BioSpec Maxwell MRI

- Intelligent Preclinical MRI
  3 Tesla, 7 Tesla, and 9.4 Tesla

Make the Move to Intelligent MRI

Liquid cryogen-free MRIs take the first step towards cryogen independence, saving both time and money by eliminating the financial expense of cryogen acquisition and the time involved in the tedious fillings, all while conveniently **fitting in every lab**.

BioSpec Maxwell MRIs take MRI innovation to the next level with automated self-supervision, enabling significant reduction of service requirements during installation and throughout the lifetime of your instrument.

This **automated self-supervision** puts the power in your hand to auto-cool and auto-charge the instrument. Combined with **remote monitoring**, it lets you sleep well at night, knowing that your BioSpec Maxwell MRI continually self-regulates to its optimal state so that your research remains undisrupted.

Preclinical MRI at 3 Tesla, 7 Tesla, and 9.4 Tesla with simplified handling and streamlined scanning and analysis combined with full research flexibility provides a completely new small rodent imaging experience.

Put your focus on your research.
Let your BioSpec Maxwell MRI do all the rest.

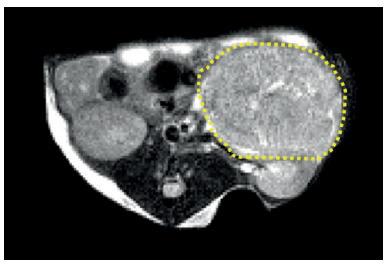
Applications

BioSpec Maxwell MRIs with their leading sequence portfolio and ready-to-use imaging protocols support a wide range of research applications, enabling breakthrough discoveries in preclinical research.

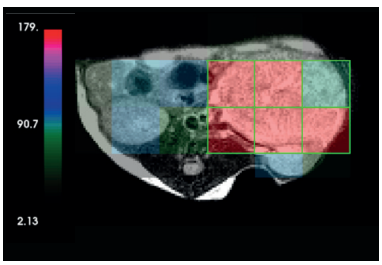
Oncology

Spectroscopic imaging of hyperpolarized pyruvate and lactate conversion reveals intertumoral variation in patient derived renal cell carcinoma. 2D EPSI at 3T after infusion of hyperpolarized [1-^{13}C] pyruvate in mouse model.

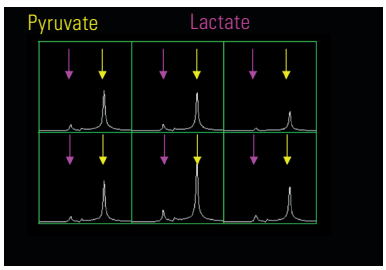
Courtesy: R. Sriram, S. Subramaniam, D. Peehl, J. Kurhanewicz et al. Pre-Clinical MR Imaging Core, University of California, San Francisco, USA



