ONCOLOGY

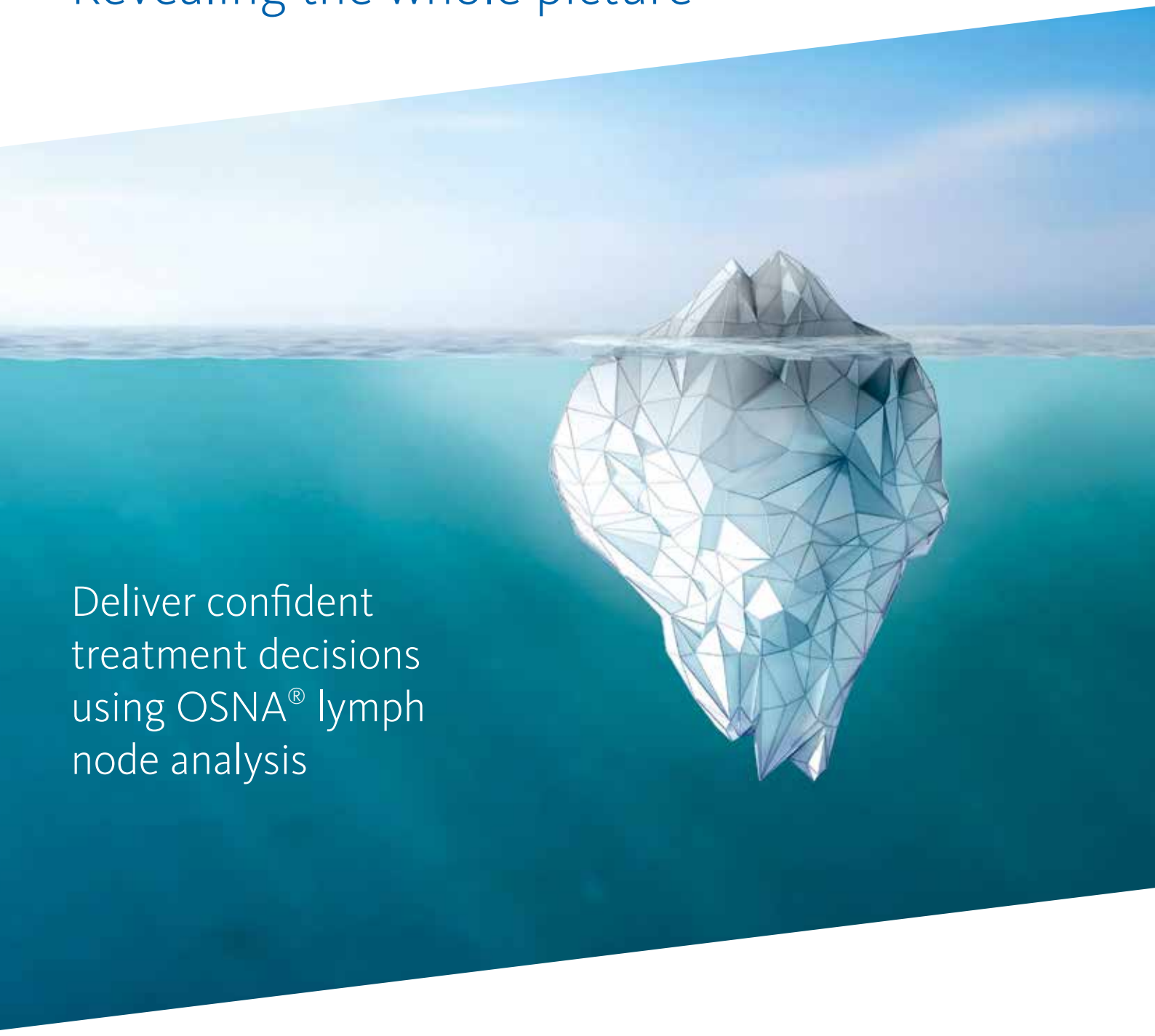
# REPORT

1/2018

# THE FUTURE OF DIAGNOSTICS

New paths of investigation for diagnosing cancer and making therapy decisions

# Revealing the whole picture



## Deliver confident treatment decisions using OSNA® lymph node analysis

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'INNOVATION IS NOT ABOUT HAVING IDEAS – IT'S ABOUT FINDING SOLUTIONS' AARON SHAPIRO

Dear reader,

Welcome to the first edition of Oncology Report. It strives to give readers an insight into how and why Sysmex is engaging in the field of oncology and how our products contribute to improving the diagnosis and treatment of cancer patients.

For us at SYSMEX, innovation means developing and offering what is necessary and useful – and not so much providing what is technologically possible. The main question to be answered is: where are the real medical needs in the field of diagnostics and therapy decision making? It requires experience, time and close communication between clinicians and industry to identify what solutions are really missing in cancer management.

We would like to support you as healthcare professionals in doing your job to the highest of standards. A few concrete and outstanding examples of our close collaboration are described in the current Oncology Report. We asked doctors from the University Clinics in Barcelona to discuss the theory, practice and benefits of lymph node analysis in breast cancer. Prof Ann Smeets from the University Hospital Leuven was one of the first clinicans to use the magnetic marker in clinical practice and tells us about her enthusiasm for the method. We have also interviewed Prof Léa Payen-Gay from Claude Bernard University in Lyon about her experiences with the promising BEAMing method. Wolfert Spijker from the Dutch Screening Organisation tells us about the successful use of immunological tests (FIT) in population-wide screening.

Oncology is characterised by rapid change. The product cycles are short, and new studies mean that clinical standards can change even within a short space of time. This challenges us all to remain open to new and unexpected possibilities – our magazine is intended to provide some support in this respect.

With this in mind, I wish you inspiring reading.

*Dr Ines Gröner, MD*
*Senior VP Oncology*
*Sysmex Europe GmbH*

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# LIGHT AND SHADOW

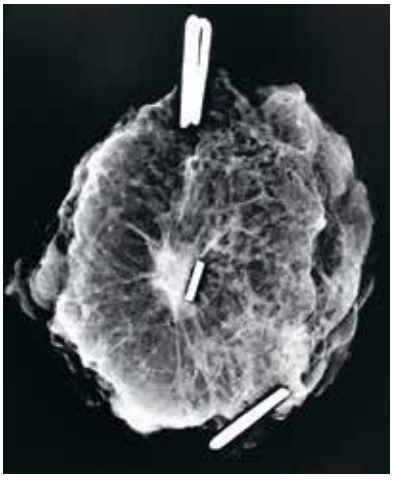
## The complexity of origami mirrors how the term 'cancer therapy' makes us feel

What do Western Europeans think of when they hear the word 'Japan'? Kimonos and sushi, high tech and friendliness, bustling cities and tradition writ large? Is this just prejudice or are we over-generalising what we know about or associate with the country? We like to pigeonhole so that we can handle the flood of information with which we are bombarded, but want to nonetheless perceive the environment as it truly is. This saves precious time and frees up capacity for new thought processes. Brands serve a similar function for a company in that they pack the values and properties into an experience-rich concept that enables them to be conveyed both internally and externally, making them emotional, tangible and easy to remember.

As a long-standing market leader in haematology and an international company with Japanese roots, Sysmex is one such brand. In addition to haematology, Sysmex also focuses on oncology, the subject to which this magazine is devoted, in the form of a wide range of services that is currently in a far-reaching growth and development phase and tightly interwoven with current medical knowledge.

To experts, it is evident that oncology is not about 'cancer as one disease', but as several hundred diseases with one thing in common – the body's own cells reproduce uncontrollably. It is also an undisputed fact that modern therapies intervene in complex molecular networks and it is therefore often impossible to predict which patients will benefit from which approach and to what extent. For patients and their families, the diagnosis is usually a life-changing event, after which insecurity and anxiety, hope and disappointment are constant companions.

Origami, the Japanese art of paper folding, allows fascinating and sometimes highly complex structures to be created from just simple paper. Professionally folded objects are also found today in science and technology, where origami stents, for example, are used to stabilise blocked coronary vessels.
Light and shadow, simplicity and complexity are semantic differentials that reach across cultures to illustrate the affective nature of the meaning of the term 'cancer therapy'. Our company values are closely intertwined with Japanese tradition and modernity, and our entrepreneurial vision focuses on making headway in the complex world of the health industry. Design inspired by origami is both a symbol and a guide to light the way.



Magseed is smaller than a grain of rice. Its helical design optimises its ultrasound, X-ray and Sentimag detectability.

PROF ANN SMEETS

# ON THE TRACK OF THE INTANGIBLE

## Magseed allows surgeons to accurately locate and easily remove impalpable breast cancer

Magseed was launched in the United States at the end of 2016 and has already benefitted over 3,000 patients. The Multidisciplinary Breast Centre of the University Hospital Leuven was one of the first major institutions in Europe to use the magnetic marker in its clinical practice. Surgical Oncologist Prof Ann Smeets talks about her experience:

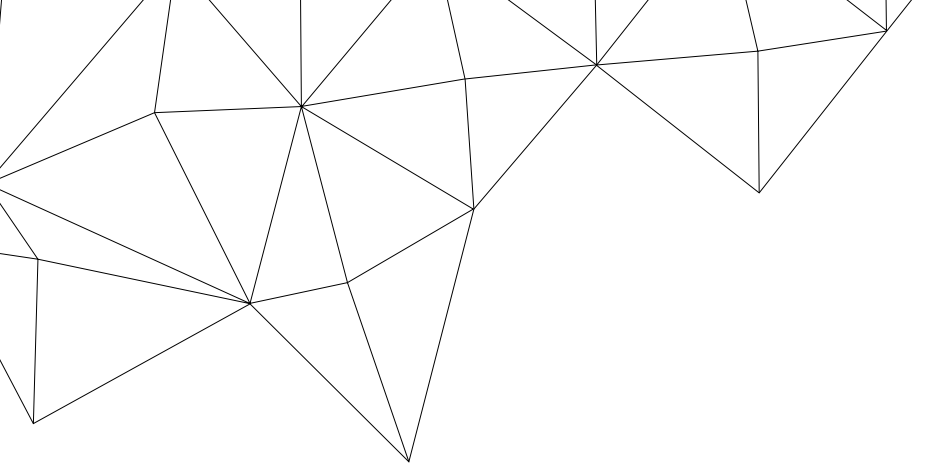
**You have been one of the first clinicians to use Magseed in EMEA: What was your first impression of the new technology?**
PROF ANN SMEETS: From the first interventions onwards, we were very enthusiastic. It was quite easy to perform the procedure, well tolerated by the patients and the operations went very well.

