Clinical candidate BO-112: a nanomedicine capable of stimulating innate and adaptative immune responses and triggering apoptosis in cancer cells

BiOncoTech Therapeutics

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THE COMPANY

Bioncotech Therapeutics emerged as the first spin off of the Spanish National Cancer Research Center (CNIO).

cnio
Centro Nacional de Investigaciones Oncológicas

Bioncotech Therapeutics was established in 2010 and has its headquarters in Valencia, Spain.

Bioncotech Therapeutics is fully dedicated tothe development of innovative technologies for the treatment of aggressive tumors.

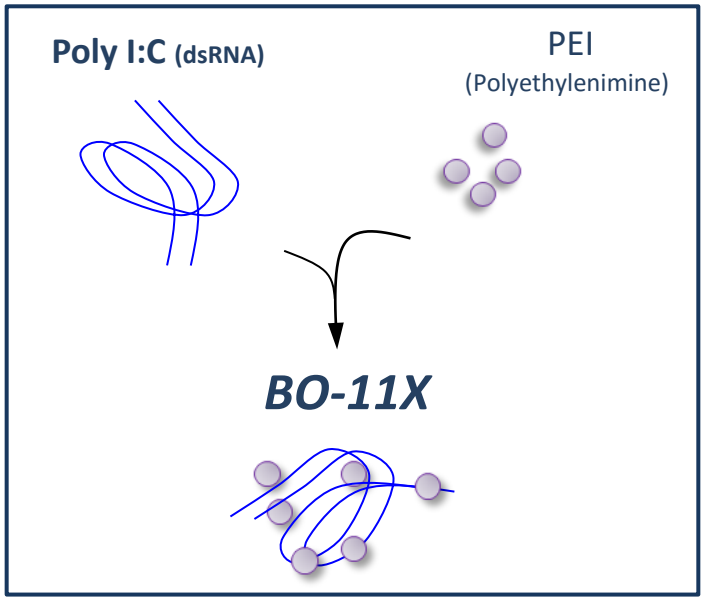
It is now focused on its most advanced candidate, **BO-112**, a potent anti-tumoral drug with immuno-stimulatory activity

BO-11X has been developed for its use in solid tumors:

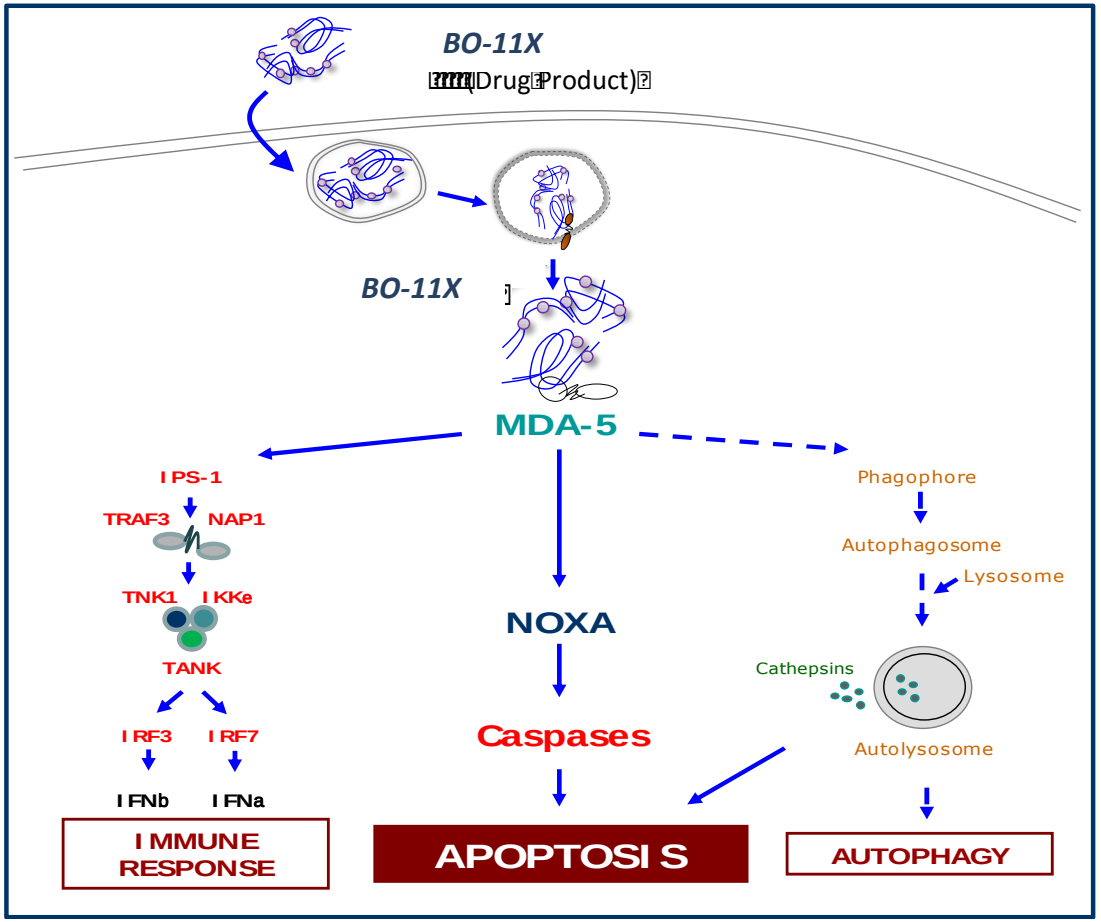
It can be delivered both sistimically and directly into the tumor, allowing much higher concentrations of the product in the tumor microenvironment than do systemic infusions, providing lower toxicity and better efficacy when combined with other agents.

