PERFORMANCE OF NEW 400 MHZ HTS POWER-DRIVEN MAGNET NMR TECHNOLOGY ON CINACALCET HCL (TYPICAL API IN PHARMA)

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PANIC NMR 2018

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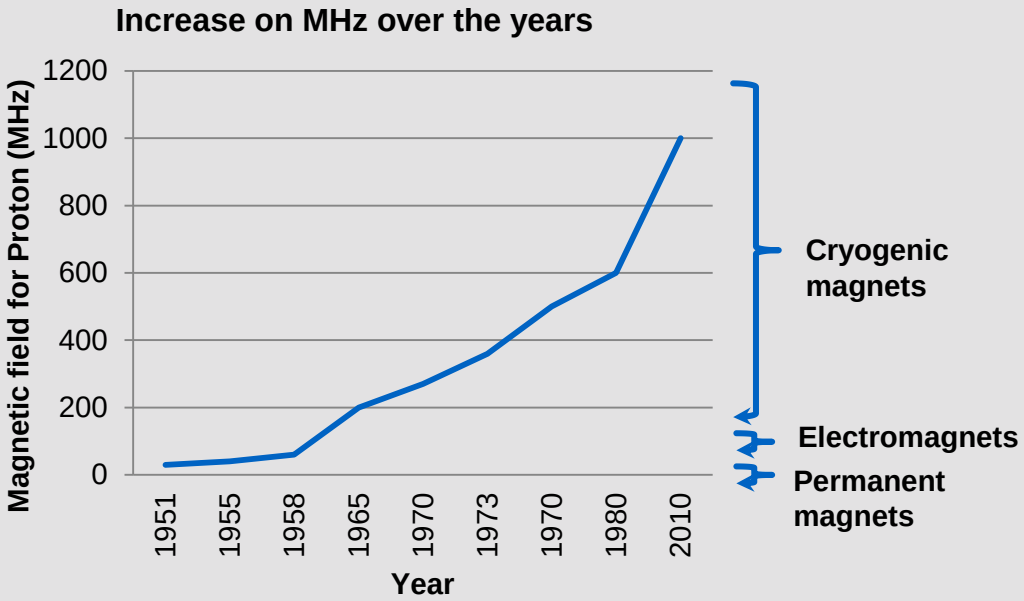
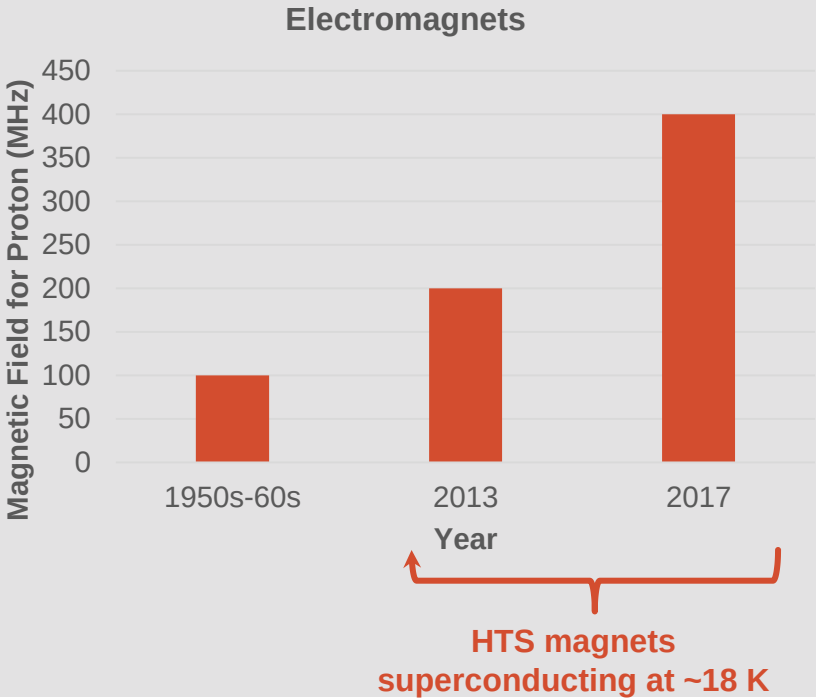
OUTLINE

- Historical highlights of magnet development
- Symbiotic scientific collaboration
- Scheme of the instrument
- Cinacalcet HCl
- NMR data (1D 1H, 2D COSY, 2D NOESY, 2D 1H-13C HSQC)
- HTS NMR system installed at Amgen chemistry laboratory
- Pros and cons of HTS magnet system
- Acknowledgements
- Thank you