**Why are you considering using an alternative to your current method?**
We have always used the hookwire method in our hospital. It is complicated, painful for the patient and has an extensive workflow. At the time we were thinking about switching to the radioactive seed localisation procedure, I found out about the idea of the Magseed method which sounded much more comfortable. This was really what we were waiting for.

**What are the benefits of Magseed compared to the hookwire method and the radioactive seed method?**
Compared to both methods, the workflow with the Magseed is much easier. We don't have to manage all the radiation safety issues that we have to with the radioactive seed procedure. And compared to the hookwire method, there are different advantages. With the old method, the patient had to first go to the radiology department in the morning and then, after a wait, in for surgery.

**In what way do you think patients can benefit from the new method?**
A few years ago, one of our patients had the same procedure on the other breast using the wire method. This time, we did the localisation with the Magseed and the lady told us that it was much less painful, it was quicker, and the time spent in radiology was shorter.

**Do you believe Magseed has the potential to become thenew standard of care for impalpable lesion localisation?**
I think so and I hope so. At the moment, I see only advantages in the method.



# SOLIDARITY AGAINST CANCER

The development of cancer is the result of the interaction of numerous unfavourable factors. The most important step in combatting cancer is just such an interaction: the complex work can only be mastered by a close alliance between researchers, manufacturers and attending physicians



TEXT Isabell Spilker 

Prof Carsten Bokemeyer is Head of Internal Medicine and the Cancer Centre Hamburg-Eppendorf at the University Medical Centre Hamburg-Eppendorf

'We already know a lot, but are unable to process this information sufficiently'

DR MARC THILL

'We have to find a balance between an aggressive treatment and the quality of life'

DR FRANCESCO CRAFA

'The focus is no longer on the cancer, but the patient'

DR REMY SALMON

The development of cancer is the result of the interaction of numerous unfavourable factors. The most important step in combatting cancer is just such an interaction: the complex work can only be mastered by a close alliance between researchers, manufacturers and attending physicians. Modern therapy decisions are based on agreements between surgeons, pathologists, oncologists, radiation oncologists and specialists from the corresponding medical field. And the therapy itself is a bundle of possibilities from surgery, radiation and chemotherapy, accompanied by increasingly personalised medicine, immunotherapies, nutrition counselling and psychological support. Cancer is not a modern disease; it was already around in ancient times. Paleopathologists have found osteosarcoma in mummified bones that are thousands of years old and records indicate that Egyptian queens suffered from breast cancer. It was only in the 19th century that the potency and significance of cancer became apparent: improved hygiene and the decline of infectious diseases prolonged life expectancy. Humans did not die so much from infections, but more frequently of cancer. The battle against an unknown enemy began.

## A LONG LIFE INCREASES THE RISK

'Women live on average to 82, men to 78', is how Dr Marc Thill, Head of the Clinic for Gynaecology, Obstetrics and Breast Centre at Agaplesion Markus Hospital Frankfurt, explains one aspect of the increase in cancers over the past decades. Mutations in the DNA of special genes that are due to a number of reasons and which trigger rampant cell growth are to blame. The carefully controlled mechanism between cell division and cell death is disturbed. They can grow faster and are more adaptable – they are a more perfect version of normal human cells. Each generation of cancer cells also brings forth some with a slightly different genetic structure and thus could be more resistant to the attacks of the immune system or a chemotherapeutic agent. Only the best-adapted cells survive – the disease makes perfect use of the principle of evolution.

Its ability to change constantly makes cancer a tough opponent with many faces. In truth, there are hundreds of diseases, resulting from around 200 different types of cell in the human body that can develop into malignant tumours in various ways. However, some major breakthroughs have been made in cancer medicine since the 1970s: apart from the discovery of oncogenes, more than 100 of which have since been listed, viruses have been identified as disease triggers, new active substances have been developed, immunotherapies established, therapies on the whole have been customised, sentinel lymph nodes discovered and new paths opened up in diagnostics with liquid biopsy.

## ALL TOGETHER FOR A BETTER RESULT

Dr Francesco Crafa, Head of Oncological and General Surgery at the St. Giuseppe Moscati Hospital in Avellino, Italy, is hoping for some new findings from the tumour research: 'The better understanding of the biology of tumours as well as the concept of a multidisciplinary approach will probably increase the chance of successful cancer treatment in future.' It can already be said that some types of cancer are similar to a chronic disease.

Prof Carsten Bokemeyer, Head of the University Cancer Centre Hamburg (UCCH), also advises that doctors join forces and come to agreements with each other: 'An interdisciplinary approach, in other words the mutual coordination of individual fields, is an absolute necessity for the majority of cancer patients today and quite simply the best solution.' With well-coordinated, new kinds of therapy, drugs and methods, it is becoming increasingly possible to control cancers over longer periods of time with a good quality of life. 'There is a lot of special information in the individual areas that has to be integrated. Formats such as tumour boards have to be found for this to discuss such matters and define strategies for the patients.'

'An interdisciplinary approach is simply the best solution'

PROF CARSTEN BOKEMEYER

The success of this approach is also reflected in the statistics: the mortality rates for certain kinds of cancer have dropped significantly. For patients, this means surviving for much longer with a good quality of life, even in an advanced stage of the tumour disease. The quality of life – alongside the earliest possible and optimised prevention and early detection – has today become one of the most important pillars in dealing with the disease. 'The survival rates have greatly improved thanks to new therapies. We now have to find a good balance between an aggressive, effective treatment and the quality of life', remarks Crafa.

## A FOCUS ON THE PATIENT

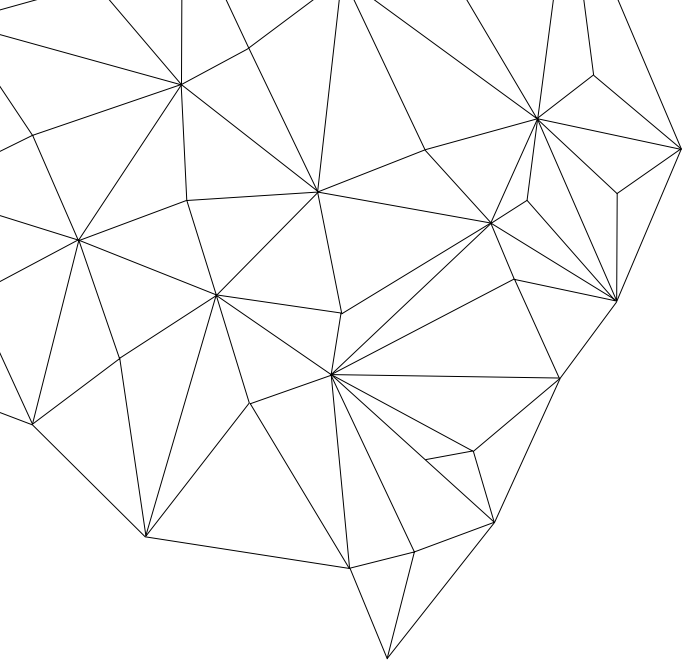
Dr Remy Salmon from the Clinique Saint Jean de Dieu in Paris has been treating breast cancer for more than 30 years and is a great supporter of the tumour boards that have become obligatory in many European countries. It is no longer enough for the surgeon alone to decide on the therapy; what is needed is rather an all-round package that has been agreed by everyone involved.

'When I started work as a surgeon in the 1980s, almost all of the women underwent a radical amputation of the affected breast', explains Remy Salmon about the change when dealing with this kind of cancer. ' The main concern today is to guarantee the extremely well-informed patients not only a cure but also a therapy with all of the best possible results as well as an optimum therapy support in the form of psycho-oncological treatment. The focus is no longer on the cancer, but the patient.' Quality of life has therefore also become an integral part of clinical studies in many aspects of therapies which patients formerly feared. Drugs have been developed against nausea and serious infections that counteract these side effects and thus make the treatment less terrifying.

## MAMMOTH PROJECTS AGAINST THE INVINCIBLE

A lot of hard work is going into airing the secret in the battle against cancer: researchers finally want to figure out how to prevent mutations in the susceptible cells. Finding ways and means of eliminating the mutated cells without affecting normal growth is a Herculean task. Mammoth projects are dedicated to charting knowledge acquired on a daily basis in the sense of big data.