THE PRODUCT BO-11X: DESIGN AND MOA

BO-112 formation

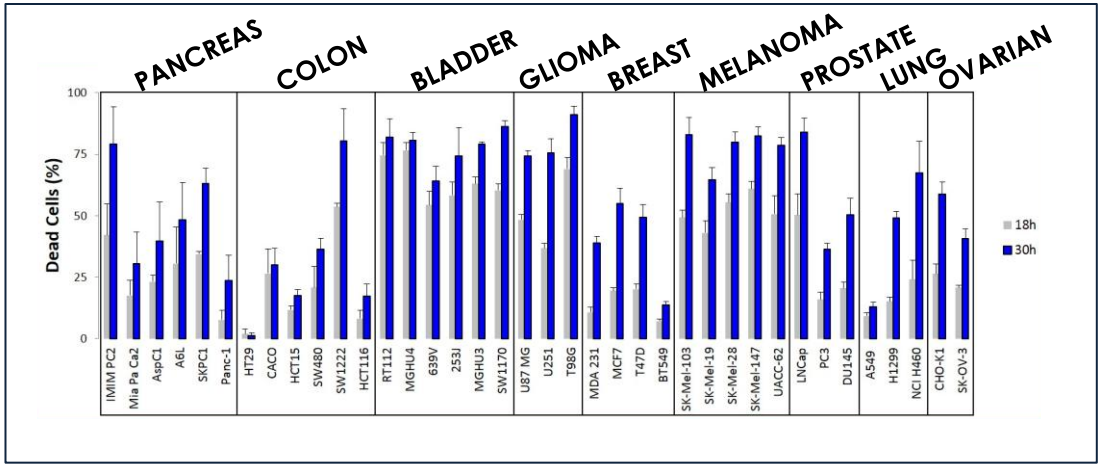


BO-11X mechanism of action

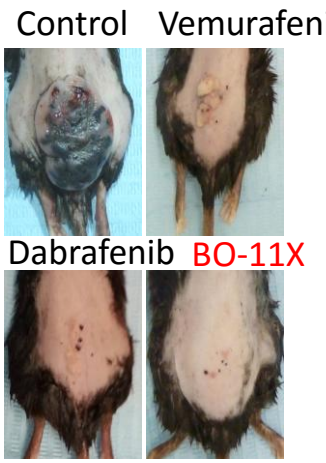


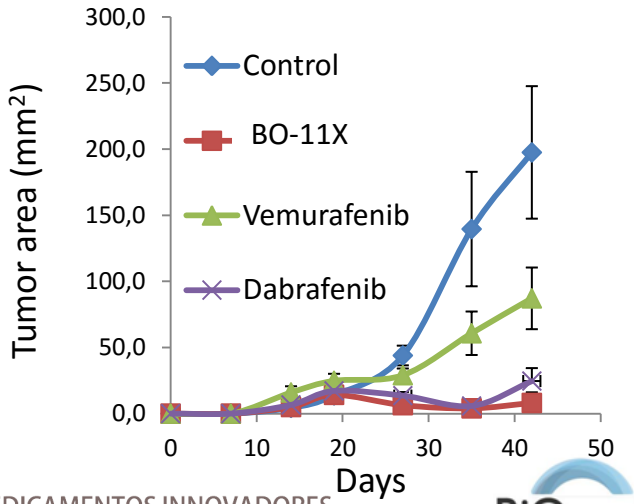
PROOF OF CONCEPT: *IN VITRO* AND *IN VIVO* STUDIES