HISTORICAL HIGHLIGHTS OF MAGNET DEVELOPMENT





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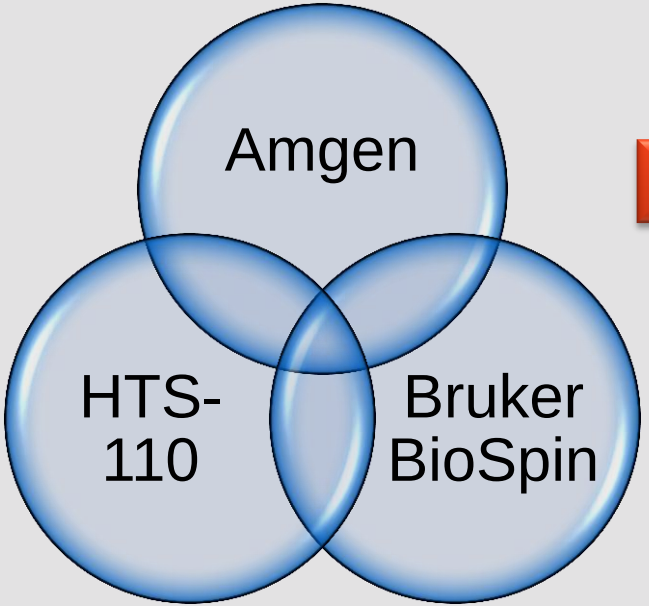
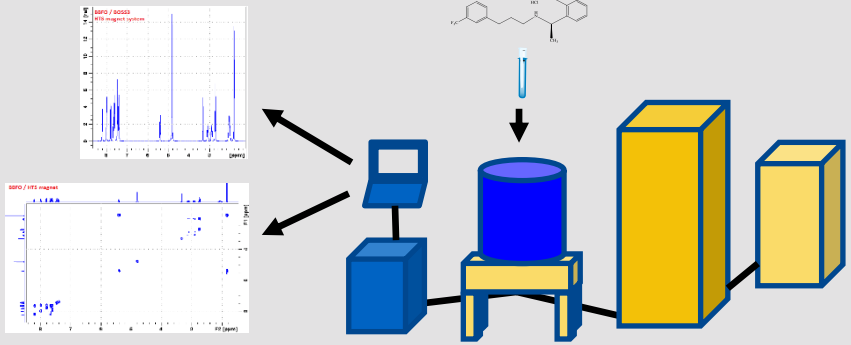
SYMBIOTIC SCIENTIFIC COLLABORATION





Maria is happy!

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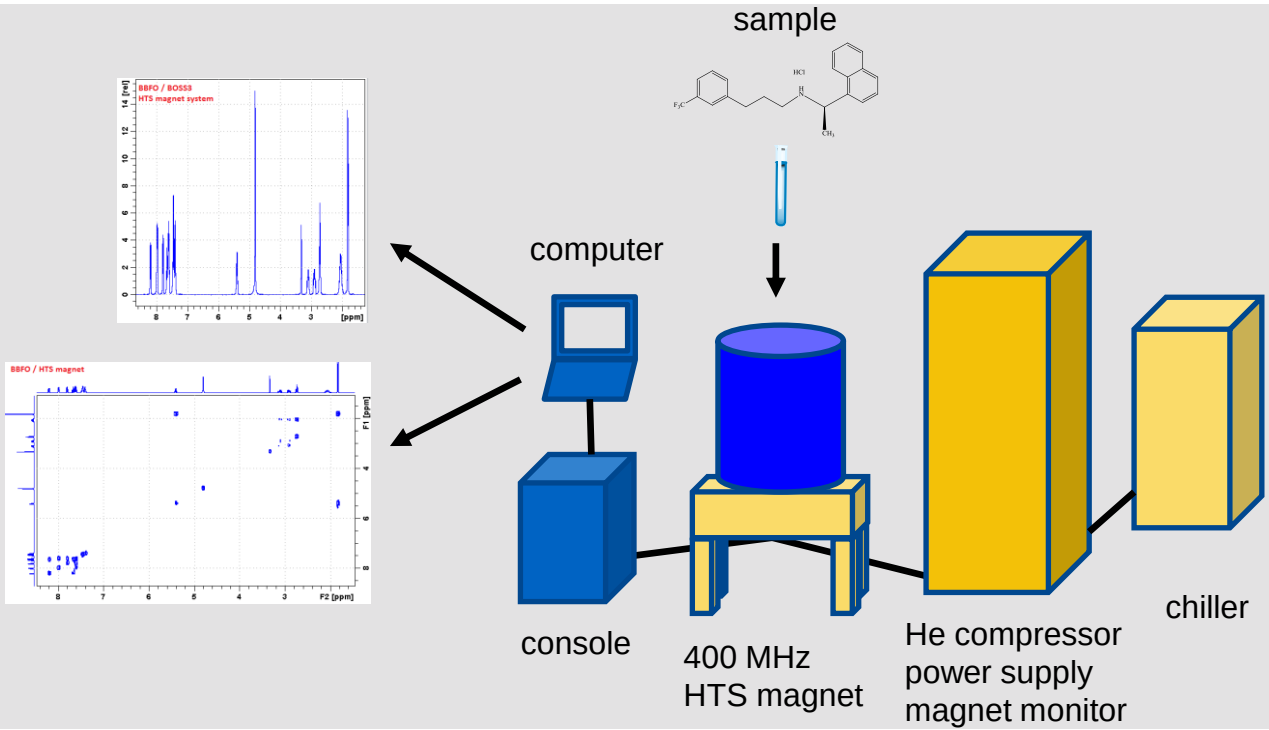
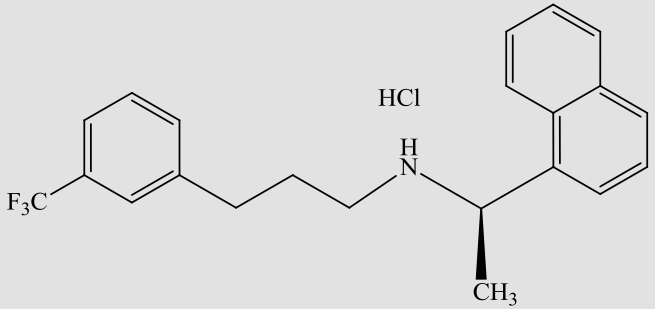
SCHEMATICS OF THE INSTRUMENT



