



HAL
open science

CEST MRI to contrast chondrosarcoma tumors: two contrasts in one acquisition

Leslie Mazuel, A. Voissiere, Valérie Weber, Yvain Gerard, Sophie Besse, J.-M. Bonny, Elisabeth Miot-Noirault, C. Peyrode, Guilhem Pages

► **To cite this version:**

Leslie Mazuel, A. Voissiere, Valérie Weber, Yvain Gerard, Sophie Besse, et al.. CEST MRI to contrast chondrosarcoma tumors: two contrasts in one acquisition. ISMRM 2018, Jun 2018, Paris, France. 2018. hal-02736532

HAL Id: hal-02736532

<https://hal.inrae.fr/hal-02736532v1>

Submitted on 2 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



JOINT ANNUAL MEETING
ISMRM–ESMRMB
16–21 June 2018

SMRT 27th Annual Meeting 15–18 June 2018
www.smrt.org

Paris Expo Porte de Versailles
Paris, France

Declaration of Financial Interests or Relationships

Speaker Name: Leslie MAZUEL

I have no financial interests or relationships to disclose with regard to the subject matter of this presentation.

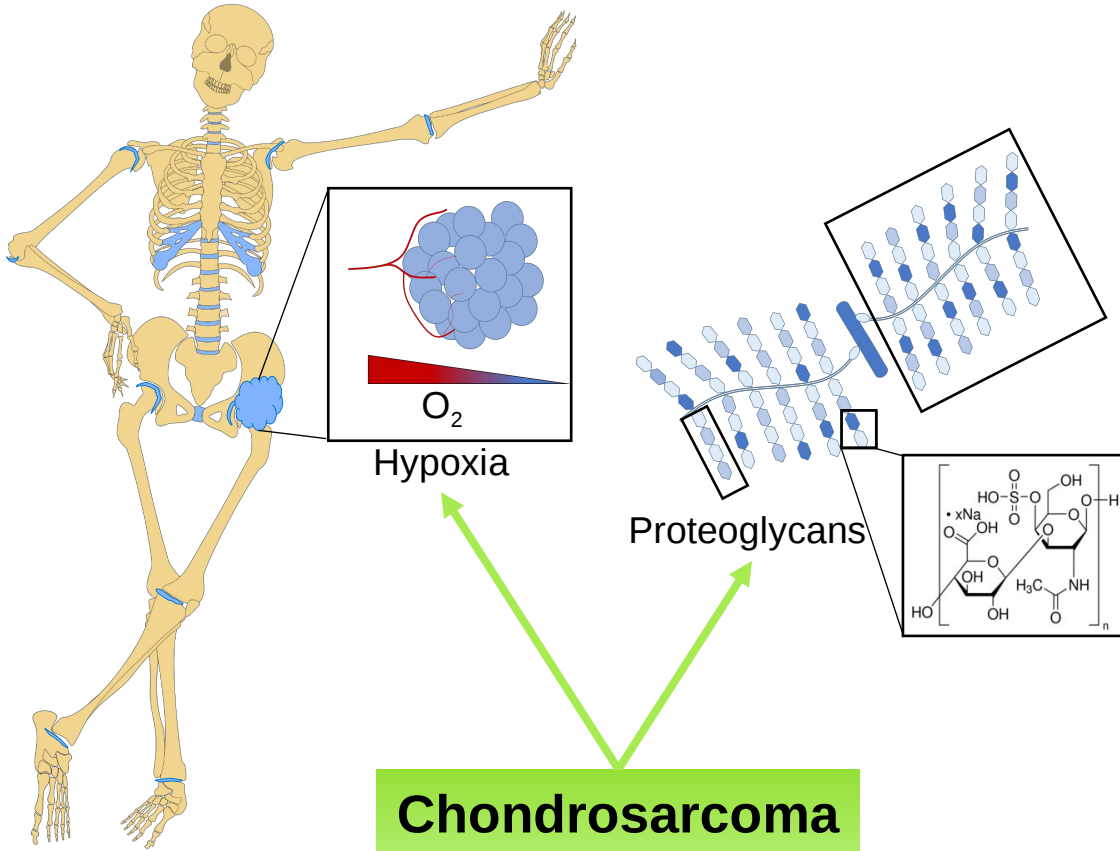
CEST MRI to contrast chondrosarcoma tumors: two contrasts in one acquisition