The analysis of this huge amount of data is seen as a great opportunity for medical research. The Cancer Genome Atlas, for example, is a library of all genetic defects for all possible kinds of cancer, and 51 partners from eleven European countries are collecting anonymised patient data for the Harmony project (Healthcare Alliance for Resourceful Medicines Offensive against Neoplasms in Haematology). 'Intelligent medicine means that the results of the tumour board are compared in the database and the doctors receive information on which mutation experience has shown to amplify a side effect', is how Dr Marc Thill explains the future prospects. He currently sees chances for success in translational research, which means the coalition of scientists in the laboratory and the practitioner at the bedside. The aim is to shorten the time between the development of new diagnostic and therapy methods in the research laboratory and their availability for cancer patients. 'But this also means that oncology can no longer be managed from one country alone. We already know a lot, but are unable to process this information sufficiently and apply it practically', regrets Thill. 'A tumour board should be made up of not just the usual suspects but also human geneticists, molecular biologists and biostatisticians.' Hamburg is ahead of the game: this kind of tumour board already exists, admits Professor Bokemeyer. Yet despite all of the new therapies, the progress made in diagnostics and an increasing sequencing of the oncogenes, one thing has become perfectly clear: this can only be achieved together. The challenge facing oncologists will remain not to lose sight of the bigger picture, and to develop a strategic overall concept from the therapeutic modalities – consisting of surgery and radiotherapy, interventional local measures and hormone therapy, immunotherapy and chemotherapy, psycho-oncological support and, at the same time, aetiology.



# MORE PRECISE, LESS AGGRESSIVE

To know more is one of the main goals of the new methods in treating cancer patients. Lymph node status is one of the most important prognostic factors and plays a key role in surgical and therapeutic decision-making

Plain speaking in Barcelona: Pathologist Vicente Peg Cámara PhD, Gynaecologist Mar Vernet Tomas PhD and Radiation Oncologist Manel Algara López PhD

The reliable analysis of lymph node tissue and accuracy is crucial for a precise determination of the metastatic tumour burden and optimal staging as shown, for example, in the management of breast cancer. We invited Mar Vernet Tomas, MD, PhD, Chief of the Gynaecologic Oncology and Breast Diseases Section from Hospital del Mar, Barcelona, Manel Algara López, MD, PhD, Chief of the Radiation Oncology Department, also from Hospital del Mar, and Vicente Peg Cámara, MD, PhD, Pathology Department, Hospital Universitari Vall d'Hebron, Barcelona, to talk about the relevance of sentinel node analysis, the different challenges faced by the medical departments and the future of axillary management.

**As you know, axillary management has changed significantly over the past few years. What are the main changes and challenges regarding the sentinel node technique today?**
DR PEG: We have experienced radical changes: first, in the way we approach it, because anatomy is becoming increasingly molecular. The molecular approach has allowed us to give a definitive diagnosis in 100% of cases for the first time. Before, when a node was diagnosed positive, we were sure it was positive, but when it was negative, we could be wrong or simply not see what was there. Now, we are sure of what we are seeing. So, for reasons I am sure we'll cover later on, we provide more information than just 'positive or negative'. The clinical management is a different story, but for us, this has first of all meant changing the way we work and secondly, the ability to provide more information with greater confidence.

**Dr Vernet, from a gynaecological point of view, what are the changes and challenges regarding the sentinel node?**
DR VERNET: Well, all this translates into more precise patient treatment and follow-up. We give more precise and less aggressive treatments. We want to know more. Not just whether the sentinel node is positive or negative, but how positive or how negative it is. We are evidently moving towards a more accurate medicine with which we can make decisions that will affect survival because we are honing in more. The sentinel node technique is obviously along these lines: the lines of precision, of treatment individualisation, of knowing exactly what we have and consequently what we must do.
DR ALGARA: That is basically it. The sentinel node has allowed us to define micrometastasis and macrometastasis. The next step is to better define these, which will eventually lead us to the right treatment: more local treatment or more systemic treatment. Recent studies have totally revolutionised axillary treatment. We have gone from always operating to not operating in many cases with a positive sentinel node. Molecular analysis may also help us decide whether radiation therapy is necessary or not.

**Regarding these new methods, what are the main benefits of molecular techniques, and what are the main differences with histopathology?**

## 'We are evidently moving towards a more accurate medicine with which we can make decisions that will affect survival'

DR MAR VERNET TOMAS, CHIEF OF THE GYNAECOLOGIC ONCOLOGY AND BREAST DISEASES SECTION FROM HOSPITAL DEL MAR, BARCELONA

DR PEG: I think that the main, fundamental, difference is that we analyse the entire lymph node. Because if there is one thing pathologists are undoubtedly sticklers for, it is reproducibility. Ours is a very subjective speciality, and it is true that, in very clear cases, many of us agree, and in cases that are not that clear, we agree less, but there is always a certain degree of personal bias in the interpretation. Molecular technology offers reproducibility, as anything automated does. But it also provides us with more information. We measure metastasis. When we slice a lymph node, we never know if what we see is the maximum diameter, because we analyse a very small portion of it. So we analyse it in its entirety, we measure it in a much more reproducible manner. And on top of that, it provides clinical information and prognosis, which used to be much more difficult to obtain. Another question is what clinicians do with that information. They can judge how important it is, but from our point of view, we overcome one of those major hurdles pathologists deal with: reproducibility.

**Dr Vernet, the concept of sentinel node is emerging in other cancer entities, such as gynaecological cancers. In that case, what kind of information do you expect from the pathologist today in order to decide on the surgical approach?**
DR VERNET: To give a less invasive treatment that is just as effective as a more invasive treatment. Obviously, the more precise and reproducible the information given by the pathologist, the more homogeneous our therapeutic decisions will be, and the indications will be better. This is equally valid for onco-gynaecological diseases such as breast cancer. For us, it is fundamental to observe, standardise and use reproducible techniques.

**How can precise staging be preserved when axillary dissection is being increasingly avoided and we are obtain infomation only from the sentinel node?**

DR PEG: The number of axillary clearances has decreased. Therefore, all or many cases will be staged 'pN' based on the 'sn'. It is true that TNM takes this into consideration; it can be done only as a function of the result of the sentinel node. However, in any case, the usual TNM staging as we know it now will disappear.

DR VERNET: I am not sure. It is as if medicine is going a bit that way. I do not think that this issue is closed because if we look at precision medicine and we keep talking about individualisation, and then we don't care that, with some patients, we don't know whether there are three, four, five, or six positive nodes, well, that means we're not really individualising all that much. Because if I individualise, as we said before, based on the tumour phenotype, and then I do not care what is in the axilla, it is not that clear to me that it is not important. It seems that now it is fashionable to ignore it, but to me it is not that clear.

DR ALGARA: But if you have a test that tells you that the sentinel node has a high tumour load, perhaps it is not important to know whether there are seven or eight. Perhaps that is enough. We will see, maybe that is where the road will lead.

DR VERNET: I think that this is a complex equation with several different characteristics. What response to systemic treatment does such a phenotype with such a tumour load have; what response does radiotherapy give in any phenotype with a certain tumour load; and up to what point will surgery be necessary to reduce the tumour load. This is a more complex equation, I think, than what we are currently considering.

**Dr Algara, in a scenario with fewer lymphadenectomies despite a positive sentinel node, what is the specific challenge for the radiation oncologist?**

DR ALGARA: The challenge is to know whether to treat or not. Despite all the studies, Z0011 does not tell you what to treat or not to treat because in one treatment arm, 70 per cent received radiation therapy. Therefore, the challenge is to know really whether patients with low tumour load need or do not need axillary radiation. There is one study going on right now – OPTIMAL. We use the criterion of 15,000 copies of OSNA-determined total tumour load. We irradiate all or just a part.

**And what is the implication of this in clinical practice? Do you think a personalised treatment for the patient is really possible?**

DR ALGARA: Yes, radiotherapy increasingly allows us to personalise a lot because this issue of axillary radiation has been discussed for a long time now. Twenty years ago, we would not have had this discussion because whenever the breast was irradiated, the axilla was too. Nevertheless, this was when we planned everything in 2D. Currently, 3D techniques with modulated intensity and volumetric techniques allow you to adapt much better to the volume to be irradiated. So, I have to know whether I need to include the axilla or not. Additionally, partial radiation techniques are becoming increasingly common. Therefore, it is much more complicated to include the axilla in the treatment volume when you intend to irradiate only a part of the breast, than when you irradiate the whole thing. Axillary treatment can be surgery or radiation – the outcomes are the same. The role of the sentinel node is that you can be sure that there is or there is not complete remission, and that increasingly determines treatment. So far, even if there is complete remission, we still do everything, but in a matter of months or years, we'll stop doing things after complete remission. And also, in conjunction with molecular methods, for we trust molecular methods more than a microscope.

DR VERNET: Well, it is the pathologist we trust, right?

DR PEG: Let me qualify this: neither the microscope nor the pathologist, but the cut. Many of our failings were due to inaccurate location of the metastasis.

DR ALGARA: Because you cannot look at everything. When we did 2D radiotherapy, you could only see what was going on in one plane. Then the woman developed dermatitis four centimetres above. Of course: no one had made any calculations for that area! What molecular methods do is look at everything. They know what has happened in this node – and that is critical, because as I say, currently we continue doing everything, but we will stop doing certain things. We will probably operate less or irradiate less. One of the two local treatments will decline.

DR VERNET: Or both, as they become positive and respond to systemic treatment...

**We know that OSNA and the number of copies of CK19 mRNA have also shown to be of prognostic value in the PLUTTO trial mentioned by Dr Peg. How is the issue of units of breast pathology taken into consideration for treatment decisions?**

DR ALGARA: Very much little by little.