Silva Elipe, MV, Donovan, N, Krull, R, Pooke, D, Colson, K, 2018, submitted

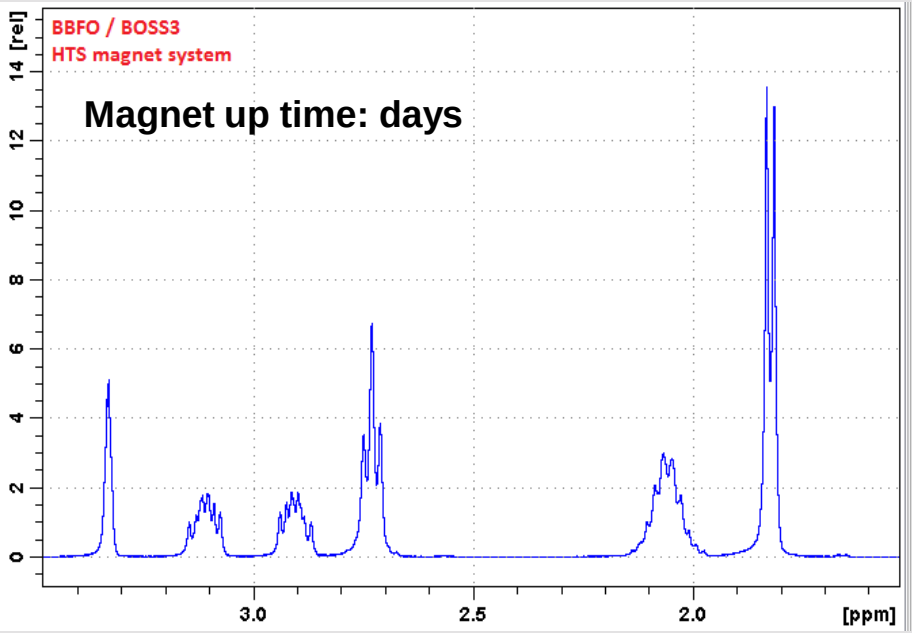
CINACALCET HCL

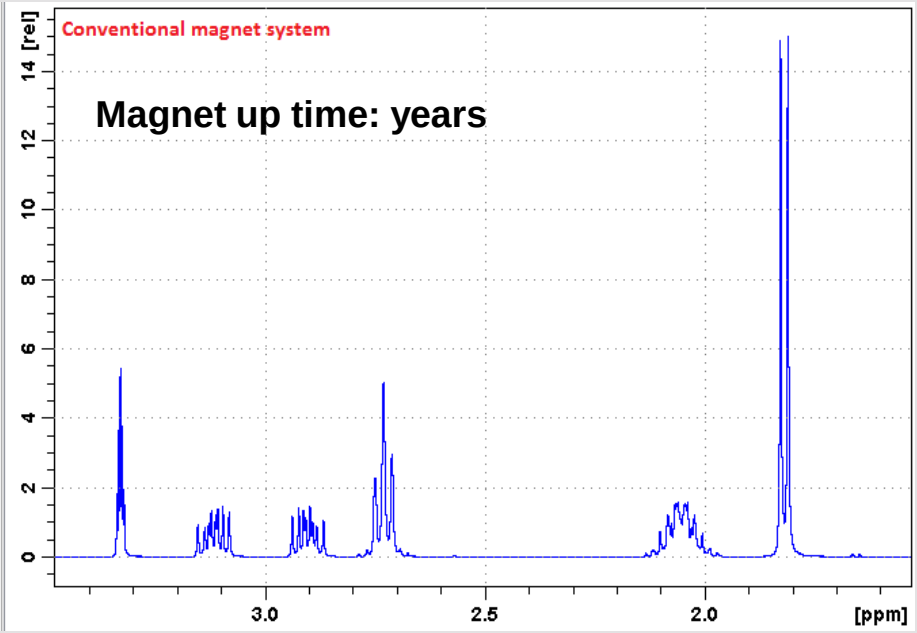
- **API of commercial oral formulated tablets of Sensipar®/Mimpara®**
- **Approved in 2004 by FDA as Sensipar® and by EMEA as Mimpara®**
- **Therapeutic indications:**
  - **Secondary hyperparathyroidism (sHPT) for patients with chronic kidney disease (CKD) on dialysis**
  - **Primary hyperparathyroidism and parathyroid carcinoma**



