

ARTIFICIAL INTELLIGENCE PREDICTS THE RISK OF RECURRENCE FOR WOMEN WITH THE MOST COMMON BREAST CANCER

21-09-2021, New York, NY and Paris, France— The RACE AI study conducted by Gustave Roussy and the startup Owkin, as part of the AI for Health Challenge organized by the Ile-de-France Region in 2019, was presented as a proffered paper at ESMO (European Society of Medical Oncology). This study shows that thanks to deep learning analysis applied to digitized pathology slides, artificial intelligence can classify patients with localized breast cancer between high risk and low risk of metastatic relapse in the next five years . This AI could thus become an aid to therapeutic decision making and avoid unnecessary chemotherapy and its impact on personal, professional and social lives for low risk women. This is one of the first proofs of concept illustrating the power of an AI model for identifying parameters associated with relapse that the human brain could not detect.

With 59,000 new cases per year, breast cancer ranks first among cancers in women, clearly ahead of lung cancer and colorectal cancer. It is also the cancer that causes the greatest number of deaths in women, with 14%¹ of female cancer deaths in 2018,. 80%¹ of breast cancers are said to be hormone-sensitive or hormone-dependent. But these cancers are extremely heterogeneous and about 20% of patients will relapse with distant metastasis.

RACE AI is a retrospective study that was conducted on a cohort of 1400 patients managed at Gustave-Roussy between 2005 and 2013 for localized hormone-sensitive (HR+, HER2-) breast cancer. These women were treated with surgery, radiotherapy, hormone therapy, and sometimes chemotherapy to reduce the risk of distant relapse.

Chemotherapy is not routinely administered because not all women will benefit from it due to a naturally favorable prognosis. The practitioner's choice is based on clinico-pathological criteria (age of the patient, size and aggressiveness of the tumor, lymph node invasion, etc.) and the decision to administer or not adjuvant chemotherapy varies between oncology centers. Genomic signatures exist today to help identify women who benefit from chemotherapy, but they are not recommended by the French National Authority for Health and are not reimbursed by the French National Health Insurance (although they are included on the RIHN reimbursement list), which makes their access and use heterogeneous in France.

Gustave Roussy and Owkin have taken up the challenge of proposing a new method that is simple, inexpensive and easy to use in all oncology centers as a therapeutic decision-making tool. Ultimately, the goal is to direct patients identified as being at high risk towards new innovative therapies and to avoid unnecessary chemotherapy for low-risk patients.

¹Institut national du cancer (France):

<https://www.e-cancer.fr/Professionnels-de-sante/Les-chiffres-du-cancer-en-France/Epidemiologie-des-cancers/Les-cancers-les-plus-frequents/Cancer-du-sein>

<https://www.e-cancer.fr/Patients-et-proches/Les-cancers/Cancer-du-sein/Hormonotherapie>

In the RACE AI study, Owkin's Data Scientists, guided by Gustave Roussy's research physicians, developed an AI model capable of reliably assessing the risk of relapse with an AUC of 81% to help the practitioner determine the benefit/risk balance of chemotherapy. This calculation is based on the patient's clinical data combined with the analysis of stained and digitized histological slides of the tumor. These slides, used daily in pathology departments by anatomo-pathologists, contain very rich and decisive information for the management of cancer. It is not necessary to develop a new technique or to equip a specific technical platform. The only essential equipment is a slide scanner, which is a common piece of equipment in laboratories. Like an office scanner that digitizes text, this scanner digitizes the morphological information present on the slide.

The results of this first study by the Owkin and Gustave Roussy teams open up strong prospects and next steps include prospectively validating the model on an independent cohort of patients treated outside Gustave Roussy. If the results are confirmed, through providing reliable information to clinicians, this AI tool will prove to be a valuable aid to therapeutic decisions.

Source

ESMO 2021 – Oral Session

Proffered paper : Translational research

Prediction of distant relapse in patients with invasive breast cancer from deep learning models applied to digital pathology slides

Présentation n° 11240 – Channel 5 – 14h20-14h30 Sunday 19th Septembre 2021

Speaker : Ingrid J. Garberis, Gustave Roussy

About Gustave Roussy

Classed as the leading European Cancer Centre and the fifth on the world stage, Gustave Roussy is a centre with comprehensive expertise and is devoted entirely to patients suffering with cancer. The Institute is a founding member of the Paris Saclay Cancer Cluster. It is a source of diagnostic and therapeutic advances. It caters for almost 50,000 patients per year and its approach is one that integrates research, patient care and teaching. It is specialized in the treatment of rare cancers and complex tumors and it treats all cancers in patients of any age. Its care is personalized and combines the most advanced medical methods with an appreciation of the patient's human requirements. In addition to the quality of treatment offered, the physical, psychological and social aspects of the patient's life are respected. 3,200 health professionals work on its two campuses: Villejuif and Chevilly-Larue. Gustave Roussy brings together the skills, which are essential for the highest quality research in oncology: a quarter of patients treated are included in clinical trials.

For further information: www.gustaveroussy.fr/en, [Twitter](#), [Facebook](#), [LinkedIn](#), [Instagram](#)

About Owkin

Owkin is a French-American startup that specialises in AI and Federated Learning for medical research. Owkin's mission is to connect the global healthcare industry through the safe and responsible use of data and application of artificial intelligence, for faster and more effective research. Owkin was founded in 2016 by Dr Thomas Clozel M.D., a clinical research doctor and former assistant professor in clinical hematology, and Dr Gilles Wainrib, Ph.D., a pioneer in the field of artificial intelligence in biology.

Owkin leverages life science and machine learning expertise to make drug development and clinical trial design more targeted and cost effective. Owkin applies its cutting-edge machine learning algorithms across a broad network of academic medical centers, creating dynamic models that not only predicts disease evolution and treatment outcomes, but can also be used in clinical trials for enhanced analysis, high-value subgroup identification, development of novel biomarkers, and the creation of both synthetic control arms and surrogate endpoints. The end result? Better treatments for patients, developed faster, and at a lower cost.

Owkin has published several high-profile scientific achievements in top journals such as [Nature Medicine](#), [Nature Communications](#), [Hepatology](#) and presented results at conferences such as the [American Society of Clinical Oncology](#).

For more information, please visit www.owkin.com, follow @OWKINscience on Twitter
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¹Institut national du cancer (France):

<https://www.e-cancer.fr/Professionnels-de-sante/Les-chiffres-du-cancer-en-France/Epidemiologie-des-cancers/Les-cancers-les-plus-frequents/Cancer-du-sein>

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