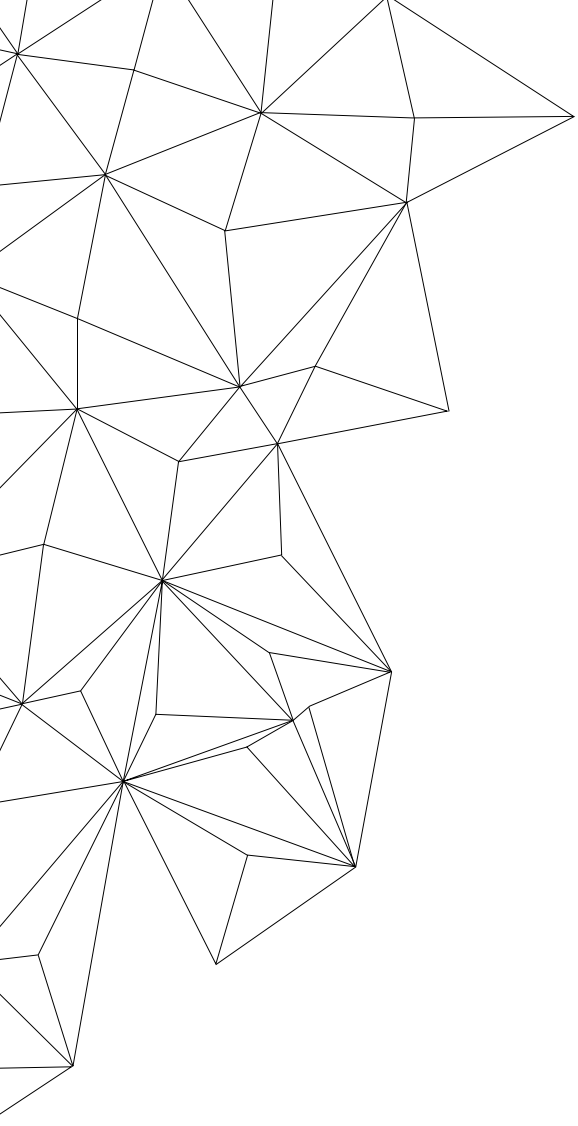
DR PEG: Just yesterday, I was talking with the hospital oncologist – I am going to start presenting it at an internal discussion forum as a possible marker. But for all practical purposes, in reality, very slowly.

**How would you envisage using this kind of more elaborate diagnostic information on a broader level in the future?**

DR PEG: In the near future, SLN can't be only a matter of positive or negative results, but there will be a need for more information like that which we can already get from the primary tumour. At that point, I am sure that molecular methods will continue to help us to make better decisions.

DR ALGARA: Essential. Treatments will become more and more personalised. This is the reason why information should be more detailed, accurate and reproducible.

DR VERNET: I see it as becoming an indispensable and routine tool in breast cancer treatment.



# IMMUNOLOGICAL TESTS ARE GAINING GROUND

After lung and breast cancer, colorectal cancer is the third most common cancer worldwide. To accelerate early detection, European countries are now starting to implement population-based screening programmes with FIT (Faecal Immunochemical Testing). The Netherlands has led the way for four years

Sending the FIT out to over 2 million Dutch per year: Wolfert Spijker,
CEO Organisation for Population Screening in the Netherlands

# 'One of the benefits of FIT is that you can carry out high-volume testing because the throughput is fast: you can easily analyse a few thousand tests per day'

WOLFERT SPIJKER, CEO ORGANISATION FOR POPULATION SCREENING IN THE NETHERLANDS

Wolfert Spijker, CEO of the Organisation for Population Screening in the Netherlands, is satisfied: after sending out two million tests as part of an annual colorectal cancer screening programme, over 70 per cent have been returned. Colorectal cancer was diagnosed in 4.9 out of 1,000 submissions. Usually, colorectal cancer would have remained undetected for a long time. The high submission rate is partly due to the good organisation, but also to the simplicity of the Faecal Immunochemical Test (FIT) when it comes to application and evaluation.

Globally, colorectal cancer is the third most common cancer and the second most common cancer in Europe: per year about 342,137 people develope colorectal carcinoma for the first time, and almost 215,000 die of it. The five-year survival rate is 63 per cent. Colorectal cancer accounts for around half of all gastrointestinal malignancies in Europe, 47 per cent among men and 54 per cent among women in the EU. Its burden is expected to increase by 60 per cent to more than 2.2 million new cases worldwide and 1.1 million cancer deaths by 2030. The appearance of colorectal cancer and the mortality rate vary worldwide and depend greatly on the stage of development of each country. The more developed the country is, the more it manifests itself. A person's lifestyle is considered the main risk factor for colorectal cancer: obesity, lack of exercise, tobacco use and an unhealthy diet favour tumour formation. About one third of all cases can be traced back to genetic factors.

## EARLY DETECTION IS WHAT COUNTS!

90 per cent of tumours in the colon develop from benign polyps and adenomas and tend to grow extremely slowly. Colorectal carcinoma does not cause any distinct problems until it is in an advanced stage. In its early stage, however, there are only very non-specific symptoms: altered bowel habits such as more frequent bowel movements and constipation, stool that is different in appearance, smell or consistency, pain during bowel movements, or digestive problems, such as bloating or loud abdominal sounds. The earlier colorectal carcinoma is discovered, the better the chance that it can be cured (see stages on the next page).

The gold standard of colorectal cancer screening is the 'high' colonoscopy where the entire large intestine and the last section of the small intestine can be examined with an endoscope. Individuals covered by statutory health insurance are eligible for a screening colonoscopy starting at the age of 50

in some countries , 55 in others. During the colonoscopy, potential colon polyps that otherwise might develop into potentially malignant tumours can be removed right away. If the results are negative, the patient is eligible for another screening colonoscopy after ten years. This allows a physician to detect polyps and adenomas very reliably, resulting in the almost 100 per cent prevention of colorectal cancer if regular colorectal cancer screenings are performed.

However, patients' acceptance of this screening procedure is not particularly high: on average, only about 23 per cent of those eligible take advantage of the availability of screening colonoscopies. Many people shy away from the required bowel cleansing and the risk of infection, bowel perforation or bleeding during the procedure.

While colonoscopy is the most reliable method for detecting colorectal cancer in its early stages, it is also a costly procedure and uncomfortable for the patient. Immunological tests for faecal occult blood (FIT) are less of a burden and reliable at the same time. Tests for faecal occult blood that might originate in colon tumours or polyps are clearly less of a burden for the patient. In the majority of European countries, individuals between the ages of 50-74 are eligible to participate for free in the different screening programmes. The early detection cancer directives differ slightly from country to county around Europe. Some countries organise CRC screening programmes on a national or regional level, and the eligible population is formally invited to participate. In other European countries, screening is still opportunistic and offered by accredited GPs and paid for by statutory health insurance schemes. The stool test is not a replacement for colonoscopy. However, it can be a simple means of detecting tumours.

## IMMUNOLOGICAL TEST IS BECOMING A ROUTINE PROCEDURE

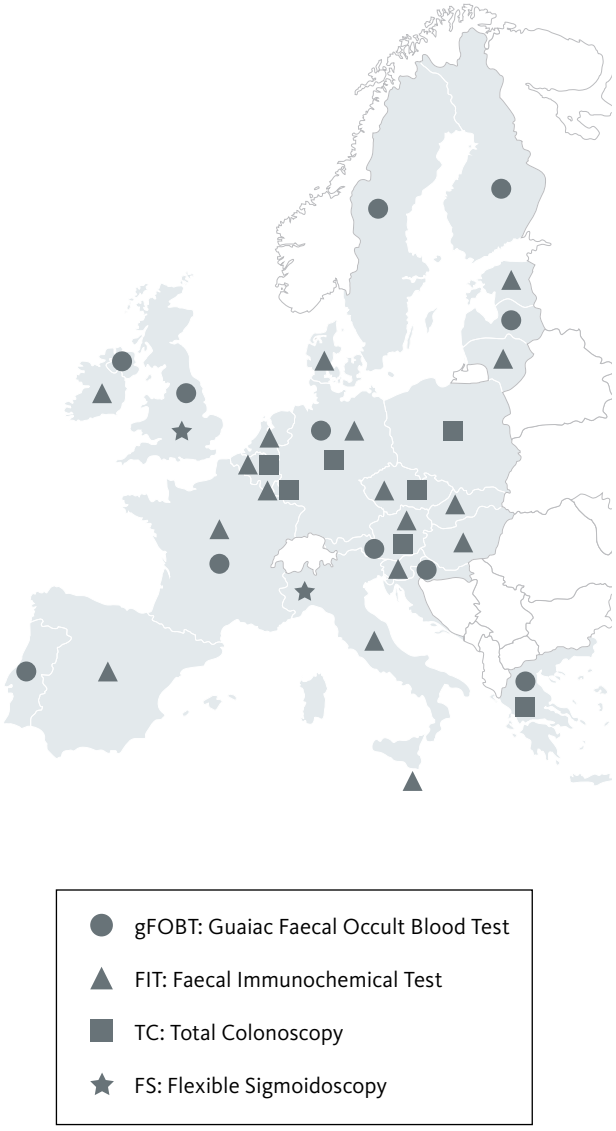
Some laboratories are still using chemical qualitative occult blood tests. The best-known is the gFOB (guaiac). To perform this qualitative test, there is a need to apply two samples each of three consecutive bowel movements to a small card. Certain foods, drugs or even menstrual bleeding can falsify the test result as it is not specific to human haemoglobin. An immunological test for faecal occult blood clearly delivers more reliable results. The test contains specific antibodies that bind to the substance in the sample. Patients only have to collect the stool sample with a sample collector and introduce the collector device inside a tube. After placing the test tube in the analyser without any further manipulaton, drops of the fluid are applied to a test cassette where an immunological reaction takes place within a few minutes that searches for traces of haemoglobin. The test responds exclusively to human haemoglobin and is therefore not affected by the food the patient has eaten.