cinacalcet HCl

COMPARING 1D 1H NMR ALIPHATIC REGION OF HTS NMR SYSTEM WITH CONVENTIONAL NMR INSTRUMENT





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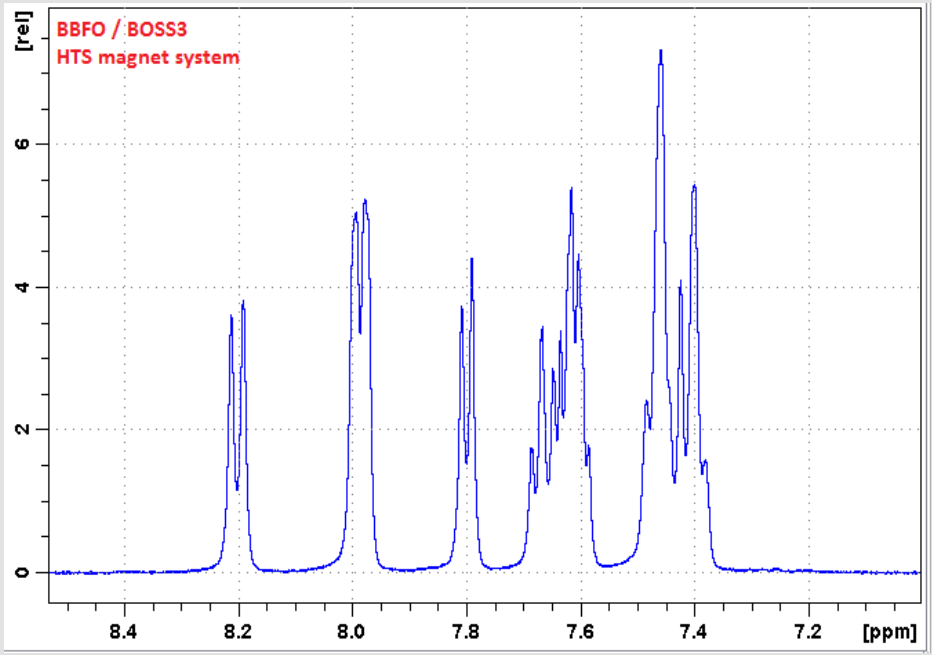
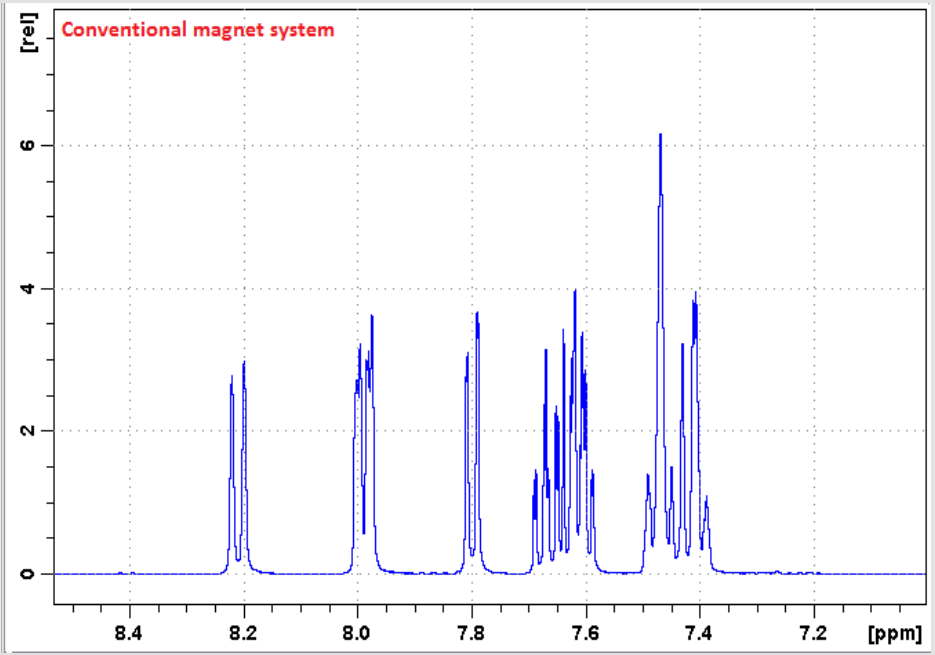
COMPARING 1D 1H NMR AROMATIC REGION OF HTS NMR SYSTEM WITH CONVENTIONAL NMR INSTRUMENT





