

numares
insider



HANDS ON

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INSIDE

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NEWS

Sustainability at numares

2020

Welcome to *numares insider*



Volker Pfahlert



Philipp Pagel

We see great commitment to adapting to the circumstances and keeping projects and day to day business running as smoothly as possible.

These are difficult times for everyone – we see our customers, collaboration partners, suppliers and employees struggle with the challenges brought upon us by the current virus pandemic and the counter measures that had to be taken to fight it. At the same time, many of you play an active role in ensuring the essential testing capacities needed to fight the infection as well as keeping up as much of normal operation as possible to sustain business and ensure patient care. Despite the difficulties all of this entails, we are very impressed by the way most people handle the situation: we see great commitment to adapting to the circumstances and keeping projects and day to day business running as smoothly as possible – inside numares and in all the other companies we work with.

In this spirit, we are publishing this issue of the numares insider and we hope that the topics we picked this time are of interest to you. We believe that things like sustainability, our MGS® approach to reliable NMR diagnostics and instrument maintenance are no less important, today than they were before.

As travel is restricted at the moment and most conferences have been canceled or postponed, we are glad to have modern technology available that allows us to stay in touch with you. Nevertheless, we are very much looking forward to meeting you in person again, once things get back to normal.

We hope you enjoy this issue of the *numares insider*.

Handwritten signatures in blue ink. The first signature is "V. Pfahlert" and the second is "Ph. Pagel".

Volker Pfahlert, Chief Executive Officer

Philipp Pagel, Chief Medical Officer

Magnetic Group Signaling™ (MGS®)

– numares' key to make NMR accessible to routine diagnostics

Nuclear magnetic resonance (NMR) spectroscopy was first described and measured by Isidor Rabi in 1938. Since then, NMR has made its way into various research facilities mainly to obtain physical, chemical, electronic and structural information about molecules. On the other hand, the great success in areas like routine diagnostics just didn't happen for many decades – but why? In this short review, we address this question and explain how numares has succeeded in taming a highly complex research instrument and turning it into an easy-to-use diagnostic analyzer for high-throughput purpose.

Historically, an NMR spectrometer is designed to meet researchers' needs. The needs slightly differ between foci of different groups but have a great intersection on optimal resolution, the possibility to customize the hardware of the machine as well as the machine's software setting before every single experiment. This has resulted in a set up in which the operator has a lot of possibilities to adjust the machine to the respective needs on both, software and hardware. Thus, besides the missing standardization, this also has resulted in a situation that only highly trained specialists can adjust, operate and maintain such a powerful tool – not to



The real beauty of the AXINON® IVD System lies below the hood: The Magnetic Group Signaling™ (MGS®) technology. An NMR machine under control of the AXINON® Software, empowered by MGS® unleashes its whole strength: the simultaneous and reproducible elucidation of metabolite constellations in a native sample.

mention the interpretation of any result which for a layman is not more than a zigzag pattern of peaks.

In research setting, this is not an issue and mostly even intended, but in the context of a clinical diagnostic laboratory completely other requirements have to apply. Questions about throughput, usability, standardization, robustness, inter-run/day/machine/site reproducibility, cost efficiency, compliance with regulations, etc. have to be addressed. Flexibilities in settings suddenly become a no-go and highly trained specialists are not only rare but also expensive. So in summary, a lot of desired requirements in the research setting are diametric to the application as a diagnostic tool. At this point, numares' *AXINON*[®] IVD *System* comes into play.

The first step towards a diagnostic IVD system was the definition of a standardized NMR hardware setting. On top, numares has created a user friendly *AXINON*[®] *Software*, which controls the NMR machine and thus also allows employees on technician level to operate the NMR system like a normal lab analyzer. However, the real know-how and the real beauty of the system lies below the hood: the *MGS*[®] (*Magnetic Group Signaling*TM) technology. An NMR machine under control of the *AXINON*[®] *Software*, empowered by *MGS*[®] unleashes the whole strength of the *AXINON*[®] *System*: the simultaneous and reproducible elucidation of metabolite constellations in a native sample.

In the past, it was only possible to measure single diagnostic markers like Troponin I, CRP or Glucose. Sometimes, this is sufficient if a condition makes a single metabolite deregulate substantially and at the same time specifically so that we can use it as a diagnostic marker. However, human metabolism is complex and thus very often one single marker alone

cannot indicate a disease with sufficient sensitivity and specificity. One has to consider multiple metabolites at once. Beyond, not only their individual concentrations but also their interplay and molecular dependencies. In short, what's needed is the body's metabolite constellation. The *AXINON*[®] *System* can measure the metabolite constellation and automatically interpret it for presenting a diagnostic result. How does this work?

