



The Artemis Project® – an innovative approach to research

In 1991, the National Breast Cancer Coalition (NBCC) was formed with one mission: to end breast cancer. NBCC has accomplished much throughout its 24 years: bringing about unprecedented research funding to the worldwide scientific community, forging new collaborations to design research and set priorities, setting a public policy agenda for breast cancer, expanding access to information and care to underserved women and launching unparalleled training programs to prepare advocates around the globe to better understand and communicate breast cancer information and to work side by side with scientists, policy makers and health care providers.

Yet breast cancer continues to take far too many lives. This year in the United States alone, an estimated 40,290 women and 440 men will die of breast cancer. Worldwide more than 500,000 women will die of breast cancer. With no significant breakthroughs, in 2035 it is estimated that 846,500 women will die. These numbers are intolerable; they are not just statistics, they are lives. A renewed sense of urgency is required to end this disease and save lives. In 2010, the National Breast Cancer Coalition set a deadline—to know how to end breast cancer by January 1, 2020, **Breast Cancer Deadline 2020®**. As part of Deadline 2020®, NBCC launched an unprecedented advocate-led, mission-driven research effort, called the Artemis Project®, focused on primary prevention—stopping women and men from getting breast cancer—and prevention of metastasis—stopping deaths from the disease.

How the Artemis Project® Began

After years of successfully advocating for increased funding for the worldwide breast cancer research community, NBCC decided the only way to achieve its mission was to take a proactive leadership role in setting and implementing an agenda for breast cancer research.

In the 1990s, NBCC began to look at different approaches to make certain that breast cancer research was directed to the goal of ending breast cancer and eliminating mortality from the disease. NBCC wanted to change the usual focus on individual research goals and expand that focus with an emphasis on overarching issues using a collaborative approach. NBCC hosted the Aspen Project meetings, bringing together stakeholders from diverse perspectives and developed the Aspen Project Research Greenhouse that identified innovative paths to funding and conducting research. NBCC has continued its mission-driven strategic work through the Deadline 2020® campaign, to focus research efforts in key areas.

In 2011, in order to develop specific research agendas under broad goals, NBCC hosted two summits, one on primary prevention and another on the prevention of metastasis. The summit participants included representatives of basic science, clinical research, health care, advocacy, industry, government and others with expertise ranging from anthropology to virology. The goal was to identify and prioritize the questions to be answered in primary prevention and prevention of metastasis and recommend who should be at the table to do so. Each identified issue would then become an NBCC catalytic project, collectively known as the [Artemis Projects®](#).

The key components of the Artemis Projects® include:

- **An advocate-led research agenda.** The Artemis Projects® are led by advocates who have no other agenda but to accelerate the end of breast cancer and are trained in the language and process of science through NBCC's [Center for Advocacy Training and Project LEAD®](#).
- **Focus on high impact research.** The focus is on issues with significant potential impact that have traditionally been minimized in the research arena—these overarching issues are addressed by specific catalytic projects. Advocates, regulators, scientists and visionary thinkers from diverse fields are brought together to address the issues of primary prevention and preventing metastasis.

- **Unexpected and unique collaborations.** Innovation and expertise come from a broad array of fields, countries, institutions, disciplines and perspectives. Bringing investigators and advocates together from these diverse worlds has enabled new, exciting, successful collaborations that would never have occurred except for this Artemis approach.
- **A dynamic, continuous input process.** Scientists and advocates collaborate to design the research protocols and endpoints in a dynamic process with continual input. Participants are added regardless of their past participation in Artemis. This ensures that the work stays focused as designed, yet with flexibility so that the work is not dominated by one investigator or one institution.
- **An advocate-designed framework.** The Project is conducted within a framework designed by advocates. Annual meetings of participants designed to foster discussion and debate, in addition to webinars, conference calls and smaller meetings throughout the year, maintain the dynamic collaboration.

The Artemis Project® today

Primary Prevention

Four annual meetings and several interim meetings have taken place to develop plans for a **preventive vaccine**. These have served to bring experts together from broad ranging disciplines to determine what questions need to be addressed, who should address them and how to move forward in a timely manner. Strategic plans have been developed and milestones have been set to keep moving the work forward.

The Artemis Project® has funded seed grants to (1) identify as targets potential viruses and antigens that could lead to the development of breast cancer and (2) develop better ways to define subsets of ductal carcinoma in situ (DCIS) and determine if those data reveal a path to prevention.

Artemis has also **established a path forward for the creation of a preventive vaccine**. Advocates have surveyed the scientific literature to determine potential protein targets for vaccine development. Candidate proteins for inclusion in a preventive vaccine have been selected by the Artemis team based on the literature review, seed grant results and interaction at Artemis meetings and webinars. An international team of scientists with wide ranging expertise, together with advocates, are developing the experimental protocols to create the preventive vaccine and gather the preclinical safety and efficacy data that will be necessary for FDA approval. **Artemis participants are ready to begin the preclinical phase for a preventive vaccine.**

Prevention of Metastasis

Following up on the results of the 2011 Metastasis Summit, a systematic review of the landscape suggested that tumor dormancy and maintaining tumor cells in a quiescent state might be a successful approach to preventing progression of metastasis. This led to the first Artemis Project meeting on the topic in Walland, Tennessee, in June 2013. Consensus among the scientists and advocates at this meeting confirmed that an increased knowledge of tumor dormancy and how it can be maintained could lead to an understanding of how to prevent metastasis.

The immuno-oncology field had progressed far enough to reasonably believe that breast cancer vaccine approaches to not just preventing the development of primary breast cancer, but also preventing the development of metastatic disease, are achievable goals. Thus, we were able to build on both the Artemis model and the work of participants from the initial pilot project. Participants in this Artemis Project also meet annually, hold interim meetings, and webinars and have designed action plans and set milestones to spur progress.

To accelerate this work, a project has begun to identify **how the immune system interacts with dormant tumor cells**. A seed grant was also awarded to create a **database containing genomic and clinical data from breast cancer patients**.