L. Mazuel^{1,2}, R. Autissier^{1,2}, E. Maubert¹, V. Weber¹, J. M. Bonny², E. Miot-Noirault¹, C. Peyrode¹, G. Pages²

¹ INSERM, UMR1240, Clermont-ferrand, France

²AgroResonance, UR370 QuaPA-INRA, F-63122 Saint-Genès-Champanelle, France

Pathological Context



- **Malignant cartilage tumor**
- **2nd bone cancer**
- **Diagnostic by imaging**

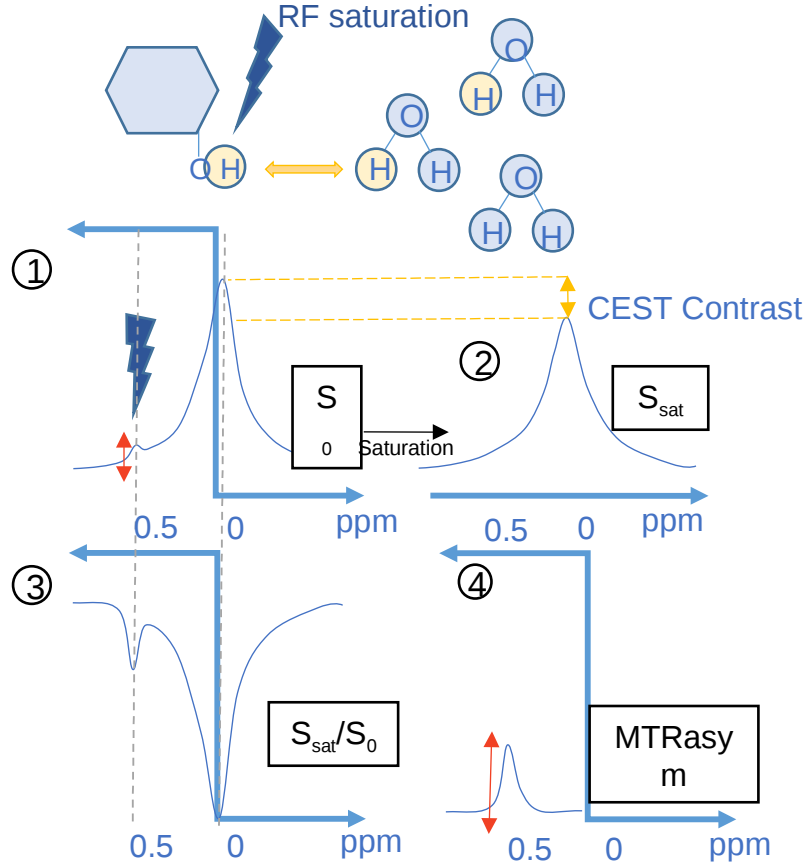


- no specific method

- 2 mains characteristics :
 - Hypoxia

Could be used to develop a new imaging strategy?

CEST MRI principle



Functions

Frequency

Hydroxyl (OH)

250 - 750 Hz

Amines (NH₂)

800 - 1400 Hz

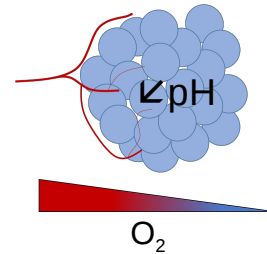
Amides (NH)

1500 - 2100 Hz

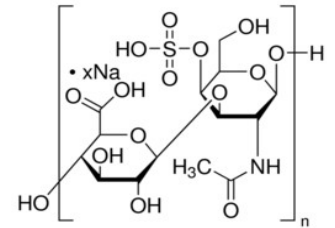
APT CEST

GAG CEST

Hypoxia



Proteoglycan



CEST-MRI should be able to simultaneously image both properties

In vivo study – Experimental design

H-EMC-SS Model

3M cells H-EMC-SS
Implanted orthotopically (tibia)

