The GPS of metastatic breast cancer

(scientific name: AURORA)

Just as a GPS guidance system helps you locate and avoid traffic problems, finding the best route to your destination, the GPS programme aims to identify breakdowns (genetic aberrations) and to map the routes that cancer cells take to invade other organs. Knowing this, we can stop them, or change their route by choosing the best possible route to treatment.

WHY

In 2018 an estimated 130.000 people in Europe died because their breast cancer metastasised. When breast cancer metastasises, it spreads to other parts of the body. This advanced form of the disease is more difficult to treat and remains incurable ***(WHO Globcan – gco.iarc.fr).***

The GPS programme aims to help us understand both why breast cancer metastasises, how it evolves, and why some cases of the disease respond poorly to standard treatment, while others respond very well. Whenever possible, patients enrolled in the GPS programme will be offered the opportunity to participate in clinical trials testing new and promising drugs that target the specific genetic characteristics of their tumours. The hope is that the knowledge gained from the GPS programme will one day lead us both to better treatments and to cures for the women and men affected by metastatic breast cancer.

WHERE

66 hospitals associated with 10 BIG research groups covering 12 countries are participating in the programme (Austria, Belgium, Germany, Iceland, Italy, Luxembourg, Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom).

In Belgium, the following hospitals are participating:

- University Hospitals Leuven
- CMSE – CHU a Namur
- Cliniques universitaires Saint-Luc in Brussels
- Grand Hopital Charleroi
- UZA, Antwerp University Hospital
- Sint Augustinus, GZA Ziekenhuis
- Institut Jules Bordet in Brussels
- CHU SART Tilman in Liège

WHAT

Participants have their tumour samples and blood tested for genetic aberrations using molecular screening. Molecular screening uses technology that can characterise cancer on the genetic level in great detail. A unique aspect of the GPS programme is that the tests will be done on samples collected when patients were first diagnosed with breast cancer and on samples taken after the cancer metastasised.

This information will enable us to:

1) analyse why some tumours respond poorly to treatment,
2) evaluate why some tumours respond exceptionally well to treatment, and
3) learn about the natural evolution of the disease.

WHO

Women and men aged 18 or older who have been newly diagnosed with metastatic breast cancer, for which they have received no more than one course of treatment. Participation requires primary and metastatic tumour tissue as well as blood to be available for genetic testing.

The initial recruitment goal was to include 1.000 patients, a milestone that was achieved on 19 August 2020. Because of the great interest from around the globe in AURORA's very rich and unique data, BIG plans to extend the study to recruit up to an additional 1.000 women and men, if enough funding can be secured.

HOW IT WORKS

Objective 1: Understand how metastatic breast cancer develops and evolves

Objective 2: Understand why certain tumours respond well or poorly to treatment

Targeted sequencing[1] will be done for all patients (on samples collected when they were first diagnosed, on metastatic tumours samples, and on blood) to test for genetic aberrations in a specific set of cancer-related genes. If an aberration is found, a clinical trial testing a new treatment designed to target that aberration may be proposed to the patient. If no drug or clinical trial is available for an aberration, or if no aberration is found, the best available standard treatment will be proposed to the patient. All patients will be followed-up every 6 months for up to 10 years.

Whole exome sequencing[2] will be done (on samples collected when patients were first diagnosed, on metastatic tumour samples, and on blood) to test for genetic aberrations for those patients whose tumours responded either exceptionally well or poorly to a treatment.

[1] Targeted sequencing is the analysis of specific genes already known or suspected to play an important role in cancer development or progression.

[2] Whole exome sequencing is used to identify all the aberrations present in a tumour, including those whose role in cancer (if any) are still unknown.

BUDGET

The total budget of the programme to cover the first 1.000 patients was 28.000.000 EUR, or **28.000 EUR per patient**.

Next to the set-up of the programme (legal, ethical, operational aspects), it covers the collection and transportation of tumour and blood samples to a central laboratory, their storage in a biobank over 10 years, the targeted sequencing and RNA sequencing of all samples, and the whole exome sequencing of the exceptional responders' samples, the investigators and sites fees, the monitoring of the participating sites, the data collection, management and analysis (clinical and molecular), the reporting and publications.

The level of funds raised in the coming months and years will determine the degree to which AURORA can be expanded.