BO-11X induces cell death in a panel of human tumor cell lines

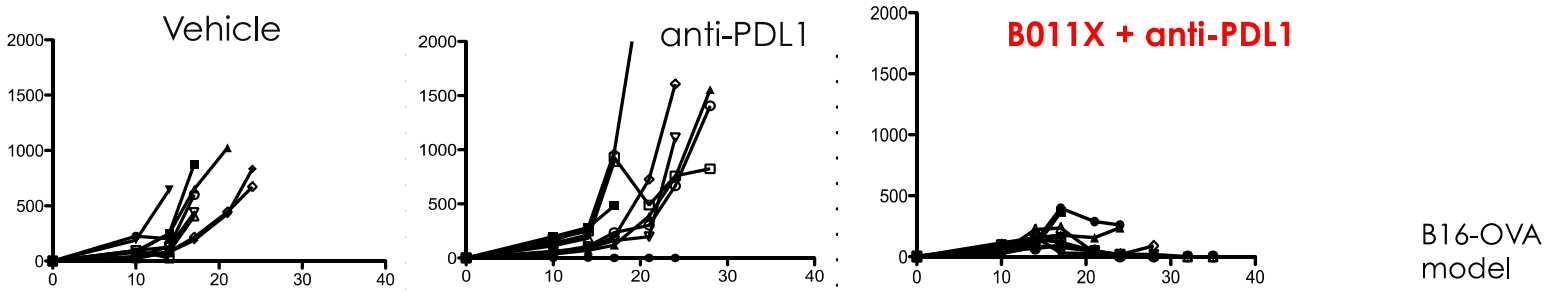


BO-11x reduces tumor growth in melanoma mouse model





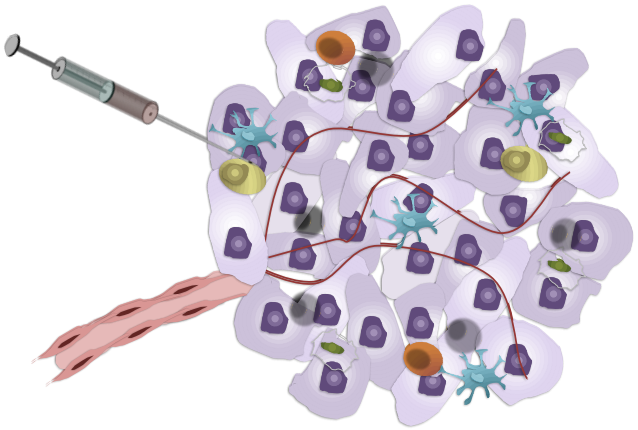
BO-11x improves the anti-tumoral effect of existing IO agents



B16-OVA model

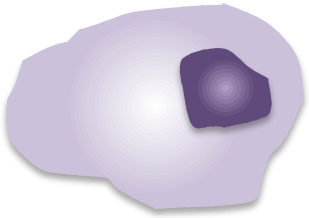
THE PRODUCT BO-11X : DESCRIBED ANTI-TUMOR EFFECTS OF BO-11X

