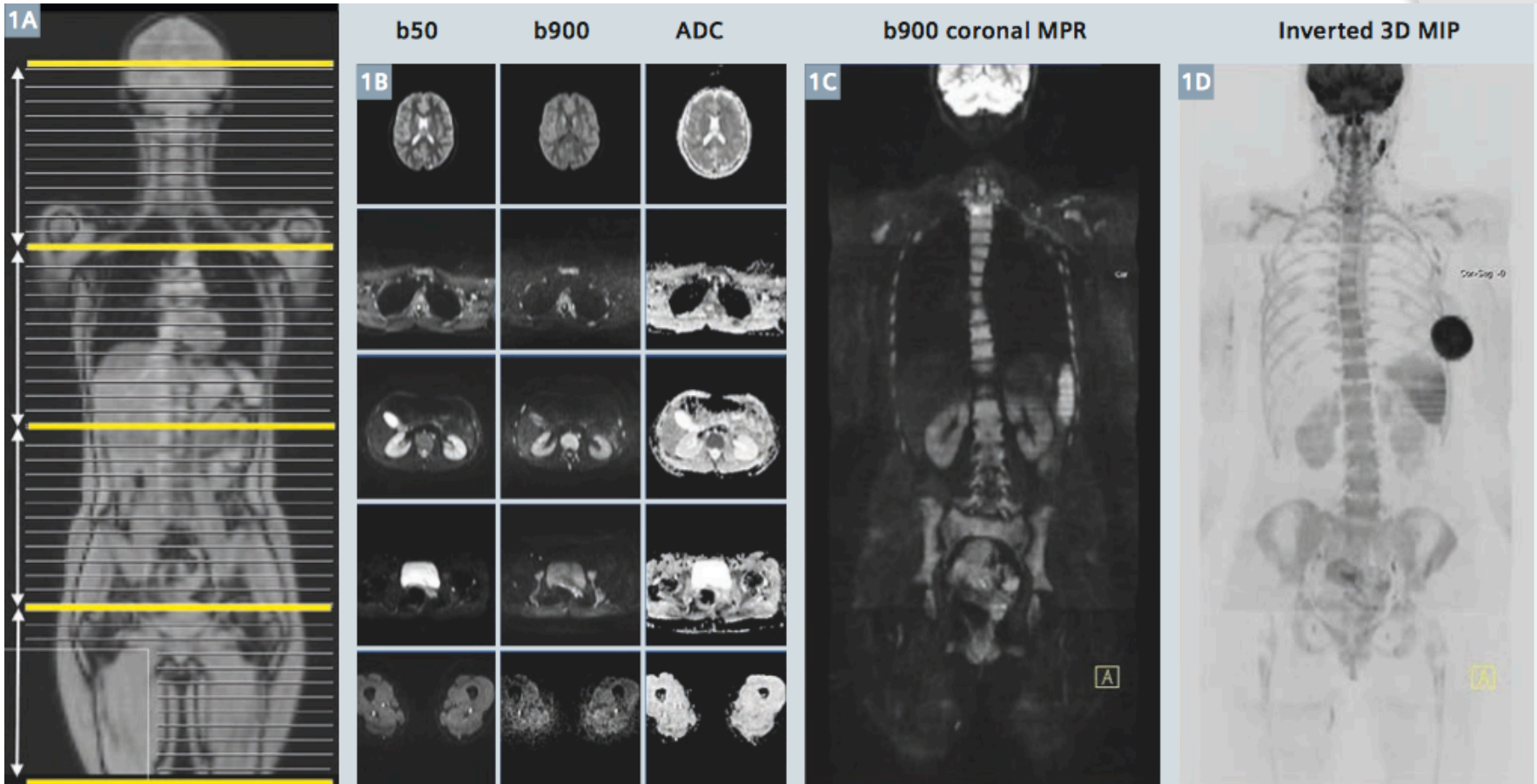
Abcés:



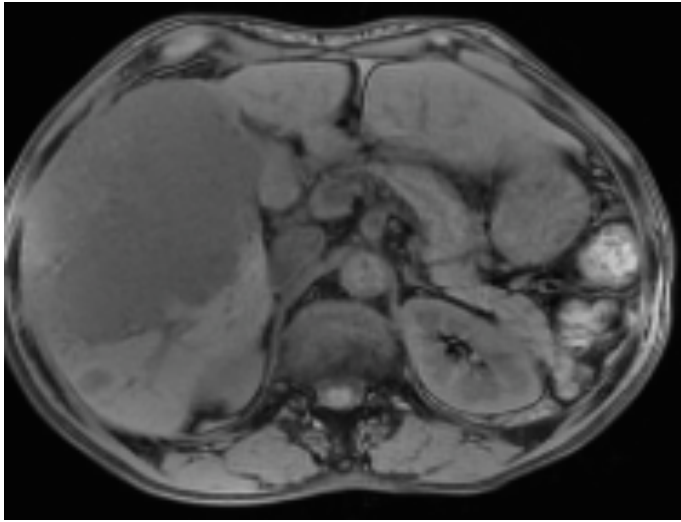
T2

T1 +C

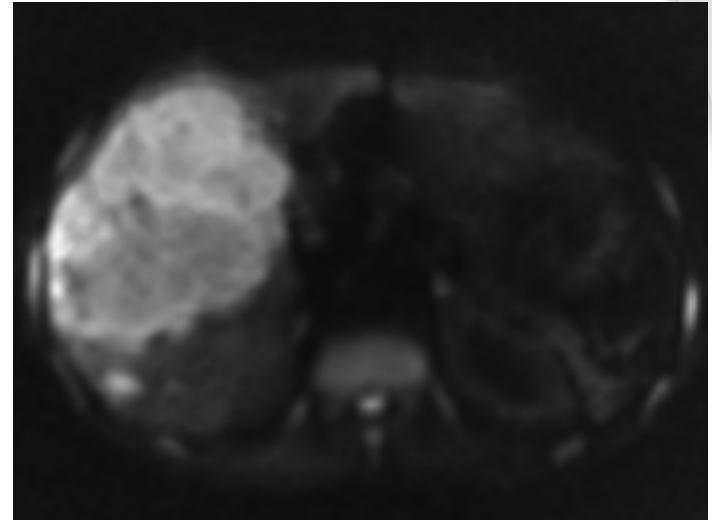
Corps entier



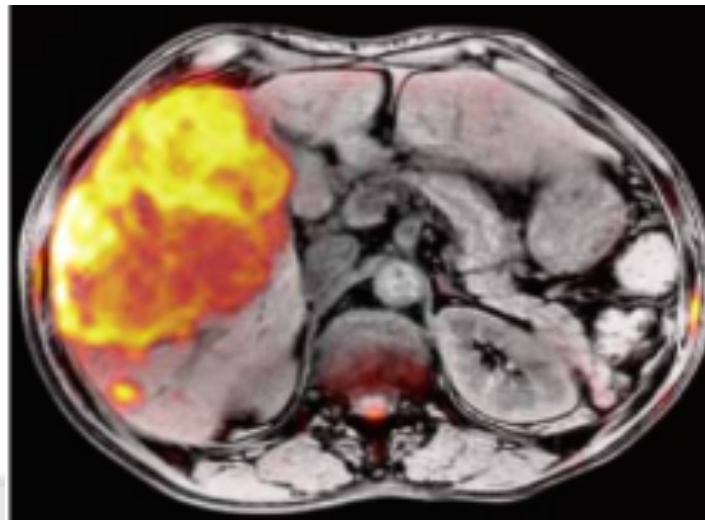
Fusion d'image



+

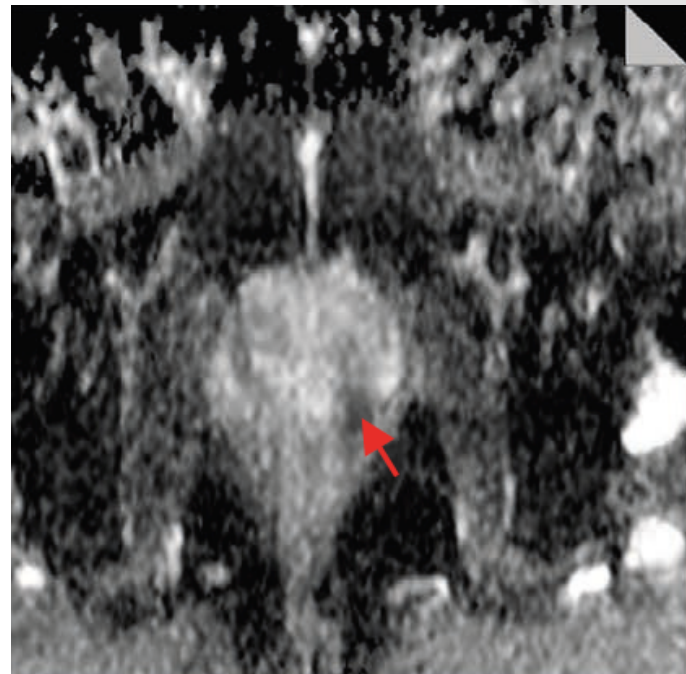


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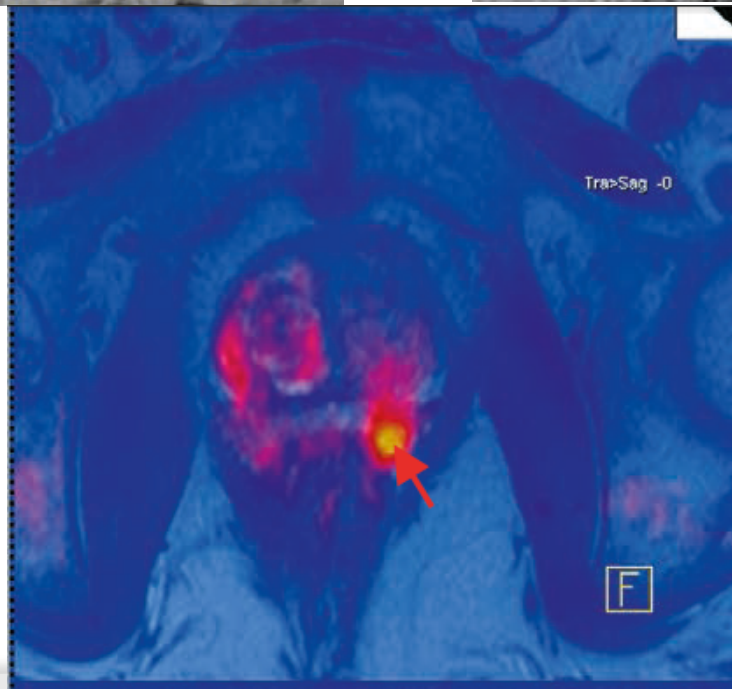