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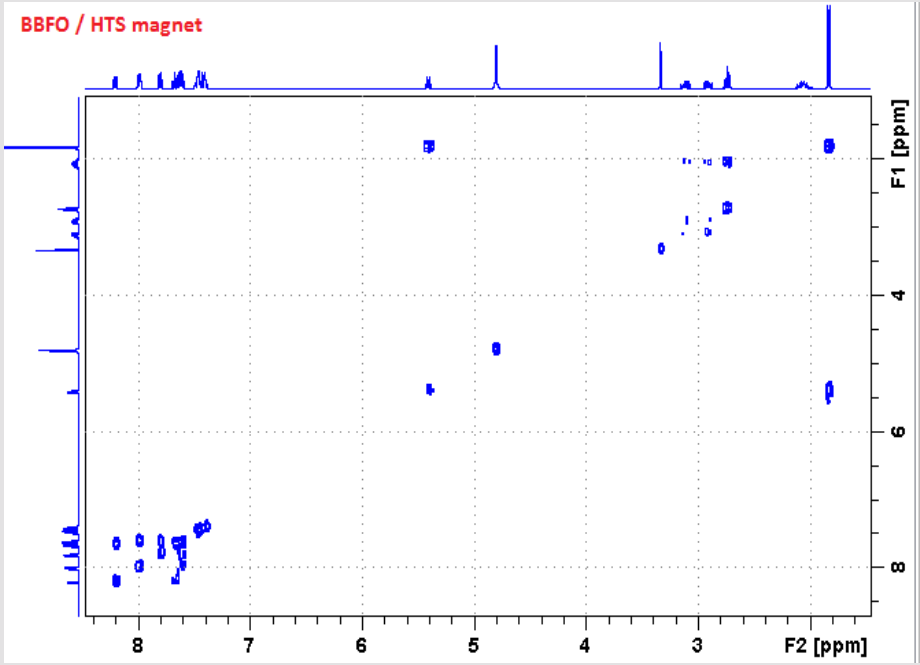
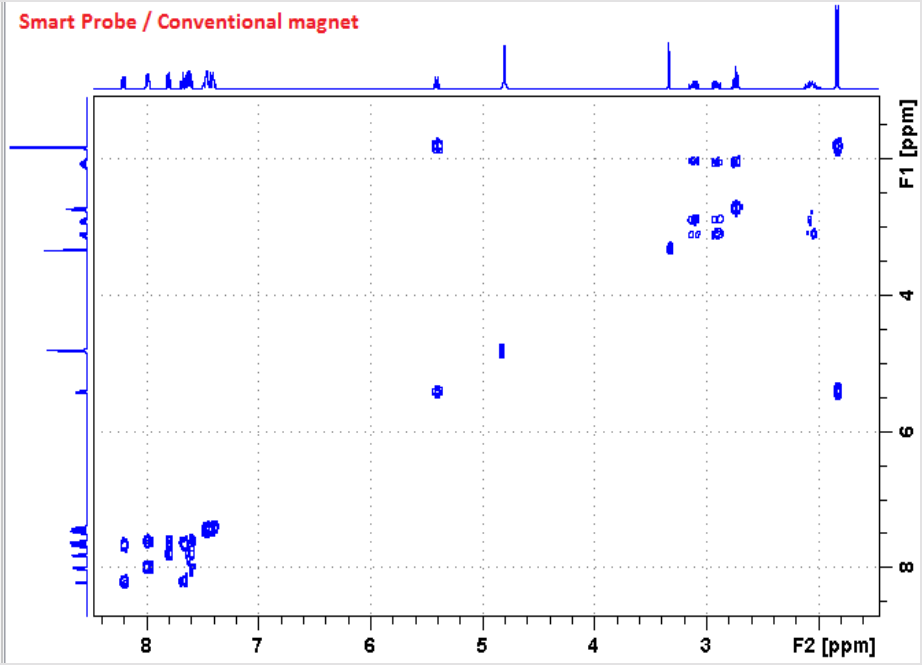
COMPARING 2D COSY OF HTS NMR SYSTEM WITH CONVENTIONAL NMR INSTRUMENT