Finding metabolite constellations among hundreds of signals which have the possibility to discriminate sick from healthy is not easy. We use artificial intelligence to analyze study data together with NMR metabolite measurements to identify the markers that carry the most information about the disease in question and to build an equation that represents the metabolite constellation.

Machine learning comprises a number of methods within the field of artificial intelligence. numares applies many sophisticated statistical algorithms to samples of clinical studies to extract information. During this development phase we use a significant amount of labeled samples of both healthy and sick subjects to identify the signals that separate the two classes ("learning the difference"). We complement this with the expertise of our highly skilled statisticians, biochemists and physicians to guide the learning process also with human knowledge. The resulting models of this metabolite constellation can then be used to predict whether a patient is healthy or sick. All this experience, know-how and innovation is combined in *MGS*[®], which allows labs all over the world to enter the next generation of diagnostics. □

#numares @ Social Media

Welcome to the social media world of *numares*! By following the LinkedIn ([linkedin.com/company/numares-ag](https://www.linkedin.com/company/numares-ag)) profile of *numares*, you will get a continuous flow of news around our products, developments and the company itself. Here is an excerpt from the latest news:



We are proud that laboratories of the Limbach Gruppe SE are using our technology to provide their clients advanced lipoprotein testing for CVD risk assessment providing additional parameters beyond the common standard lipid panel. With Metabolomics, Machine Learning and NMR-based MagneticGroupSignaling technology, numares shapes Novel Clinical Diagnostics!

We aim at developing diagnostics with highest patient benefit that fill the gap of unmet diagnostic needs for cancer, cardiovascular disease & kidney disease as well as multiple sclerosis and kidney transplantation. Learn more about it and which labs are using numares AG technology: <https://lnkd.in/dnzui5S>

TIME FOR A PARADIGM SHIFT: Acknowledging commentary of Atul K. Sharma of University of Manitoba and Tom Blydt-Hansen of the University of British Columbia regarding the latest joint publication with our partner at Universitätsklinikum Regensburg about diagnostic test development that „[...] promises a practical approach to risk assessment in renal allograft recipients with and without clinical signs of AR“ (=acute rejection). <https://lnkd.in/djJDtxU>

The findings of our prospective, observational clinical study "UMBRELLA" testing a novel method using metabolite constellations of urinary biomarkers to detect early kidney rejection reactions after transplant was published in October 2019.

numares AG is now on YouTube: [http://ow.ly/9mRr50yjghA!](http://ow.ly/9mRr50yjghA)

Subscribe to our channel and stay updated about events, developments and supportive video material for clients, who are using numares technology in clinical routine.

Enjoy watching!



There are several key maintenance tutorials online to support you:

- How to clean the NMR probe
- How to exchange the NMR pincer
- Reboot the AXINON® System
- coming soon: sample preparation

The channel will be continuously expanded with additional video material. □



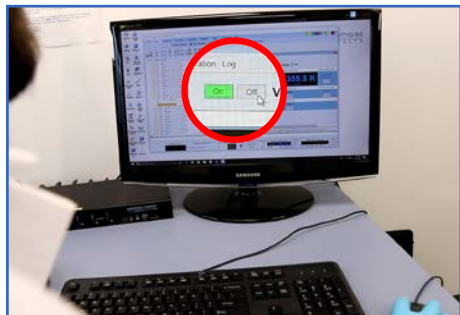
 @AgNumares
 @numares AG

 @numares NMR diagnostics
 @numaresAG

numares' Video Tutorial Series:

How to clean the NMR probe*

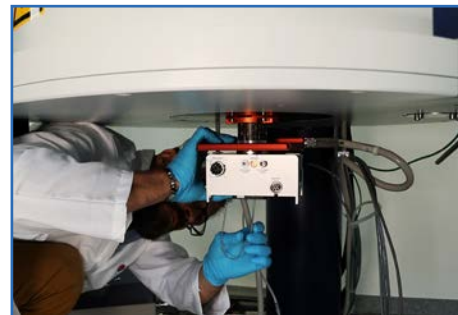
**Only for trained personnel. Also refer to Bruker manual: Bruker NMR magnet system.*



Turn off the temperature control unit (vtu) in TopSpin.



Carefully disconnect all cables and the BCU connection from the probe.



Loosen the screws at the bottom of the probe while holding the probe.