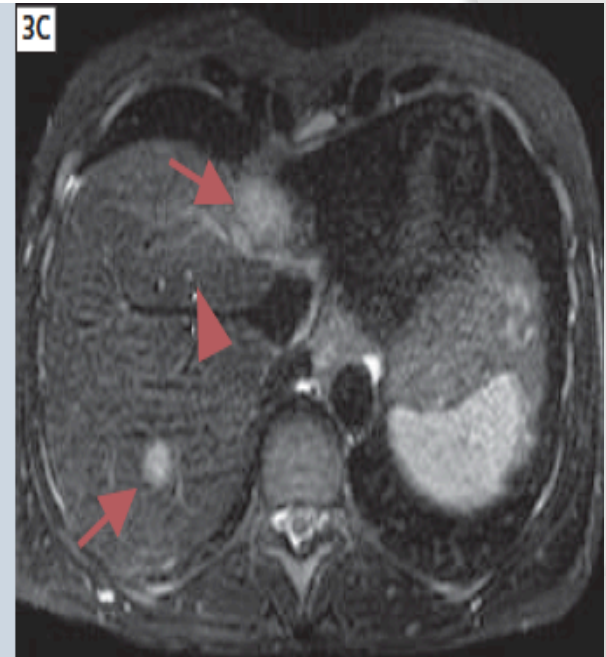
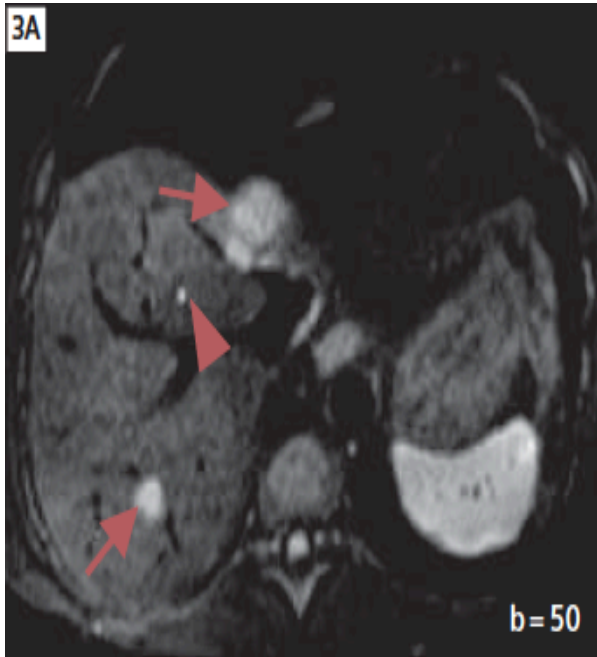
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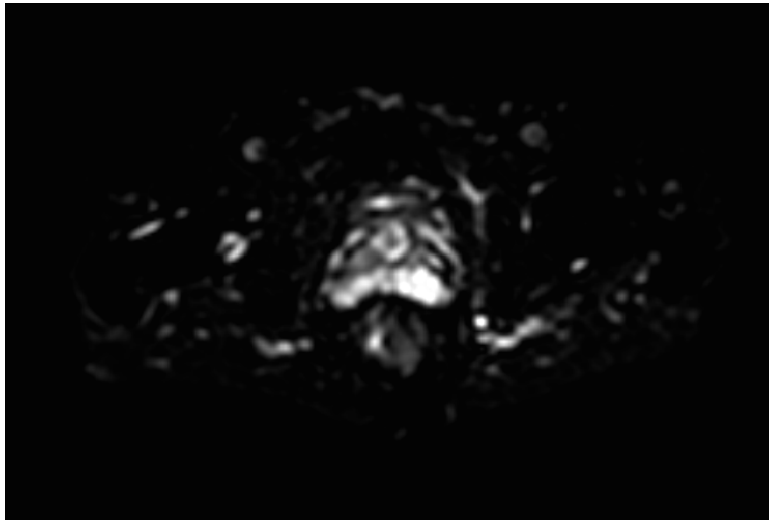
=