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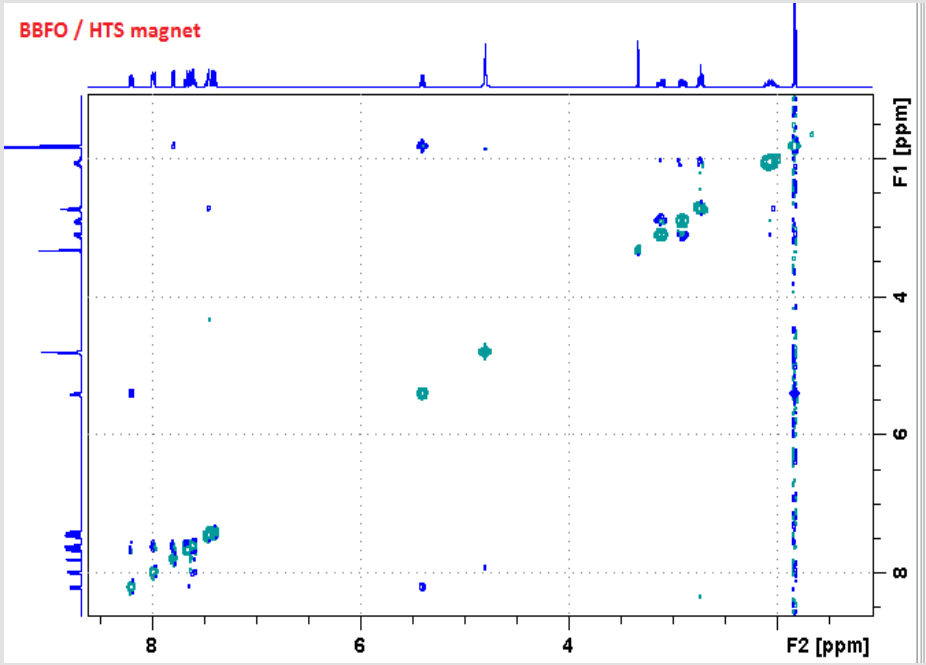
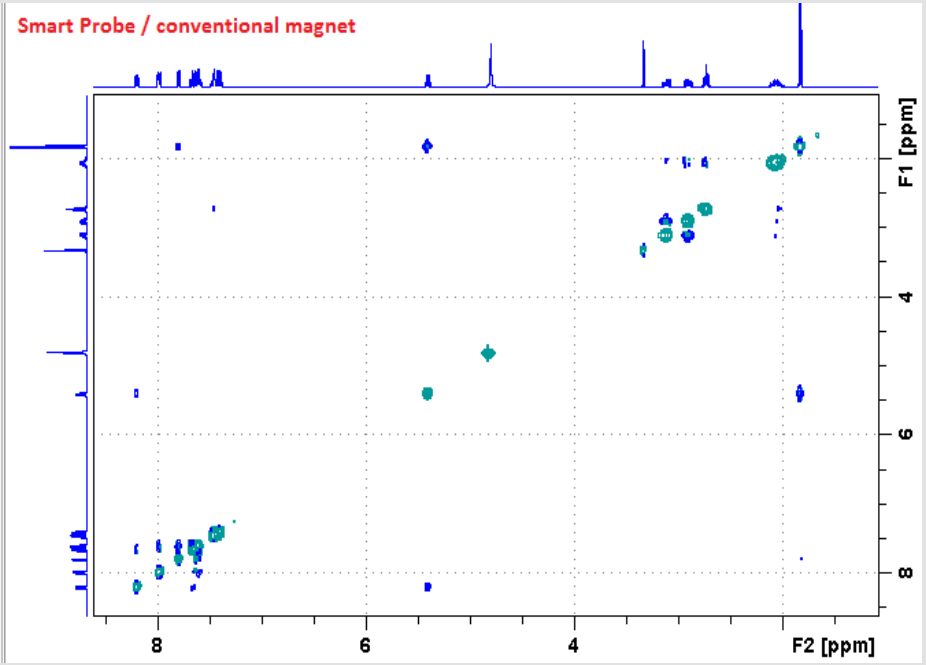
COMPARING 2D NOESY OF HTS NMR SYSTEM WITH CONVENTIONAL NMR INSTRUMENT





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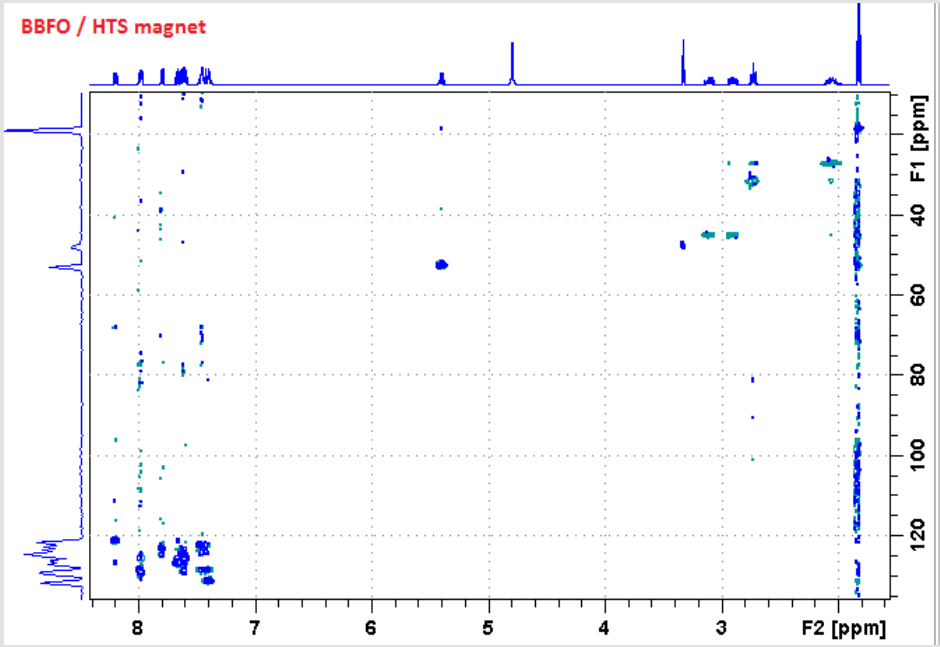
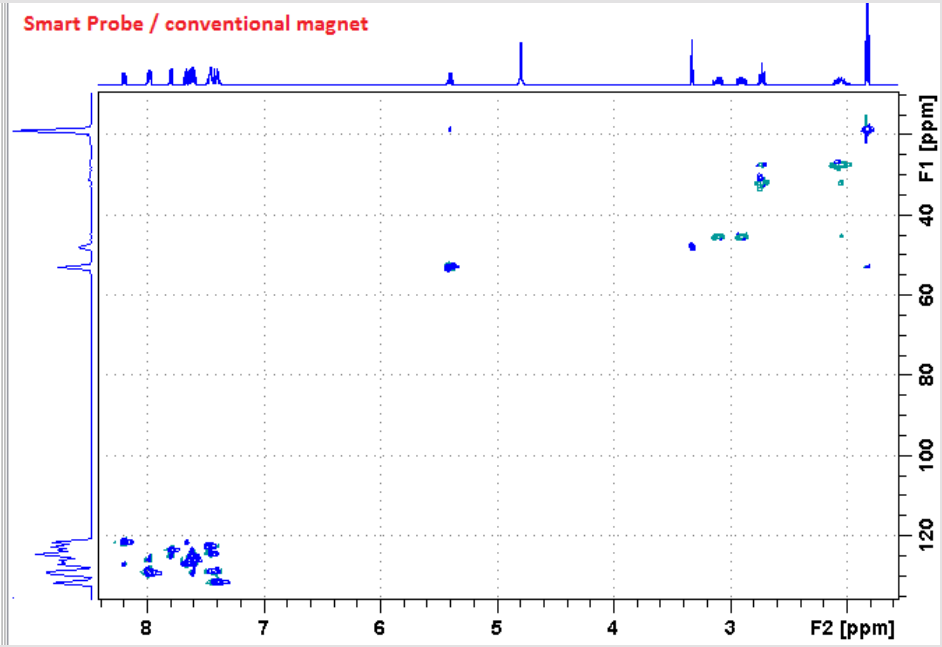
COMPARING 2D 1H-13C HSQC OF HTS NMR SYSTEM WITH CONVENTIONAL NMR INSTRUMENT