T2 weighted



T2 weighted + Lactate



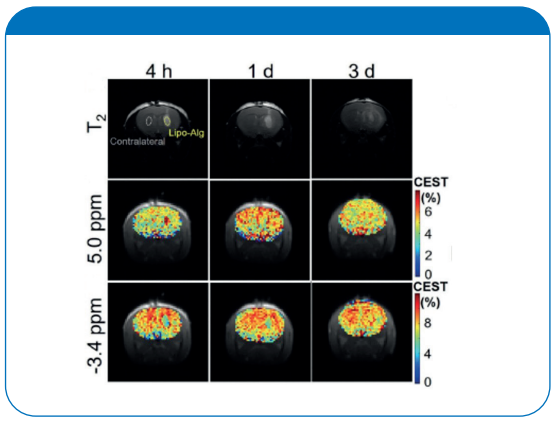
Hyperpolarized Spectra

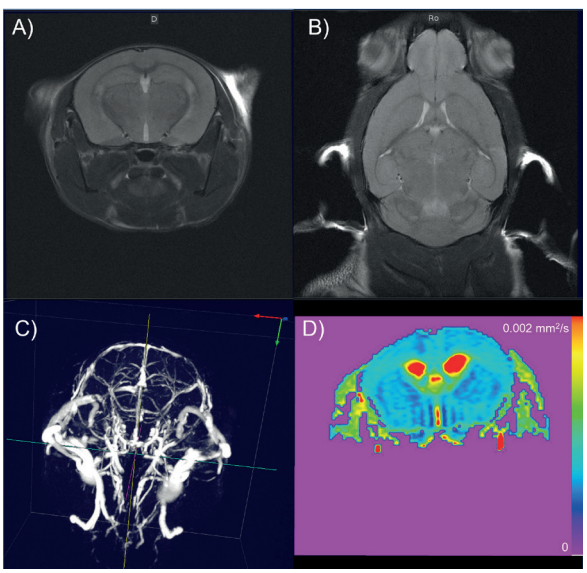
Drug Development

CEST imaging at 3T enables monitoring of compositional changes of hydrogel-based drug treatment for glioblastoma multiforme (GBM), providing valuable insights for treatment refinement.

Courtesy: K.W.Y. Chan, City University of Hong Kong, Kowloon Tong, Hong Kong

Reference: Han, et al., CEST MRI detectable liposomal hydrogels for multiparametric monitoring in the brain at 3T. Theranostics 2020; 10(5): 2215-2228. doi: 10.7150/thno.40146





Neurological Studies

Mouse neuro imaging at 9.4T. A+B) T2 weighted RARE images C) Time of Flight Angiography and D) ADC mapping. Combined with high resolution morphological data, perfusion details and quantitative diffusion provide a fuller picture when characterizing neurological diseases.

Maximum Productivity

Ease of Use from the Very Beginning

BioSpec Maxwell MRIs fit perfectly into existing lab structures, expanding biomedical research capabilities with easy-to-use MRI. User comfort and confidence is put at the forefront with these small instruments that give the user a feeling of sureness.

Touchscreen animal positioning and animal cradles with a quick-lock interface automatically connecting all monitoring and life support connections make preparation fast and easy. With over 100 pre-validated protocols for studies on i.e., morphology, perfusion, and angiography to use right out of the box, and intuitive workflows including automatic quantification, even scientists who are new to MRI to have the certainty that they will achieve the results they desire.

Combining a BioSpec Maxwell MRI with a state-of-the-art PET insert or inline module expands the range of research possibilities to provide even deeper insights using one integrated instrument.

Perfect small rodent imaging has never been easier.

- Animal cradles with quick-lock interface automatically connect all monitoring and life support connections
- Open and closed cradles with anesthetic gas exhaust connection and i.v. tracer injection route
- Water and air heating for animals available
- 3-mouse cradle for enhanced throughput available
- Accurate animal positioning with the motorized Animal Transport System, including touchscreen operation even with gloves for a simplified, precise workflow
- Automatic multi-station imaging for elongated field of views
- ParaVision 360 software with over 100 validated and ready to use *in vivo* protocols and scan programs for mice and rats
- Streamlined workflows including automatic quantification
- Upgradable with state-of-the-art PET for simultaneous or sequential PET/MR

Maximal Results

BioSpec Maxwell

This is a *BioSpec* Maxwell. It features all the superior software and methods, RF coils, animal cradles, and perfect integration aspects that you expect from a BioSpec.

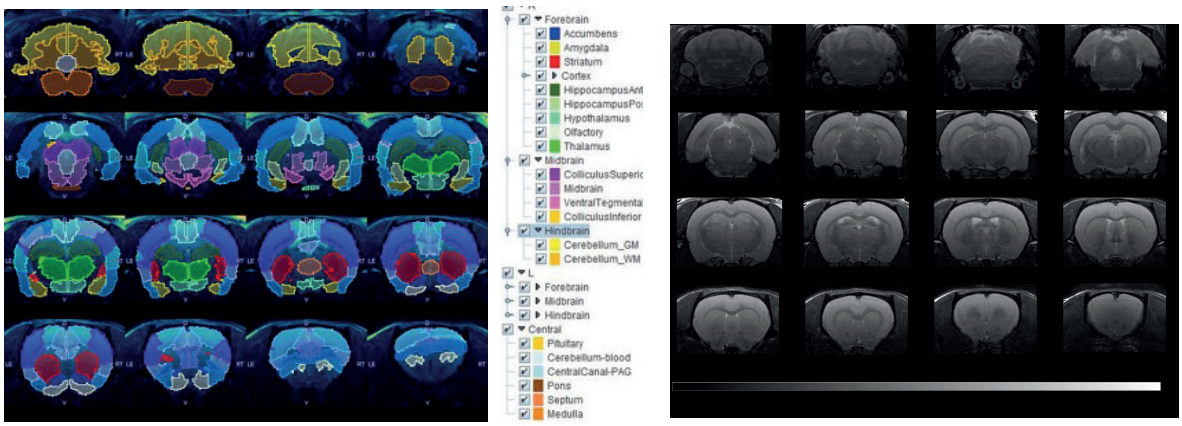
Whether oncology, neurology, inflammation, or beyond, BioSpec Maxwell MRIs give you the flexibility to perform the studies you want and the stability to achieve the results you need.