Abdomen sup

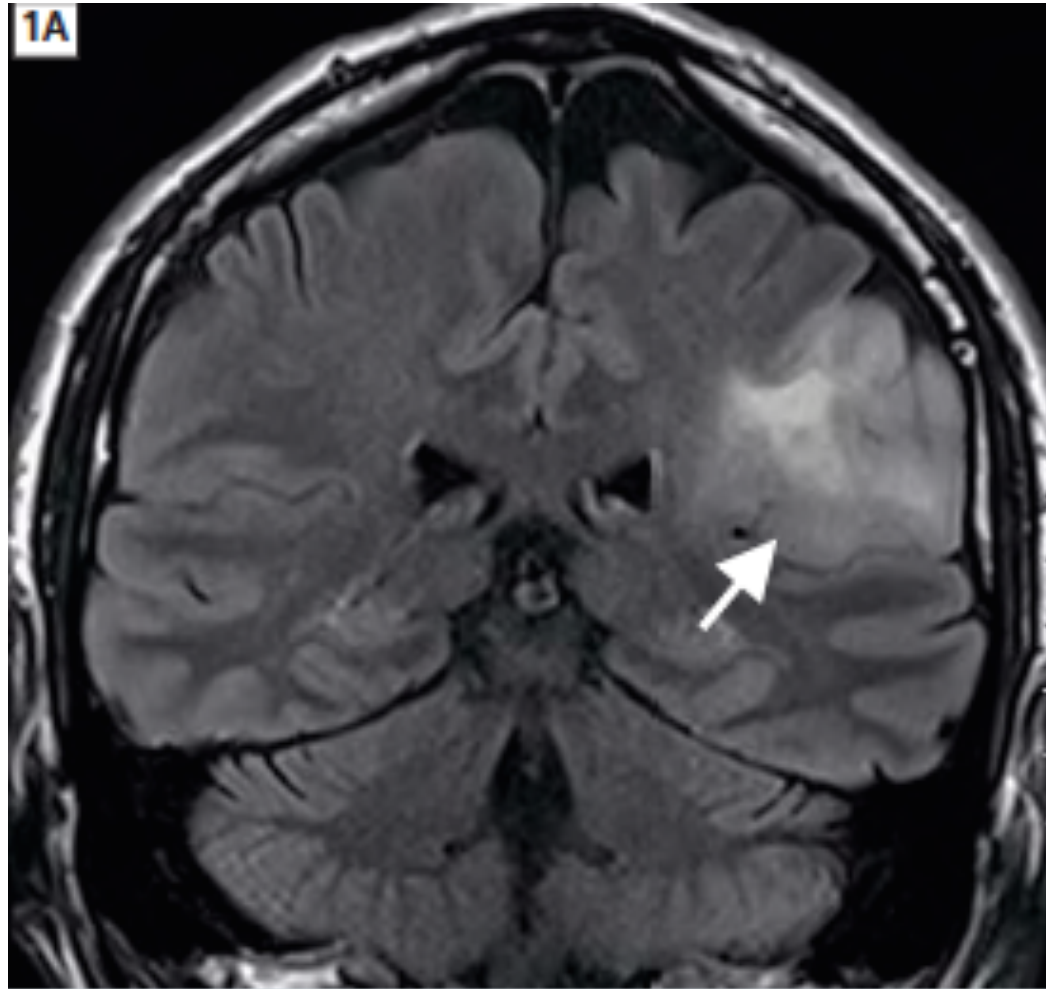


Prostate



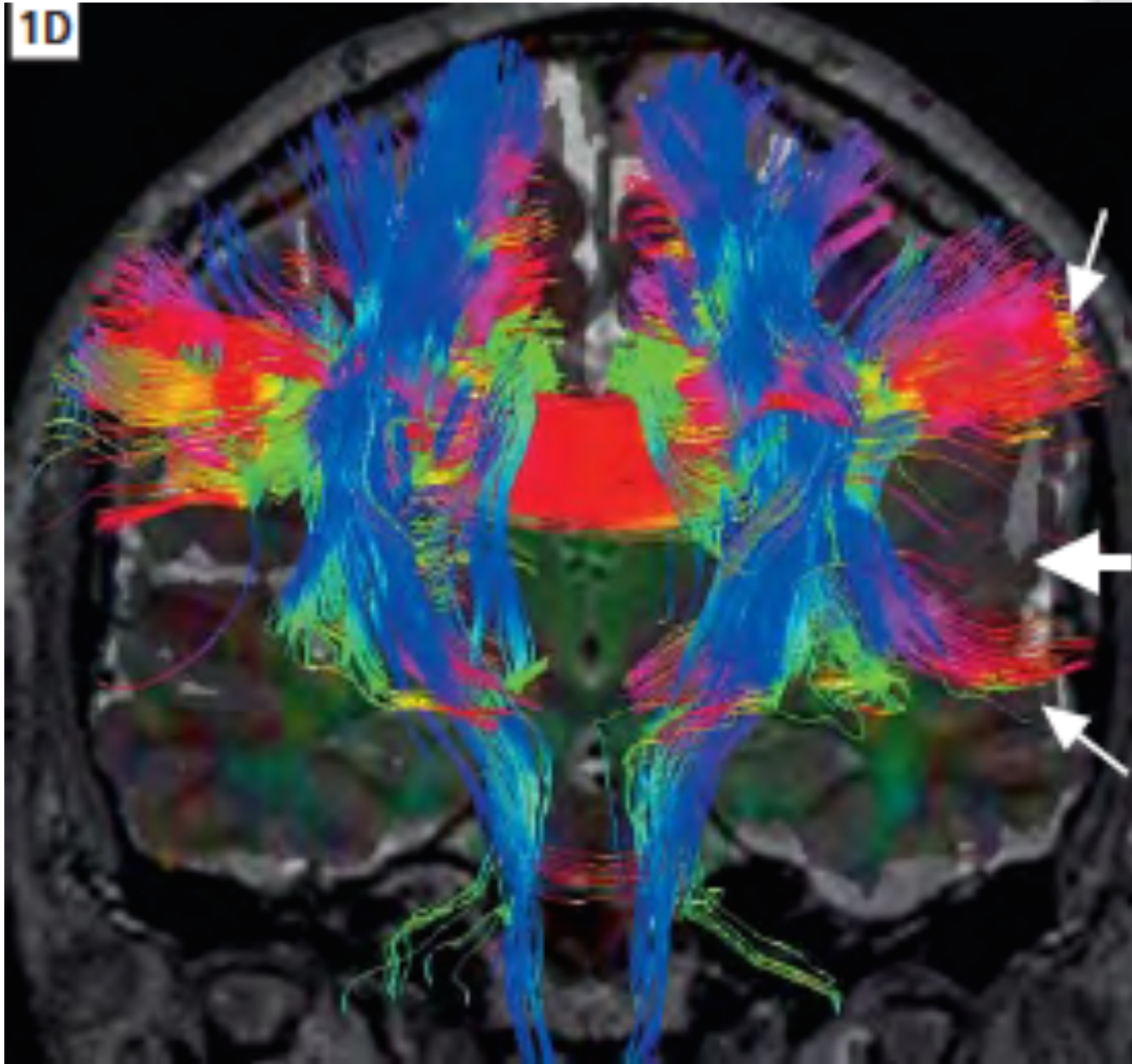
- ◉ Protocole pour le dépistage du cancer de la prostate
 - 1. visite chez l'urologue
 - analyse sanguine & échographie
 - 2. RDV prioritaire en IRM
 - fusion d'image
 - repérage pour la biopsie