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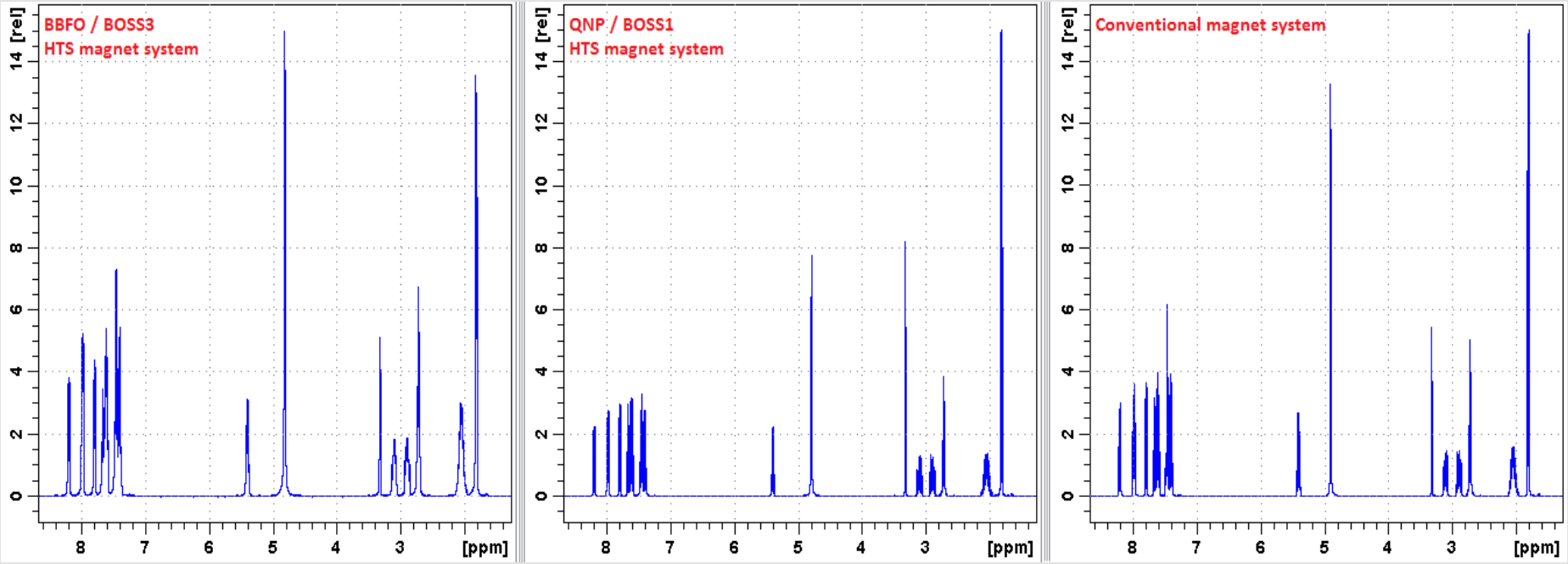
COMPARING 1D 1H NMR OF HTS NMR SYSTEM (BBFO/BOSS3 AND QNP/BOSS1) WITH CONVENTIONAL NMR INSTRUMENT