Studies on mice, large rats, or others can be effortlessly performed due to the best-in-field 82 mm RF free coil access. Anatomic specific coils and the MRI CryoProbe with an up to 5-fold SNR boost, ensure optimal scan results.

The accompanying ParaVision 360 software with more than 1000 sequence & contrast possibilities provides maximal imaging freedom and sophisticated quantification. Beyond this, researchers pushing boundaries have complete freedom to design novel studies via the method development platform. Even the most delicately designed studies can be reliably conducted due to the instrument's extreme physical stability, resulting from most advanced pulse-tube cold head technology.

Let your studies only be limited by the power of your imagination.

- 3 Tesla, 7 Tesla, and 9.4 Tesla
- Maximum experiment freedom for studies on mice and rats with support for very large rats with best-in-class free RF-coil access of 82 mm
- ParaVision 360 software with more than 1000 sequence variations and advanced quantification
- Method development platform
- Most advanced pulse-tube cold head for minimal vibrations for sensitive studies such as fMRI and diffusion
- High performance floor vibration isolation with magnet self-leveling
- Gradient strength up to 900 mT/m, Slew rate: 4200 T/m/s
- State-of-the-art AVANCE NEO electronics
- Highly synchronized gradient chain with up to 1 µs timing for extreme artifact reduction
- Built-in automatic B1 mapping and optimization with dual primary channel, which can be extended up to 8 channels
- Prospective drift correction for stable long-term measurements



Rat brain RARE at 7T, segmentation with pmod

Maximum Cost Savings and Safety

Cryogen and Siting Freedom

Innovative Maxwell magnet technology[1] eliminates the need for liquid helium refilling and the depencency on future supplies.

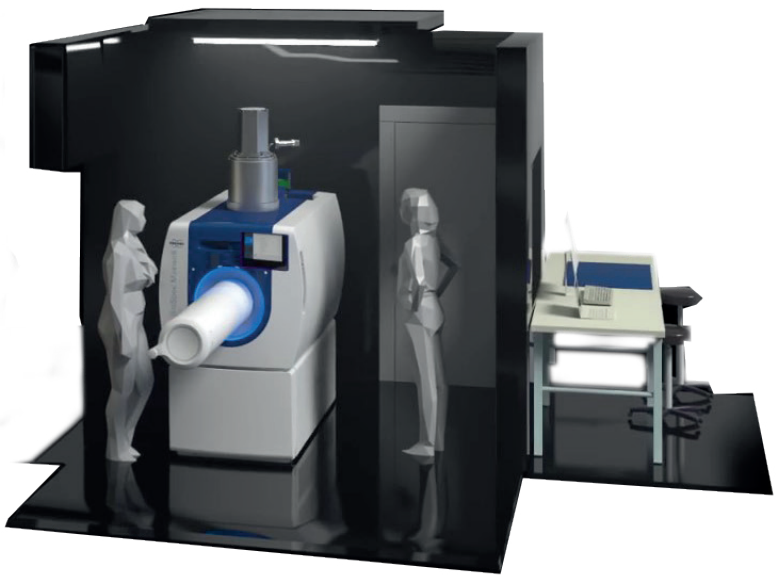
No cryogen filling also means cost savings of the cryogens themselves, the price of which can vary greatly. Additionally, it does away with the storage space, logistics, and technical personnel time that are involved in this traditional process, all of which lead to cost savings throughout the lifetime of the instrument.

The compact size and light weight of the BioSpec Maxwell MRIs and the fact that they require neither a quench pipe nor a Faraday cage, allows them to be easily sited within existing buildings with no need for additional extensive construction and infrastructure costs, which in some cases are higher than the cost of the instrument itself.