The FIT solutions offered by Sysmex, which combined the automated analysers with the Sentifit pierce tube and FOBGold Latex, allow the quantification of the human haemoglobin in the stool. According to the studies the concentration of ►

## CRC SCREENING IN EU MEMBER STATES

Organised or opportunistic: the efficiency of colorectal cancer screening programmes has led to their implementation in the health policies of all EU member states.

Nearly every EU state has its own screening based on FS (Flexible Sigmoidoscopy), TC (Total Colonoscopy) gFOBT (Guaiac Faecal Occult Blood Test) or, and increasingly more often, FIT (Faecal Immunochemical Test). Some countries are currently running pilot assessment phases for FIT. This is an overview of the tests used in 2016:




*Source: European Commission: Against Cancer. Cancer Screening in the European Union (2017), https://ec.europa.eu/health/sites/health/files/major_chronic_diseases/docs/2017_cancerscreening_2ndreportimplementation_en.pdf*

# STAGES OF COLORECTAL CANCER

## The earlier it is detected, the higher the chance that it will be cured

**Stage 0 (Tis, N0, M0)**
The tumour is still extremely small and only located in the upper layers of the intestinal mucosa. It is generally detected during a colonoscopy when polyps are removed and then analysed in the lab. There are no symptoms in Stage 0. If the necessary surgical procedure is conducted expertly, the chance of being cured is excellent.

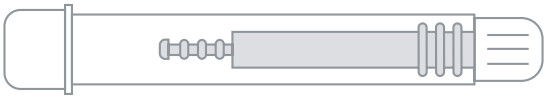
**Stage I (T1 – 2, N0, M0)**
There is also a very good chance of being cured from this early form of colorectal cancer. The lymph nodes have not been affected and after expert surgical removal of the tumour, there is no risk of metastasis. Chemotherapy or radiation therapy are not required. Even at stage I, a tumour causes no remarkable symptoms and is therefore only detected as part of colorectal cancer screening.

**Stage II (T3 – 4, N0, M0)**
The tumour is limited to the intestinal wall. However, it has already penetrated all of its layers. The lymph nodes are not yet affected and there are no metastases yet. The five-year survival rate in patients with Stage II colorectal cancer is 85%. With Stage II rectal cancer, a combined radiation and chemotherapy is recommended in addition to surgery. With stage II colorectal cancer, however, this is not the case.

**Stage III (T1 – 4, N1 – 2, M0)**
Advanced colorectal cancer cannot always be completely and permanently removed by surgery. At this stage, too, the tumour is initially surgically removed. With colorectal cancer, chemotherapy is also necessary; with rectal cancer, combined radiation and chemotherapy is required. The five-year survival rate in patients with Stage III is about 53%.

**Stage IV (T1 – 4, N0 – 2, M1)**
Very advanced colorectal cancer has already formed metastases in other organs. Some of these can already be removed during the surgical removal of the colorectal cancer. Other tumours are initially reduced by chemotherapy and are then removed during a later, second surgery. A cure is only rarely possible. However, thanks to new chemotherapy drugs, quality of life and survival rate have significantly improved during the past few years.

the haemoglobin in the stools is a good first indicator of the severity of the lesions. The WEO expert group intends to standardise reimbursed immunological tests and to conduct them using quality-based methods in a laboratory via automated procedures. Some countries have already implemented reimbursement for FIT testing while other countries are still working on it.
In the Netherlands, the FIT is been used successfully since 2014. According to Wolfert Spijker, a central, uniform organisation, support by regional, regional and local institutions and a comprehensive database are the framework conditions which led to the success of screenings in the Netherlands: 'We have a central database into which all the invitations and results are entered. There we can evaluate the screening program in a very short-cycle, which is perfect.' One of the main advantages of FIT tests is their extremely uncomplicated application. By this, the inhibition threshold for participating in the screening is lowered. Also, the fact that all people have to do is simply put the test in an envelope and throw it into the nearest letterbox explains the active participation. In addition to economic reasons – compared to the colonoscopy it is quite inexpensive – its reliability is also convincing: 'The FIT test has a major advantage as it is quantitative so that no interpretation from the doctor is required. Another benefit is that you can carry out high-volume testing because the throughput is fast: you can easily analyse a few thousand tests per day.'



Patented Universal Collection tube offers flexibility and scalability for all lab requirements


Sources:

1 United European Gastroenterology www.ueg.eu
2 Cancer Screening in the European Union (2017), Report on the implementation of the Council, Recommendation on cancer screening

# LIQUID BIOPSY ON THE RISE

Today, liquid biopsy is widely used as a precision diagnostics tool for different applications and is especially helpful in improving cancer management. One of the important aspects is to analyse therapeutic target structures and resistance mechanisms as well as monitoring the patients undergoing targeted therapy

Prof Léa Payen and her team at the Hospices Civils de Lyon, France, are using the OncoBEAM RAS CRC kit in a project called OncoCIRCAN. In this project, scientists and clinicians are investigating circulating cancer markers and their use for molecular diagnostics in lung and colorectal cancer.

**What are the current challenges in cancer management?**
PROF LÉA PAYEN: Today, when managing cancer, the challenge is to be able to adapt the treatment to the patient at every stage of the disease. In order to choose between the available therapeutic methods, one must have robust predictive or prognostic biomarkers. The future challenge will be to evaluate the tumour heterogeneity in all patients and predict the evolution of the various tumour clones under pressure from different lines of therapy.

**What is the advantage of liquid biopsy and when do you useOncoBEAM?**
The major advantage of liquid biopsies is that it is a minimally invasive procedure that can be repeated any time. This allows patient monitoring during the course of the disease. It is used for the diagnostics of colo-rectal and lung cancer when we have no DNA from tissue biopsies. In colon cancer, the presence of a KRAS and NRAS mutation in the colon precludes the prescription of anti-EGFRs. We have also validated the use of OncoBEAM for the molecular diagnostics of lung cancer. The presence of a KRAS modification in cell-free DNA (cfDNA) will steer management towards classic chemotherapy.

**Why does sensitivity matter?**
The cell free tumor DNA is generally mixed with a substantial amount of cfDNA secreted by healthy body cells. One must therefore be able to detect the mutated DNA which is diluted and poorly represented in the total circulating DNA. Given that this is a major therapeutic challenge, we must be as close as possible to 100% correlation with positive tissue biopsies in order to provide clinicians with a useful result. We have observed that the sensitivity of BEAMing was at least ten times higher than other digital PCR technologies (BioRad) or the Illumina NGS technique using amplicon targeted libraries. We have been able to detect po-sitive cases in the plasma of patients with an otherwise negative biopsy, which was mostly consistent with the response to treatment. This helps to complement the patient's mo-lecular diagnosis.

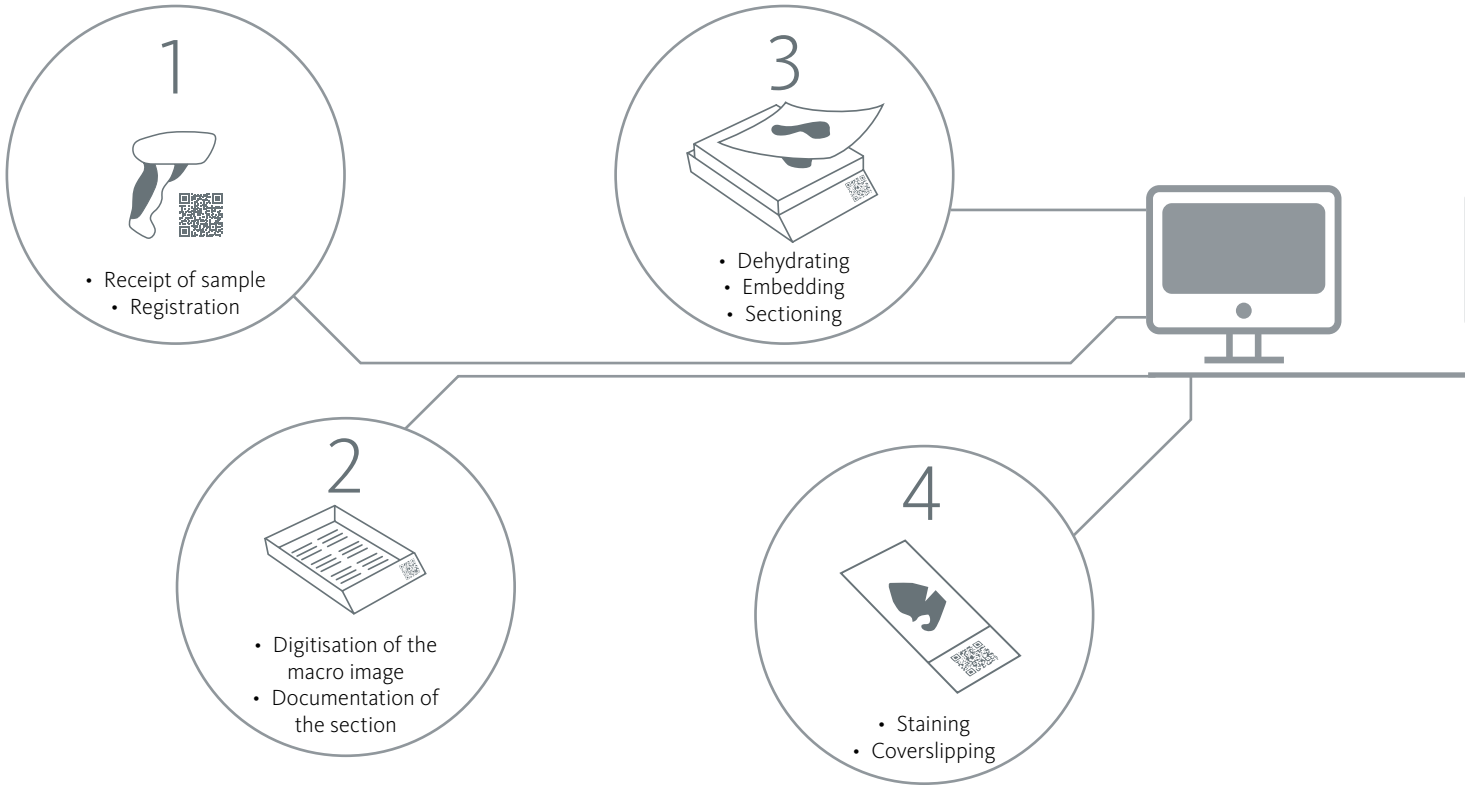
Prof Léa Payen works at the Cancer Research Institute of Lyon and at the hospital Hospices Civils of Lyon