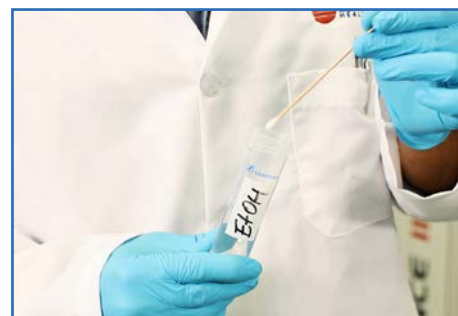
! Hold the probe tight to prevent fall and damage !



Slide the probe carefully out of the magnet.



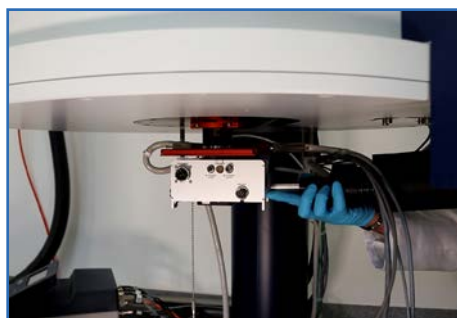
Place the probe upright onto a stable surface. Avoid tipping it over.



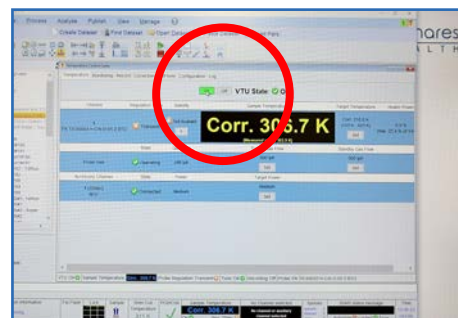
Soak the tip of a cotton swab with 96% ethanol from a clean tube. Use lint-free swabs to ensure probe is not contaminated.



Insert the cotton swab carefully into the upper part of the probe until you feel resistance. Repeat this procedure 2x with fresh, clean ethanol soaked cotton swabs. Let the probe dry for several minutes before remounting.



Reinsert the probe and fasten screws. Reconnect all cables and reattach the BCU connection.



Turn on the temperature control unit (vtu) and wait for 30 minutes. Perform a temperature calibration. (see NMR Maintenance Guide for AXINON® test systems).

Find more helpful video tutorials on numares' YouTube channel...



Pleased to meet you

Due to the Covid-19 pandemic, numares has cancelled its attendance at several events this year. As many conferences and trade fairs have switched to new dates, we will be happy to be at your disposal at the ASN and AACC later this year.

If you want to contact us independently from any event, please get in contact with our US Sales Director Sean Keohane to arrange an individual appointment.

Thank you for your comprehension and stay healthy!



American Society of Nephrology (ASN) Kidney Week

October 20-25, Denver, CO

<https://www.asn-online.org/education/kidneyweek/archives/future.aspx>



American Association for Clinical Chemistry (AACC) Annual Scientific Meeting

December 13-17, Chicago, IL, USA.

<https://meeting.aacc.org/>

For appointments, please contact: marketing@numares.com □

Christiane Proll, Marketing

Sustainability at numares

Walking through the company at a business day, you can see what we live – diversity in different ways. You meet around 60 people from 12 nations and by talking you can improve your skills in French, Swahili, Spanish and Bavarian – just to name a few. Every day numares benefits from diverse educational backgrounds, making decisions with expertise e.g. from physicists, chemists and IT specialists. In general, over ten fields of education contribute to a manifold way of thinking.

Regarding the flexible working time and day nursery, numares represents a company that supports the balance of having both a career and children. The positive side effect is a balanced gender relation - a welcome enrichment for the company that is also reflected in gender pay equality.

Recently, numares joined a local initiative to support STEM (Science, Technology, Engineering and Mathematics) projects, looking forward to providing



numares at the Wear Red Day. Several employees contributed to the National Wear Red Day raising awareness for Women's Heart Health by wearing red.



Values



Commitment



Integrity



Charity



Partnership



Sensitivity



Green initiatives



Collaboration



Honesty

young adults insights into the daily work in the development of diagnostics.

Moreover, the collaboration with institutions of higher education in Regensburg will be further expanded for students interested in science. To care for talents in the next generations is a kind of sustainable project and opens up new perspectives: what else can we do now for the future?

Regarding current environmental developments in the world, corporate responsibility (CR) is not only to be discussed, but must be implemented. numares has already reduced the use of paper by adapted documentation processes and will continue in this direction to become a “paperless” company.

Furthermore, sustainability comprises not only benefits for the environment but also for personnel: numares makes the way to work more convenient by subsidizing the tickets for public transport.

That are only a few examples how daily work benefits from diversity: different ideas lead to new sustainable innovations and that will further accompany numares in the future. □

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