Furthermore, their inherent shielding allows them to be easily integrated into existing laboratories and close to other modalities.

BioSpec Maxwell MRIs are just as easy and safe to use as any other equipment within your laboratory.

- No liquid helium or nitrogen fillings necessary
- No Faraday cage required
- No quench pipe required
- Lightweight and compact footprint
- Safe operation with inherent shielding



[1] EP3488451, U.S. Pat. Pend.

Maximum Uptime

Superior Surveillance

A magnet quench can cause massive disturbance of valuable studies, leading to immense financial setbacks and loss of reputation with collaborators.

The BioSpec Maxwell MRIs are designed for maximum uptime. Unlike other cryogen-free magnets technologies without a liquid helium bath, the Maxwell magnet technology itself ensures an extremely long hold-time of a minimum of 6 hours during a cooling disruption[1].

On top of this, approximately 30 integrated sensors constantly monitor a multitude of instrument parameters, enabling the instrument to auto-cool[2] itself to its optimal running temperature even after a cooling disruption, as soon as the surrounding infrastructure permits.

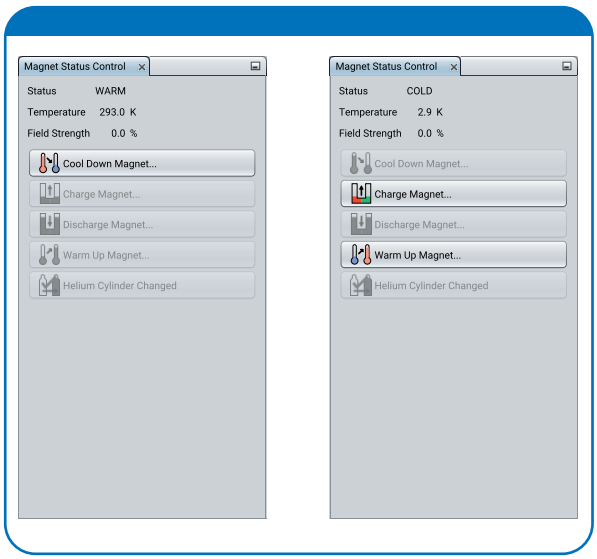
What makes this sensor monitoring stand out even more, is that the monitoring of all steps of auto-cooling and auto-charging allows one-click cooling, warming, or charging options.

Installation, and relocations are easier than ever and a simple one-click within the ParaVision 360 software can also take the instrument from field if needed for, i.e., BSL disinfection or decontamination.

This extreme reduction of the necessity of service personnel intervention leads to decreased service costs and shorter service times since many actions can be performed with the autonomous instrument control.

With BioSpec Maxwell MRIs, it is just as if an expert engineer were standing by all the time.

- Hold-time minimum of 6 hours during cooling disruption
- Extensive sensor monitoring of vital instrument parameters and operation with remote monitoring option maximize uptime and minimize related service costs
- One-click auto-cooling[2]
- One-click auto-warming[2]
- One-click auto-charging
- One-click auto-discharging



One-click intelligent magnet control: A warm magnet can be auto-cooled and subsequently charged. When the magnet is in a cold state, the user has the options to either charge the magnet or warm it up to ambient temperature.

[1] 3T: 4 hours, 9.4 T: 4 hours during power outage

[2] patent pending, , auto-cooling/-warming and auto-charging/-discharging is only available for 7 T and 9.4 T

Technical specifications	
Magnet Technology	Maxwell liquid cryogen filling-free
Field Strengths	3 Tesla, 7 Tesla, 9.4 Tesla
Bore size	17 cm
Hold-time	Minimum of 6 hours[1]
Faraday cage required	No
Quench pipe required	No
Minimal vibration pulse tube cooler	Yes
MRI CryoProbe compatible	Yes
Integrated PET insert or inline available	Yes
Advanced ParaVision 360 software	Yes
Dimensions (LxWxH)	2.71 m (3T: 2.54 m) x 0.96 m x 2.06 m (3T: 1.94 m)
Weight	<1.75 t (3T: 1.35 t)

[1] 3T: 4 hours, 9.4 T: 4 hours during power outage

For More Information

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