Human Chondrosarcoma

7 weeks



Swarm Model

Rat Chondrosarcoma

Swarm tumor implanted sub-cutaneously

2 weeks

CEST MRI

PET

^{18}F -MISO

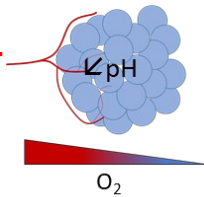
SPECT

$^{99\text{m}}\text{Tc}$ -NTP 15-5

MRI

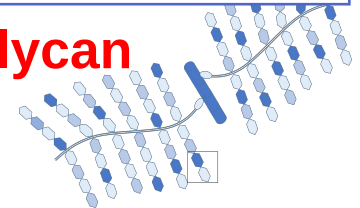
^{23}Na

Hypoxia



Proteoglycans

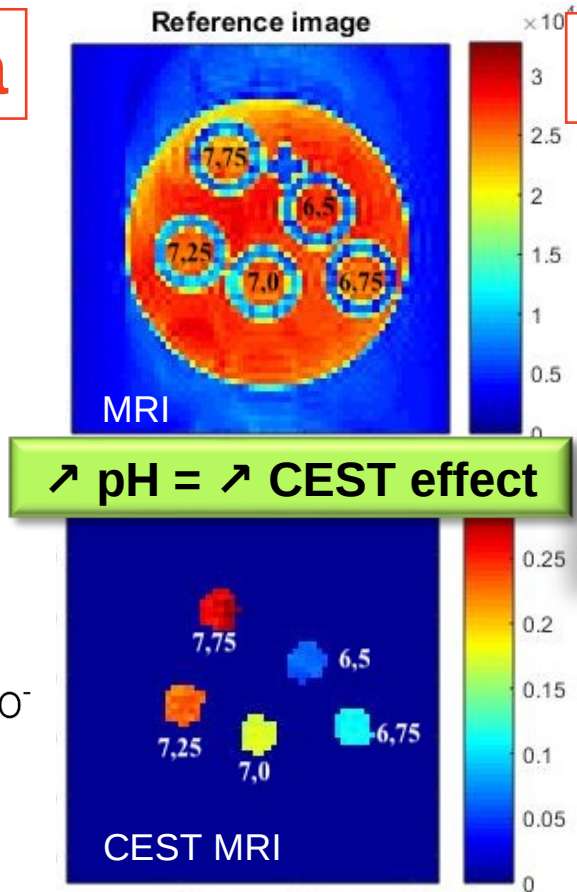
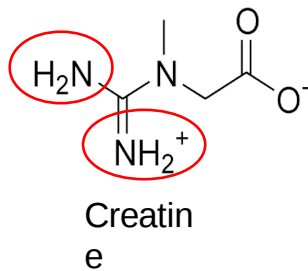
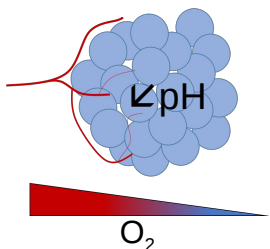
S