**You have been the first to evaluate the new OncoBEAM EGFR Kit. Why did you choose OncoBEAM for EGFR testing and what is your impression of its performance so far?**
In our laboratory, we have chosen to establish the molecular profile of patients' cell-free DNA both with an amplicon-based NGS strategy, for its wide coverage, and with the more sensitive and specific OncoBEAM tests for actionable mutations which provide additional information. These complementary approaches reduce the risk of false negatives and allow better patient monitoring. The OncoBEAM EGFR kit is highly sensitive and allows us to detect the mutation earlier during progression. The partnership with SYSMEX is special since we are not just users. We closely collaborate in order to validate new assays and optimise workflows by sharing our experience using the assays.

**How will such a liquid biopsy test influence/ change NSCLC patient management?**
At diagnosis, the use of the OncoBEAM EGFR test will help detect the presence or absence of actionable mutations with high sensitivity and specificity. Eventually, this will allow the treatment protocol to be tailored to the patient on the basis of the information obtained from the liquid biopsy.

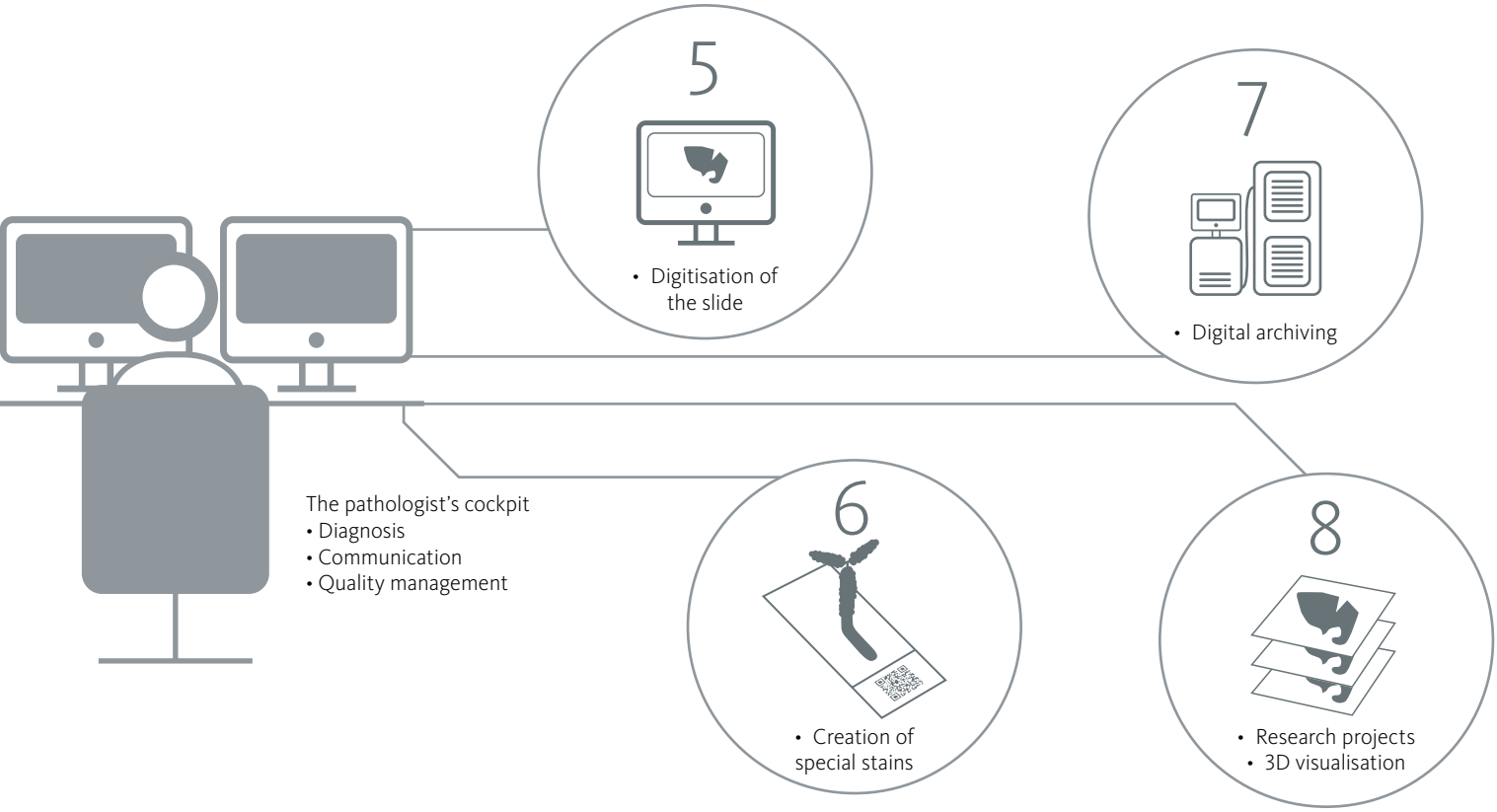
# PERSPECTIVES OF DIGITAL PATHOLOGY

Digitalisation of pathology opens up many options: not just scanning more tissue, but also a restructured laboratory workflow with many chances of making use of the pathologist's entire expertise. Dr Klaus Hofmann, Sysmex expert in digital pathology, answers three important questions




**What potential and what chances do you see in digital pathology?**
Until recently, there was no alternative at all: the histopathological examination of tissue sections always called for microscope pathology. The imaging quality of the specimen slide scanner was not comparable with the microscope quality, there was no software available for computer-aided viewing and analysis of images, nor were digital storage solutions available. However, demographic and economic developments and fast-paced developments in human medical research demand that histopathology workflows adapt to meet the new requirements. The number of samples received is continually increasing with changing demographics. More diagnostic markers and the increasing complexity of cases have led to an increase in the number of stains per case. Studies estimate an annual growth of over seven per cent and practice confirms this trend. Faster diagnoses for patient-specific therapies are required. In transplantation medicine, qualified assessments of the transplants are also required under intense time pressure. Pathologists have to become more specialised and have to be able to easily draw on expert knowledge from colleagues. This, combined with increasing cost pressures, inevitably means centralisation of the clinical pathology lo-

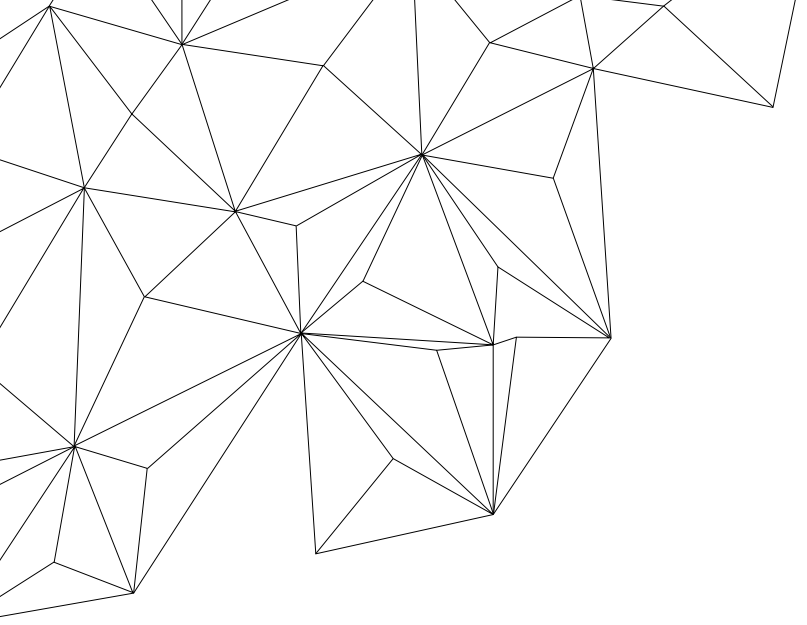
Dr Klaus Hofmann has been responsible for the business unit Digital Pathology and its further development for many years




cations, and also consolidation of the histopathological laboratory service providers.

**In which areas does this mean added value for pathologists compared to classic histopathology?**
The existing workflow is still equipped to respond to these changes. Analogue analysis requires the pathologist to be on site at all times. Working at a microscope for hours can cause ergonomic problems. It is not possible to add annotations or record measurements in the image. There is no clear way to present the sections at a tumour conference. The microscope also has no option to view different stains in a case simulta-neously and in a synchronised manner. If you want to compare older stains in a particular case, they first have to be fetched from the archive.