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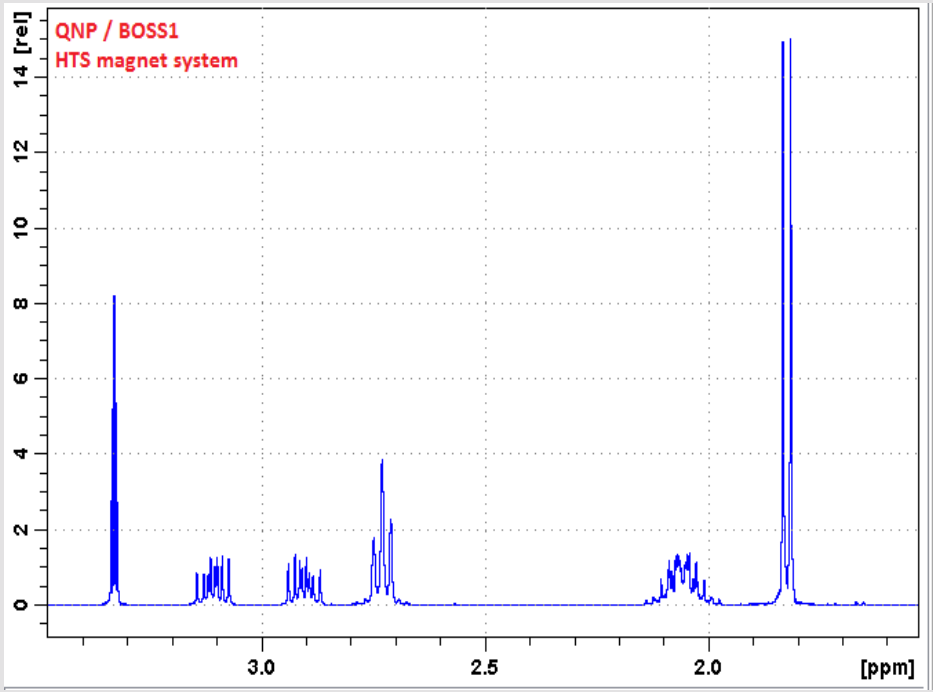
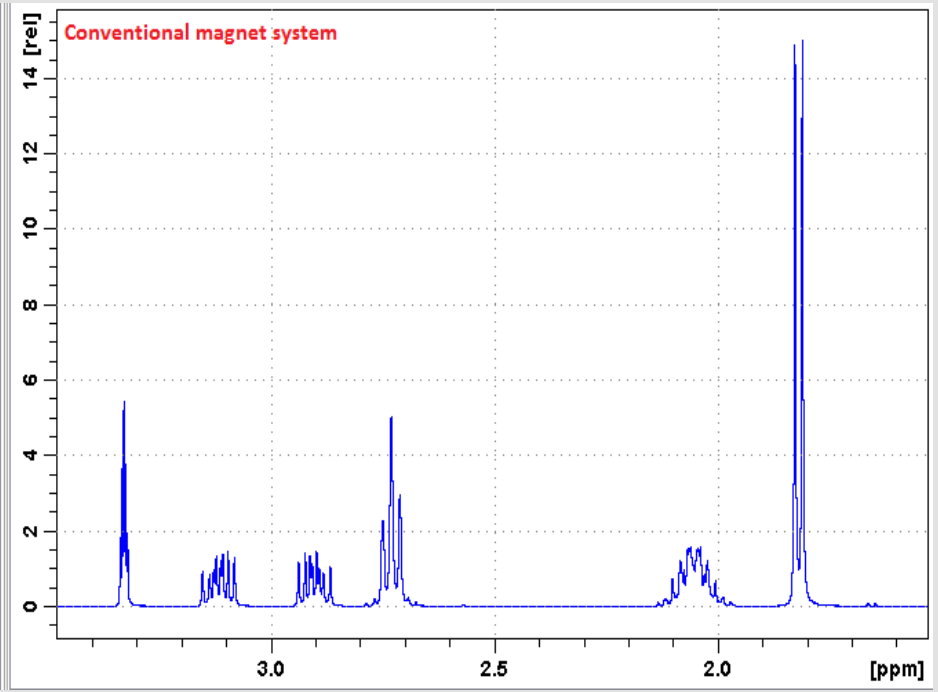
COMPARING 1D 1H NMR ALIPHATIC REGION HTS NMR SYSTEM (QNP/BOSS1) WITH CONVENTIONAL NMR INSTRUMENT





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HTS NMR SYSTEM INSTALLED AT AMGEN CHEMISTRY LAB

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PROS AND CONS OF HTS MAGNET SYSTEM

Pros:

- No need to fill with liquid cryogens (no liquid N2 and He needed) and no O2 sensors
- Easy access to chemist (in the same lab with no restricted access)
- Small footprint magnet (can site in hood, easy sample insertion, small stray field)
- Quick installation (couple of days to field and acquiring data)
- Ability to shutdown magnet during times of non-use (easy to do by the user, no need for engineer, magnet can be easy moved to other location if needed, no need for extra money)

Cons:

- Sensitive to power outages (UPS/generator needed)
- Compressor & power supply must be nearby (real-estate)
- Water cooling or air-cooling needed
- Noisy equipment (He compressor)

ACKNOWLEDGEMENTS

- **Amgen Sponsors: Janet Cheetham & David Semin**
- **Cinacalcet HCl sample from Amgen: Minhui Ma & Robert Munger**
- **Bruker BioSpin: Clemens Anklin**
- **Others: many people helped through the process**

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THANK YOU

Elvis is alive and has been working with a cryogenic magnet for decades

But now …

No cryogens????

Oops!!!

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