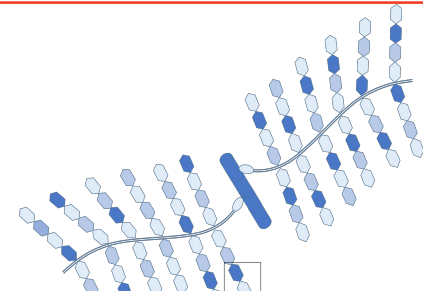
Reference imaging

CEST MRI *in vitro*

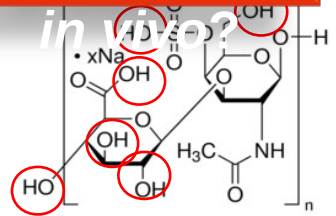
Hypoxia



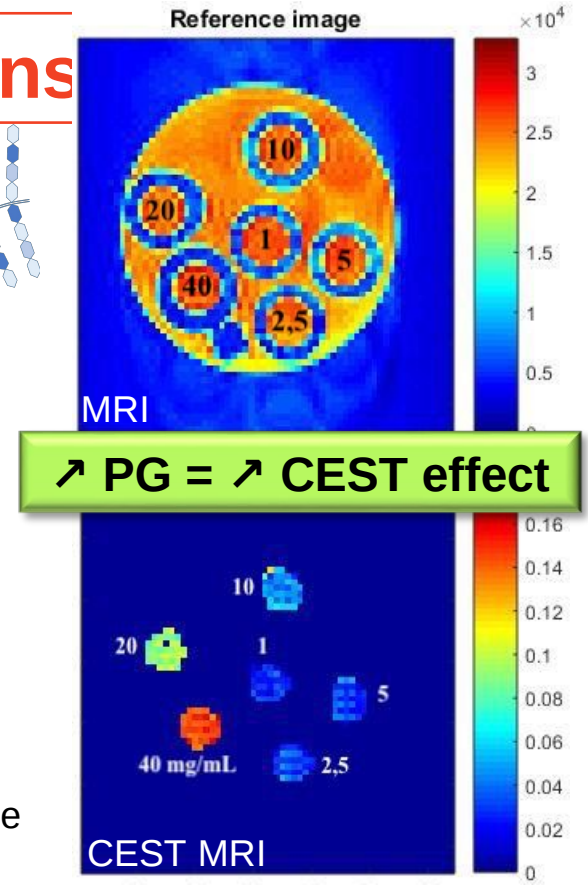
Proteoglycans



What happens *in vitro*?



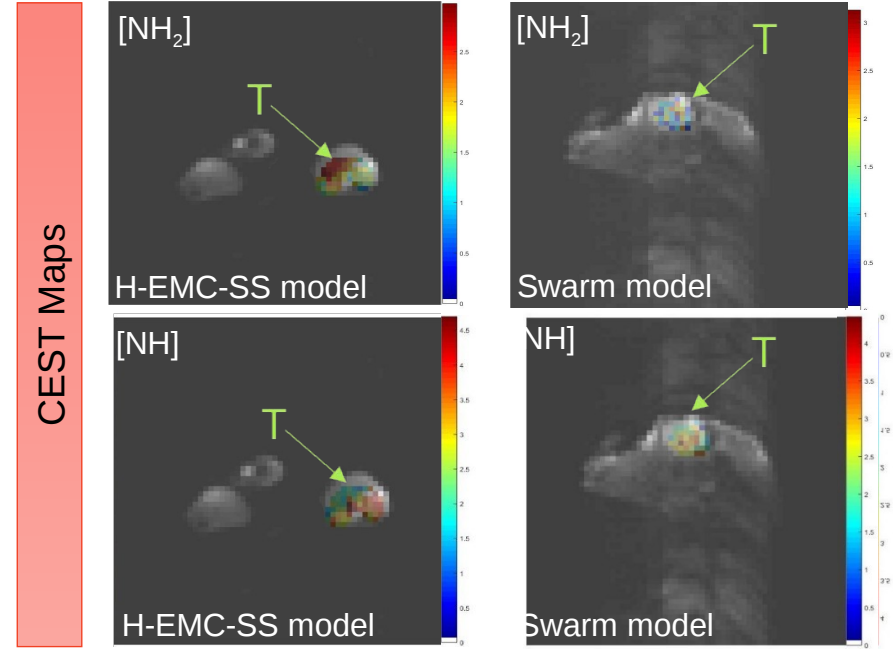
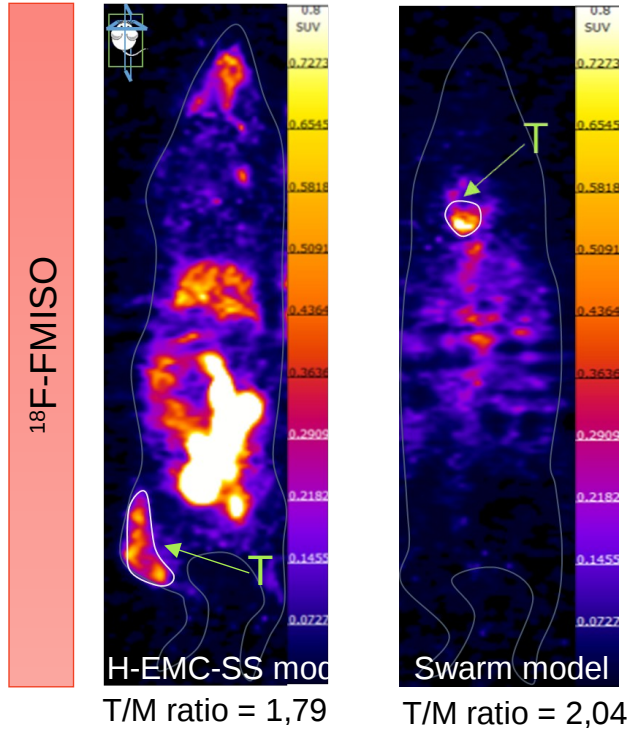
Chondroitin 4 sulfate