**What developments do you see coming onto the market in the new few years?**
Digitalisation of routine pathology tests means more than just scanning in tissue sections. It opens up many options to meet the challenges of modern pathology and enables the laboratory workflow to be restructured, giving the pathologist the chance to apply his or her expertise to the full. Many customers are already looking into this, but are still unsure what improvements the processes will bring. Once they recognise the opportunities that digitalisation opens up to them, they often ask why they did not switch sooner. This is an unstoppable trend, and will sooner or later be adopted by every pathologist.



# LABORATORY DIAGNOSTICS WITH BIG DATA

Artificial intelligence is turning the medical world upside down too. A cognitive system such as IBM's 'Watson' already correlates huge amounts of data and draws conclusions from these in a matter of minutes, conclusions that help with the diagnosis and allow therapies to be tailored specifically to the patients. And it has proven to be highly beneficial for the MLL Munich Leukaemia Laboratory, which has been using Watson in its specialist field since March 2017

Is IBM's Watson the future's knight in shining armour for the treatment of leukaemia?

# 'Watson has the potential to change the world'

PROF TORSTEN HAFERLACH

At the Munich Leukaemia Laboratory (MLL), 'big data' is one of the keys to the future – along with increasingly powerful tools for the examination of blood and bone marrow, right through to automatic DNA sequencing. 'Diagnostics has developed faster than the Internet itself over the past few years', comments Prof Torsten Haferlach. The doctor and scientist founded the MLL twelve years ago together with colleagues and turned it into the market leader in Germany for diagnostics for patients suffering from leukaemia and lymphoma diseases in both the inpatient and outpatient sector. Today, the MLL employs a staff of 175 – 46 of them scientists and ten bioinformaticians alone.

'A setting with ten high-throughput sequencers are already sequencing 130 genomes a week and this will soon rise to 200', is how Prof Haferlach explains what he describes as 'the change from phenotype to genotype' in diagnostics and, in future, in the definition of diseases as a whole. But there's more to come: the technologies used are scalable; the capacity is only limited by the machinery available and the bioinformatics.

## A TREASURE TROVE OF DATA FROM 550,000 PATIENTS

The amount of data so far is huge. The MLL hard drives hold the examination data of all of the around 550,000 patients handled by the globally recognised reference laboratory since its foundation in 2005. They have saved not only the data that can be recorded in figures but also images such as karyograms. 75,000 new cases are added every year, whereby between 30 and 3,000 parameters are recorded largely automatically. Based on the data collected to date, the specialists from Munich took the next logical step in March 2017: they enlisted the help of IBM's 'Watson'. This is an innovative software named after the charismatic CEO of the computer manufacturer. Watson's programmers had nothing less in mind than to simulate the way humans think, learn and decide, or even to do this better thanks to humans. Watson is currently causing a furore in numerous disciplines under names such as 'artificial intelligence' or 'cognitive computing' (roughly an understanding and learning IT system).

Watson can evaluate not only data but also texts such as doctoral theses, papers and guidelines. Admittedly, the system has to be trained to a certain extent. It has to be taught what is important for a certain application, the rules of the game as it were. This has already been accomplished in a number of fields, from Gourmandise (Watson develops novel cooking recipes) and quiz shows (Watson wins 'Jeopardy') to medicine.

## WATSON: LEARNING FROM QUESTIONS AND ANSWERS

The first results in this field are as astonishing as they are encouraging. For example, Watson was able to diagnose a rare form of leukaemia in a patient in Japan. The software compared 20 million clinical cancer studies with the patient's ge-

netic data in only ten minutes and presented Prof Satoru Miyano from the Human Genome Centre of the University of Tokyo with the result: the 60-year-old patient was suffering from a rare form of myeloid leukaemia. The targeted therapy took immediate effect. 'Watson has the potential to change the world', commented the scientist.

Watson had a lot to learn before reaching this point. It has to be remembered that Watson is not a ready-to-use software like the word processor Word or the statistics specialist SPSS. Watson is more like a baby, born with far more possibilities than abilities. Watson could be compared to a genetic code, a brain structure.

Thanks to this property, the software can play something that is called the 'deep question and answer game' in IT language. This 'Deep QA Concept' is something like a group of any number of experts who assess a hypothesis. Watson weighs up the opinions, evaluates these and draws its own conclusions. And with each conclusion it learns to further develop its skills and abilities.

For example, it took a team of doctors and computer specialists at the Memorial Sloan Kettering Cancer Center, the world-famous private cancer clinic in New York, one year to train Watson for a specific task: to provide doctors with effective help when compiling an optimum treatment plan for individual cancer patients.

The result is 'Watson Oncology', a version of Watson that has been specially configured for precisely this task. This software can now analyse the clinical data of a cancer patient anywhere in the world using the outstanding know-how of this clinic, compare this with the latest specialised literature – around 45,000 research articles are published each year on the topic of 'cancer' alone – and develop a customised, evidence-based therapy. This not only multiplies the number of experts in any one clinic – their knowledge and expertise can now be accessed from anywhere in the world.

### TRAINED LIKE A NEW MEMBER OF STAFF

'And', continues Prof Torsten Haferlach, returning to Munich, 'we will be using Watson to launch a new prototype cognitive technology and support the scientific development of precise diagnoses and extremely targeted, individual therapeutic options to combat leukaemia.'

In the first phase of learning, the scientists feed Watson with archive data, which they know very well has led to a certain diagnosis. Watson then goes its own way, where it is subject to strict parallel checks using conventional methods. In this respect, Watson is no different from nearly every new member of staff. Watson has to learn until it can work on its own – though still under close quality control. Or, as Prof Haferlach puts it: 'First the review of whether Watson can reproduce the results from the material, then the preview.'

Watson has to be accompanied with expertise and acumen: 'If I control a self-learning system too closely, it won't find new paths and solutions', explains Prof Haferlach, 'but if I give it too long a leash, it could suggest a wrong path.' Parallel to the evaluation of large amounts of archive data, the MLL relies not only on conventional blood counts but also very heavily on assigning specific genes to certain diseases. 'We have decided to sequence 5,000 complete genomes', is how Prof Haferlach describes the workload, '2,000 of which we had already completed by in autumn 2017.' With around 1.2 million frozen blood or bone marrow samples, MLL certainly has a big enough library.

Prof Haferlach considers the use of 'cognitive computing' indispensable and Watson 'initially a big help for our daily work.' The intense training period is then followed by an acceleration and increase in efficiency of the previous work. Because he is not only fascinated by 'Watson' as a scientist, he also sees big data in general as a business model for the future: 'We have already founded a number of MLL subsidiaries that will be looking into precisely this aspect.' This is why the data and the algorithms developed by Watson remain the property of MLL too.

Artificial intelligence leads to a quantum leap in quality and quantity in the field of medicine. On the one hand, by drawing on vast amounts of data and know-how to allow more precise diagnoses as the basis for effective therapies – and this practically anywhere in the world, largely irrespective of the geography and infrastructure. On the other hand, artificial intelligence could lead to a redefinition of diseases, particularly in view of DNA ssequencing and, above all, to individualised and targeted therapy under the heading of 'precision medicine'. This is also Prof Haferlach's deeper goal: 'Every day for the past 33 years I have been treating patients who I want to help – in each case with the most effective possibilities.'

## MUNICH LEUKAEMIA LABORATORY

The MLL has relied on precise and highly-efficient, state-of-the-art analyses from the very outset.

Scalability and the highest level of automation are hallmarks of the equipment and its software. For example, the NovaSeq 6000 sequencing system from Illumina is used for genome sequencing, whereas blood counts are carried out with the XP-300, as an automatic haematology analyser with 3-part differentiation from Sysmex.

# WHAT'S IT LIKE WORKING WITHIN SYSMEX ONCOLOGY?

What are their values? What drives them? And how do they interact with patients and customers? We asked three employees from different countries about their everyday work and what they think about it


DR ALEXANDRA KURZ

## 'FROM THE BOTTOM OF MY HEART'

PRODUCT MANAGER ONCOBEAM AT SYSMEX EUROPE, NORDERSTEDT, GERMANY

'It's been 20 years now since I decided that I wanted to work in oncology due to personal reasons and my specific interest in biology and chemistry. At the time, personalised medicine was still stuck in its infancy and many people had been sceptical whether it would become routine one day. Today, we know, yes, it has and I'm glad to see how innovative products continuously improve cancer management. I joined Sysmex in January 2017 as a product manager for OncoBEAM and function as the contact between Sysmex Inostics and Sysmex Europe and its affiliates within the EMEA countries. I like this position a lot since you are responsible for many different tasks such as marketing activities, product launches and expansion, competitive intelligence, training and supporting our affiliates in driving forward their business in their countries. Taking care of OncoBEAM is not just a job for me. I'm happy to contribute to advancing cancer management from the bottom of my heart since I'm finally able to combine my scientific background and personal motivation.'


DR ELENA BERGATTO

## 'I LIKE THE IDEA OF SHARING A NICE EXPERIENCE'

SENIOR NATIONAL PRODUCT MANAGER,
SYSMEX PARTEC ITALY, CORNAREDO

'I studied at university for several years to get my PhD in molecular and cellular biology and I always thought I would work in the field of oncology, contributing to research and the clinical practice for cancer patients. Working for a diagnostics company like Sysmex has completely met my expectations. I'm responsible for the launch and replacement of the new platform OSNA RD 210. Usually, I work closely with customers. This aspect is really important for us. I present our cancer management solutions according to product and target group. We are working to expand our solution for other cancer entities. I therefore travel a lot throughout Italy. Our working day is active, varied and sometimes very long. Every day, are faced with different stories and experiences. What I like most is the aspect of sharing a nice experience when customers recognise that our job and our solution for cancer patient management have been really crucial in helping them.'