DTI Neurologie

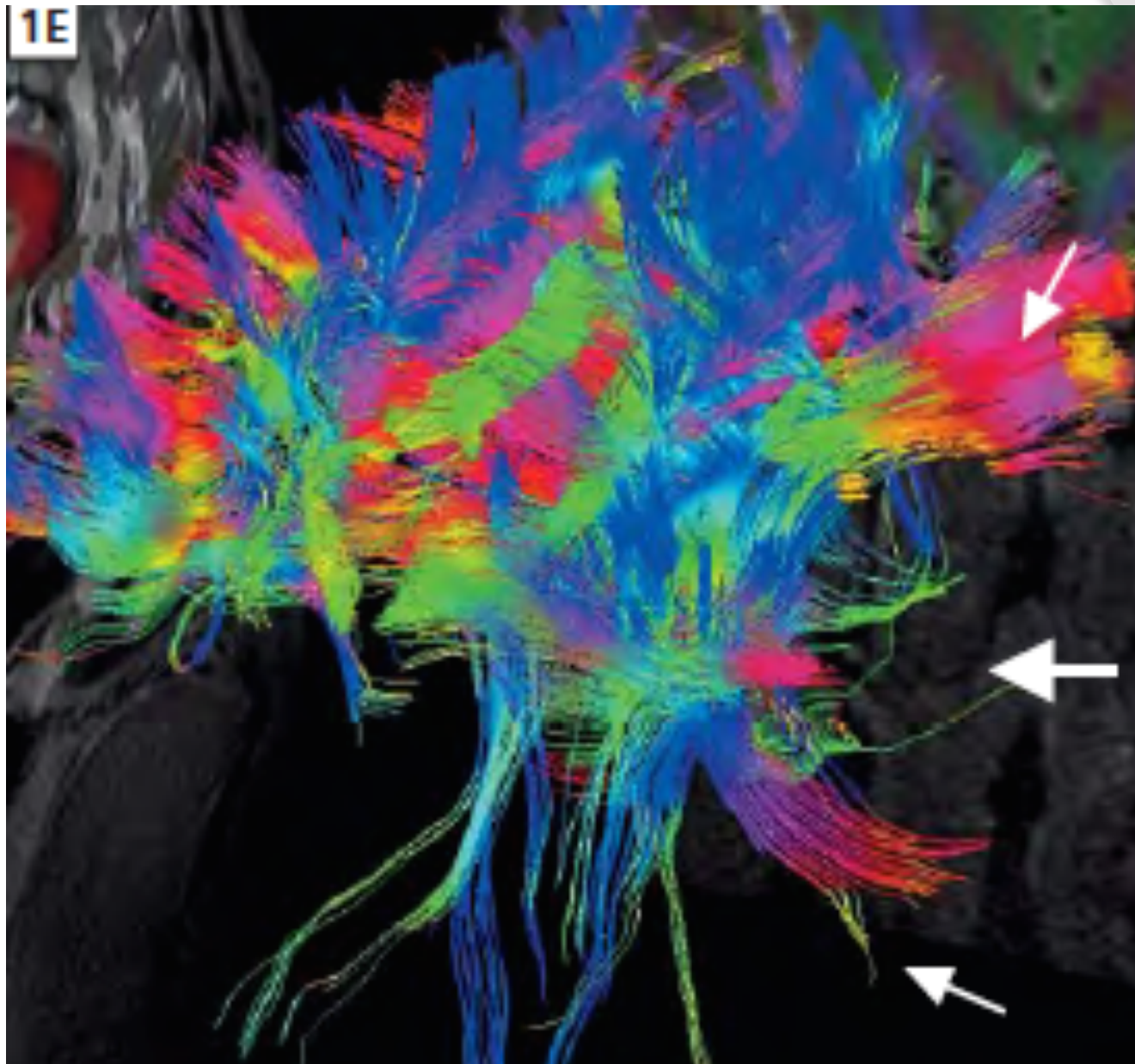


Tumeur dans l'hémisphère gauche

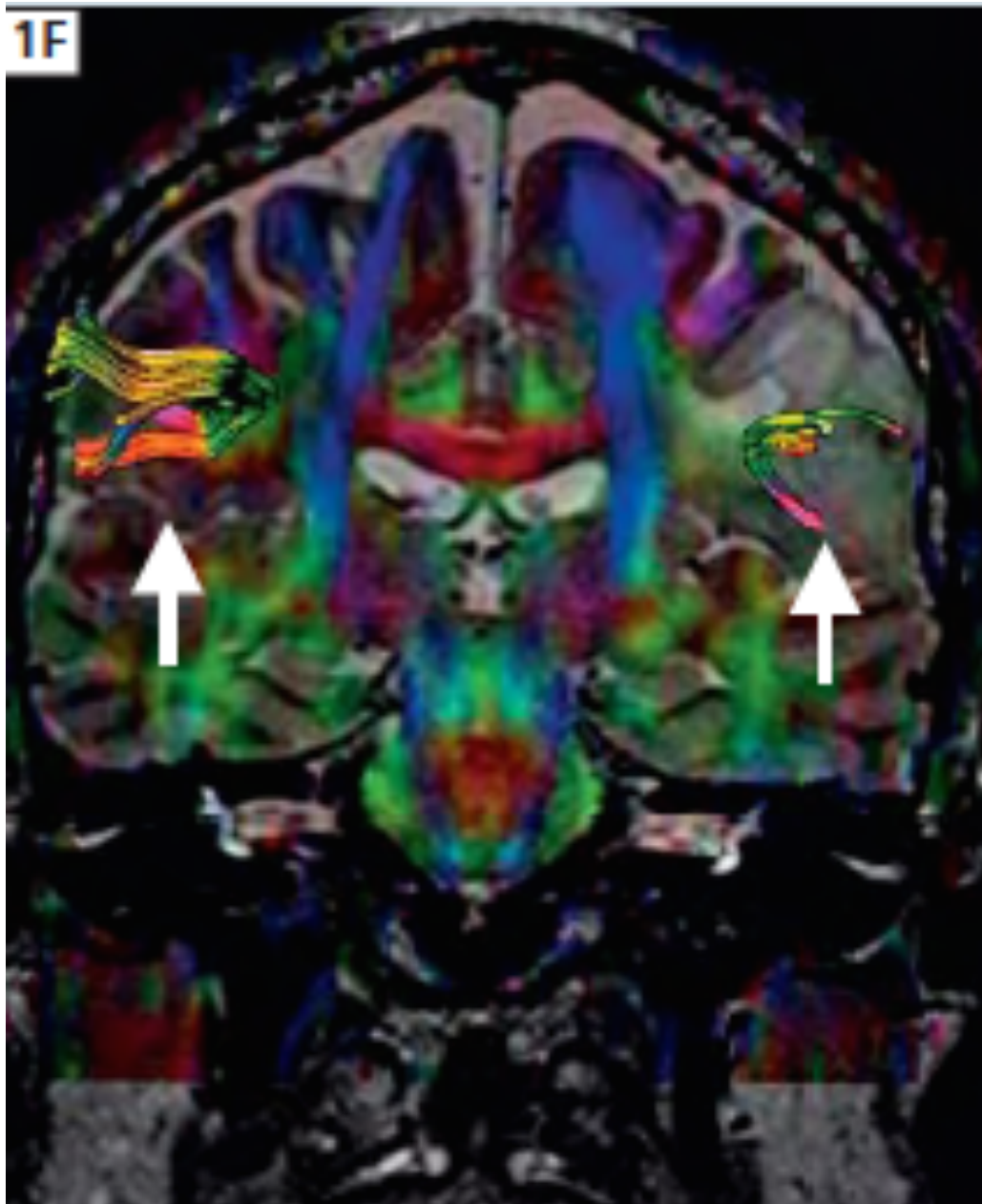
1D



Tumeur dans l'hémisphère gauche

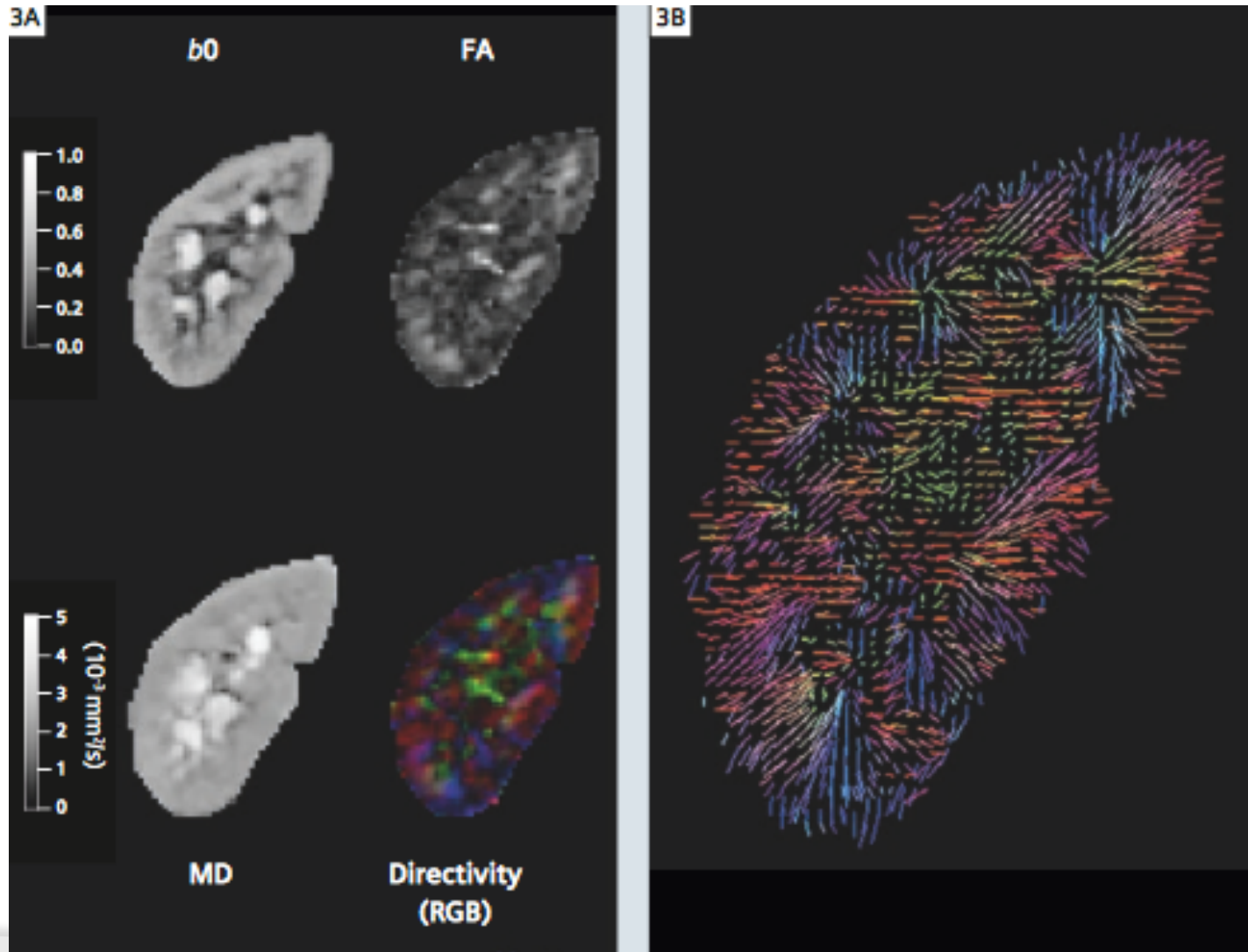


Tumeur dans l'hémisphère gauche