PET

VS

CEST MRI



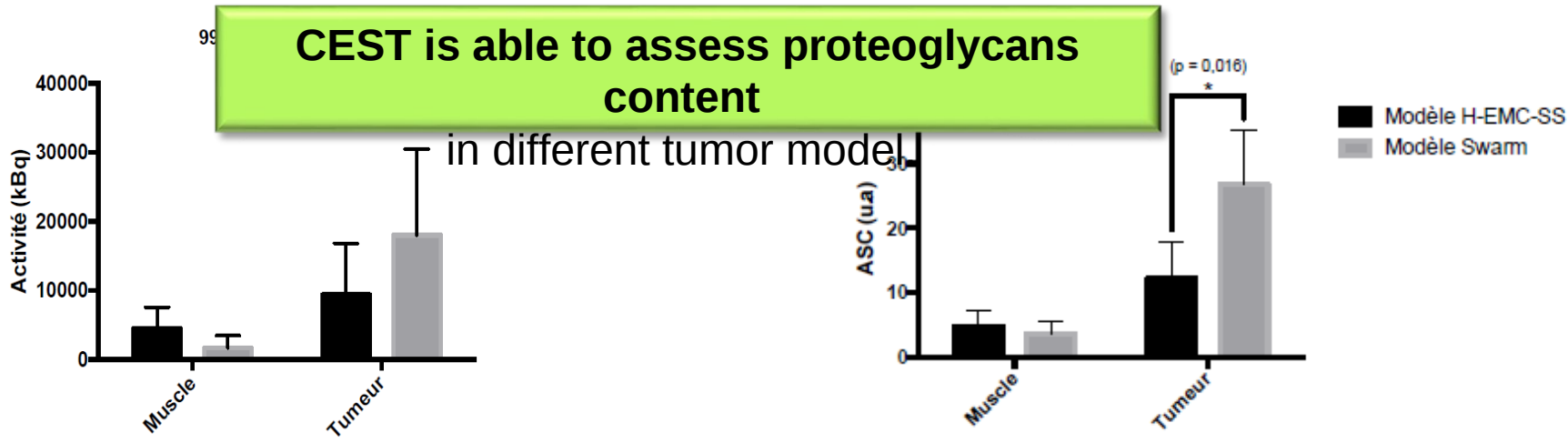
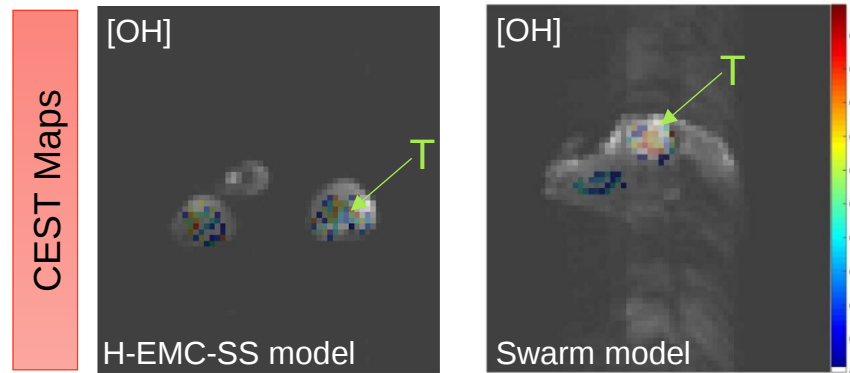
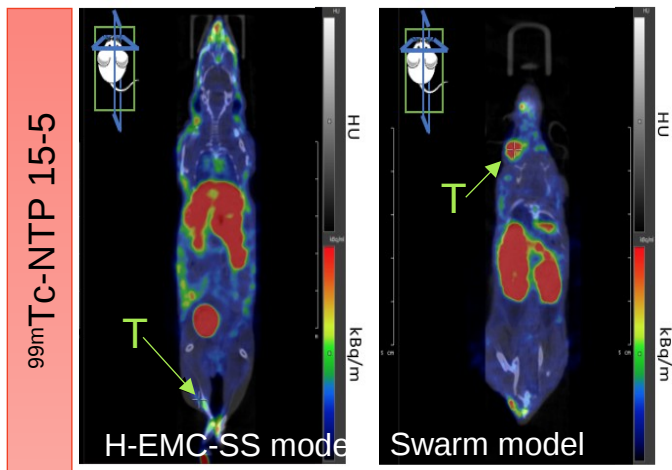
The two models are hypoxic