JACQUES HANNABY

## 'A CLEAR VISION FOR THE MEDIUM AND LONG TERM'

BUSINESS UNIT DIRECTOR,
SYSMEX FRANCE, VILLEPINTE

'I am happy to have recently joined Sysmex group, which has a clear vision in the medium and long term. I really believe in our innovation potential for better outcomes in cancer diagnosis. The number of cancer cases is increasing every year around the world. Developing new projects that can contribute to improving patients care is my main source of motivation. To me, it is important to offer our customers premium products that make a real difference in lab efficiency and improve patient outcomes. Most of our customers and partners are willing to share their motivation and issues. The customer's voice is very important in our decision making and orientations. My role at Sysmex France is to implement the new marketing and sales strategies that will help us promote our cancer management solutions.'

DIAGNOSTIC SOLUTIONS

# EARLY DETECTION AND PRECISE DIAGNOSIS HELP TO FIGHT COLORECTAL CANCER

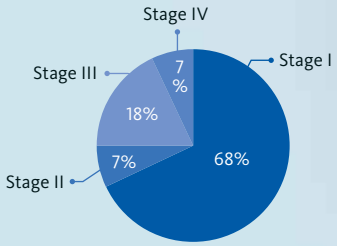
## FIT CRC SCREENING

FOB GOLD® -
FAECAL IMMUNOCHEMICAL TEST (FIT)

Screening with Faecal Occult Blood Tests decreases mortality by up to **30%**

UEG press release, https://www.ueg.eu/press/releases/colorectal-cancer-category (accessed 23 January 2018)

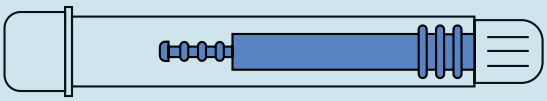
### FOBGold-base Screening Programmes data:




50% of positives were advanced adenomas

75% of the CRC cases were early stages I and II

Erasmus MC Rotterdam, NKI/Antoni van Leeuwenhoek (2016) Colorectal cancer screening programme, Monitor 2015. RIVM
Solé Llop et al. (2017) Programa de cribado poblacional de cáncer colorrectal en Aragón. Primeros resultados. Gac Sanit



Patented Universal Collection tube offers flexibility and scalability for all lab requirements

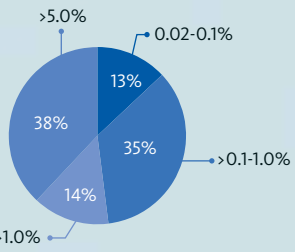
Adenoma removal reduces the incidence by **76–90%** and almost completely prevents CRC mortality within the subsequent 10 years.

Schreuders et al. (2016) Curr Treat Options Gastroenterol 14: 152-162

## RAS LIQUID BIOPSY

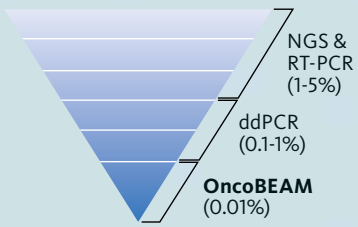
ONCOBEAM RAS CRC®

### Mutant Allele Fraction (MAF) in mCRC




48% of mCRC patients present with MAF <1%

Schmiegel et al. (2017) Mol Oncol 11(2):208-219; Saunders et al. (2016) Ann of Oncol 27(6):149-206; Vidal et al. (2017) J Clin Oncol 35 (Suppl., abstract 607)




Sensitivity matters!

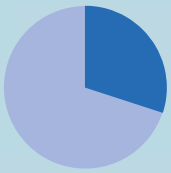
OncoBEAM detects 1 mutated molecule amongst 10,000 wild-type DNA molecules

Sensitivity matters. OncoBEAM detects the **50%** of RAS-mutated mCRC patients that others may not

# LYMPH NODE STAGING

ONE-STEP NUCLEIC ACID AMPLIFICATION (OSNA®)

Provide an earlier and reliable diagnosis for earlier treatment decision

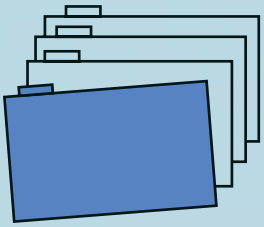


~30% of pN0 patients develop recurrences, likely due to undetected metastases

Pedrazzani et al. (2015) Int J Colorectal Dis 30(3):303-314


In Europe, up to **25,000** early stage CRC patients bear the risk of undetected metastases in the lymph nodes!

Croner et al. (2014) Br J Cancer 110(10):2544-2550; https://seer.cancer.gov/statfacts/html/colorect.html (accessed 23 January 2018); http://eco.iarc.fr/eucan/Cancer.aspx?Cancer=10 (accessed 23 January 2018)



Accurate staging may help to identify patients with high risk of recurrence.

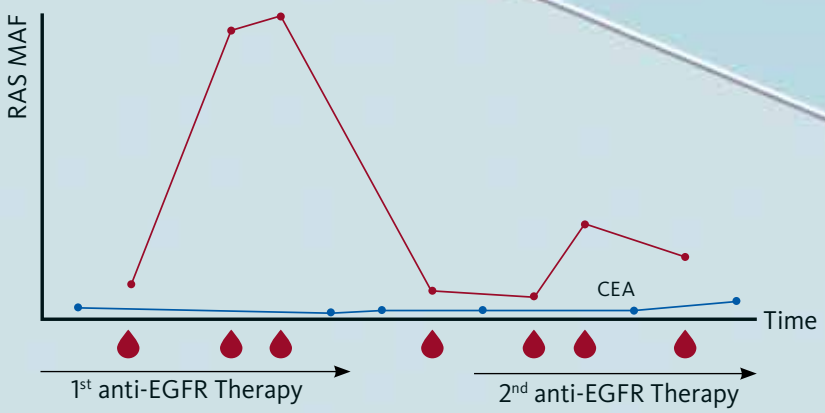
**>90%** concordance

**The** alternative to tissue biopsy

Jones et al. (2016) J Clin Oncol 34 (Suppl., abstract 11538)

It takes only **30 minutes** to analyse up to 14 lymph nodes

Just blood. Quick. Whenever.




Monitor with confidence

Siravegna et al. (2015) Nat Med 21:795-801

Sentimag® – Magseed®

# Impalpable lesion localisation has never been so easy

## Next-generation lesion localisation

- Simpler. Faster. More precise.
- No wire. No radioactivity. Just magnetism.
- Simple to place, easy to remove



Original Size

www.sysmex-europe.com/magseed

# ONCOLOGY EVENTS IN EUROPE

Sysmex Europe is involved in a number of oncology events across Europe. Here are a few you shouldn't miss

## COLORECTAL CANCER WEBINAR: OPTIMISING mCRC MANAGEMENT WITH ONCOBEAM RAS LIQUID BIOPSY

In this webinar, Dr Clara Montagut, medical oncologist and expert in liquid biopsy, will discuss her experience and the overall benefits of liquid biopsy. For more information and other webinars go to **www.sysmex-europe.com/webinar**

11.-14. APRIL 2018

## EUROPEAN LUNG CANCER CONGRESS (ELCC)

GENEVA/SWITZERLAND

Visit us at our booth #19b and join our meet-the-expert session 'Performance evaluation of OncoBEAM® EGFR compared to NGS in NSCLC' with Prof Léa Payen, Hospices Civils de Lyon, France, on 12. April 2018, 1-1:30 P.M.

10. JUNE 2018

## CHARITY EVENT: ROWING AGAINST CANCER

HAMBURG/GERMANY

Join us at the charity regatta 'Rowing against Cancer' to raise awareness and funds for the charity 'Leben mit Krebs' (Living with Cancer), which funds sporting and other projects to enhance the quality of life for cancer patients. For more informations go to **www.rudern-gegen-krebs.de**

10.-12. OCTOBER 2018

## ESSO CONGRESS OF THE EUROPEAN SOCIETY OF SURGICAL ONCOLOGY

BUDAPEST, HUNGARY

Join us for a lunchtime symposium on Thursday, 11. October 2018 (Batok II room) from 1 - 2 P.M., to learn more about new insights and developments for our Sentimag® solution with Sienna+® and Magseed®

19.-23. OCTOBER 2018

## ESMO CONGRESS

MUNIC, GERMANY

Visit us at our booth #29 in hall B2 and explore the Sysmex Oncology solutions for improving cancer management. Together with Sysmex Inostics we will focus on our expertise in liquid biopsy sharing scientific and product updates for OncoBEAM®. Plasma Safe Sequencing and Lab services provided by Sysmex Inostics will be further highlights presented at our booth.


**IMPRESSUM**

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**Print:**
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**Proofreading:**
LEKTORNET GmbH
**Photos:**
p. 3 (Ines Gröner) Photo: private; p. 5 (Ann Smeets) Photo: private; Cell photo: Sysmex; p. 7 Photo: Lucia Bartl for Sysmex; p. 8 Photo: Michael Rathmayr for Sysmex; p. 10 Photo: Lucia Bartl for Sysmex; p. 15 Photo: Lucia Bartl for Sysmex; p. 19 (Lea Payen-Guy) Photo: private; p. 20 (Dr Klaus Hofmann) Photo: private; p. 24 Photo: Lucia Bartl for Sysmex; p. 27 (Employees) Photos: private

ZE001838.EN.N.02/18

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