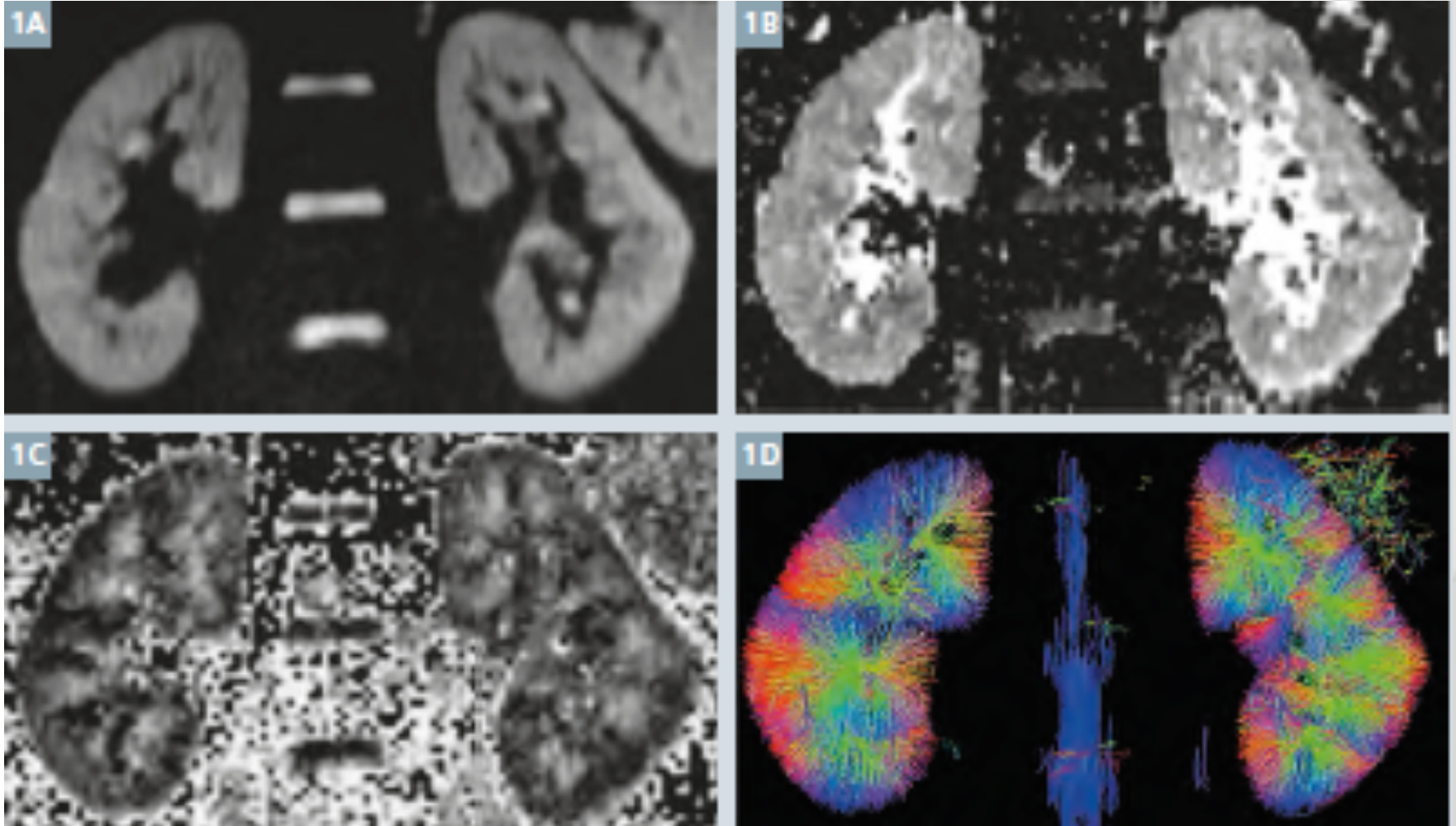
Tumeur dans l'hémisphère gauche

DTI Reins



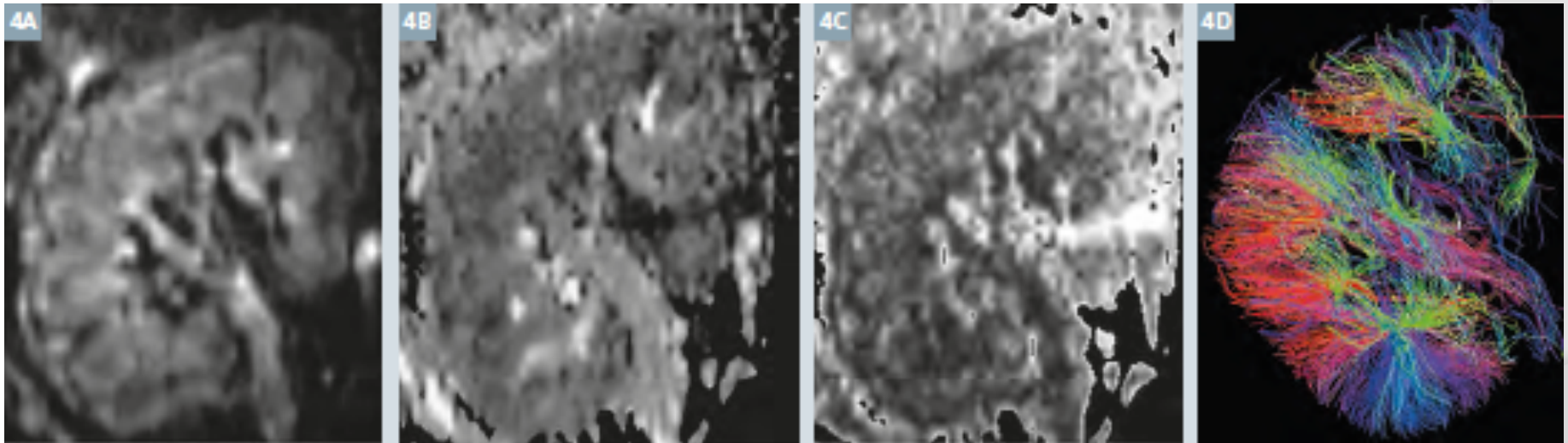
DTI des reins sains :

1A: $b=0$, 1B: CDA, 1C: FA et 1D: Tractographie



DTI d'un rein transplanté :

4A: $b=0$, 4B: CDA, 4C: FA et 4D: Tractographie



Conclusion

- ⦿ Enormes avantages de la diffusion
- ⦿ Applications dans tous les domaines
- ⦿ Confort du patient
- ⦿ Grand potentiel

→ excellent moyen de parfaire le diagnostic

Limites

- ⦿ Génératrice de beaucoup de bruit
 - ⦿ Recherches sont vastes
 - ⦿ Difficultés de suivre toutes les innovations:
 - Limitation par la puissance des machines
 - Limitation par le temps d'acquisition
 - ⦿ Pas de protocoles standardisés
 - Dépend des radiologues
- envisageons de la standardiser au reste du corps humain



Merci