Difference in CEST effect observed
in the two different models =>
difference in pH

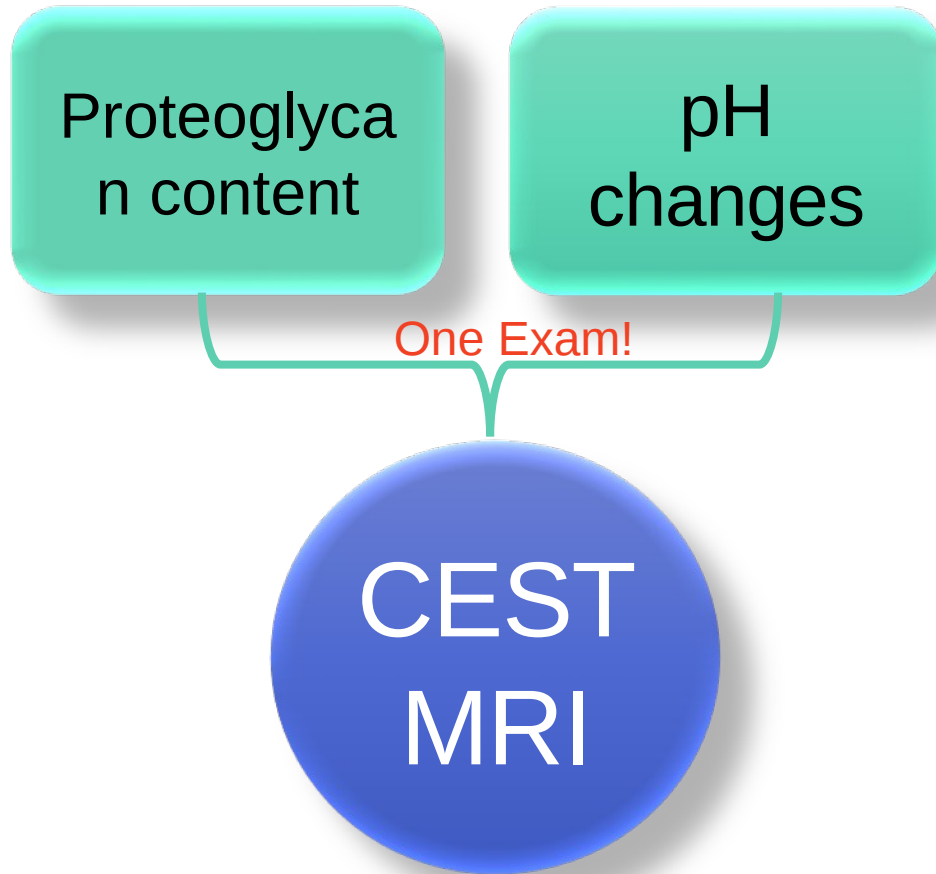
SPECT

VS

CEST MRI



Conclusion - Perspectives



New diagnostic tool
for
chondrosarcoma

Therapeutic efficiency
=> prognostic tool?

The text is presented in two parts. The first part, 'New diagnostic tool for chondrosarcoma', is enclosed in a red-bordered box and tilted clockwise. A blue arrow points from the bottom of this box to the second part of the text, 'Therapeutic efficiency => prognostic tool?', which is positioned to the right and below the box.