BO-11X



Tumor microenvironment

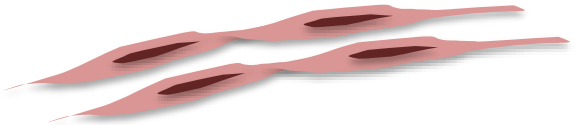
TUMOR CELL



↑ Apoptosis and autophagy

INCREASES TUMOR CELL DEATH

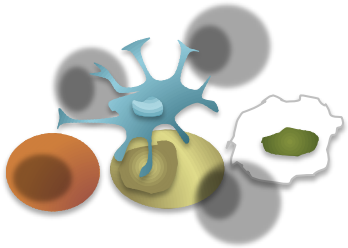
LYMPHANGIOGENESIS



↓ Angiogenesis activators

REDUCES TUMOR VASCULARIZATION

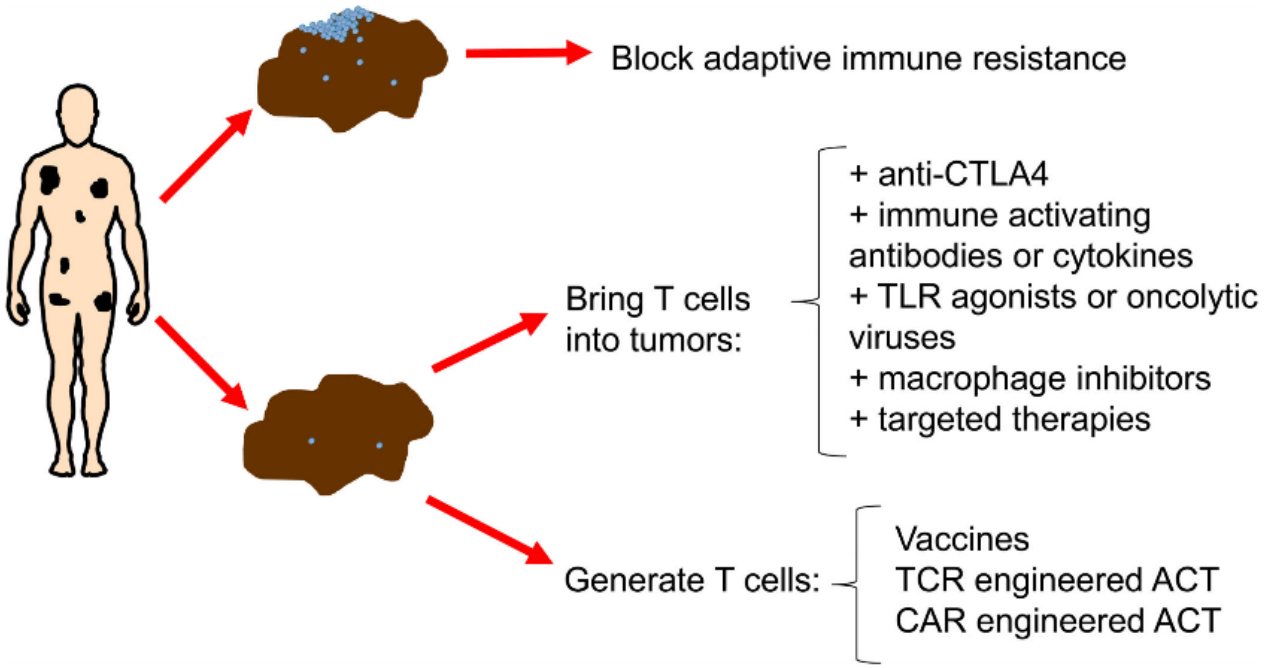
IMMUNE SYSTEM



↑ M1 macrophage polarization

ENHANCES ANTI-TUMOR IMMUNITY

Differential features facing the market: **STRATEGIES COMBINING IO AGENTS**



BO-11X represents an atractive tool to enhance the therapeutic effect of immune therapies that act "releasing the brakes" of the immune system

Combination with well-established agents brings alternative benefits by sensitizing tumor cells towards apoptosis and overcoming tumor-mediated immunosuppression.

STATUS OF DEVELOPMENT: FIRST IN HUMAN

An exploratory first in human phase I clinical and pharmacokinetic study of intratumoral administration of BO-112 in adult patients with solid tumors"

EUDRA CT: 2016-000527-24

Study population

Patients with aggressive solid tumors from whom biopsies can be obtained

Hospital Gregorio Marañón, Madrid
Clínica Universitaria de Navarra (CUM)

First Patient October 2016

GOBIERNO DE ESPAÑA MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

MEDICAMENTOS INNOVADORES
Plataforma Tecnológica Española

BiOncoTech Therapeutics

farmaindustria

STATUS OF DEVELOPMENT: FIRST IN HUMAN

Primary objective:

To determine the **biological effect** of a single IT administration of BO-112

Secondary objectives:

To determinate the safety profile of BO-112 in patients enrolled in the study

To establish the pharmacokinetics (PK) profile of BO-112 administered intratumorally

To explore pharmacodynamics (PD) markers of the BO-112

To monitor changes in the profiles of innate, specific, complement, and NK mediated immune response

To evaluate the preliminary antitumor activity of the drug

STATUS OF DEVELOPMENT: PRECLINICAL STRATEGY

THERAPEUTIC EFFICACY

CLINICAL INDICATIONS

Tumor models:
- Melanoma
- Breast carcinoma
- Colon carcinoma

Survival and tumor growth studies

TREATMENT STRATEGY

- BO-112
- BO-112 + (Immunoagents, radiotherapy, chemotherapy)

Survival and tumor growth studies

MECHANISMS OF ACTION

IN VIVO TUMOR MODELS

BO-112 selected therapy

Characterization of the Immune response (TILs and draining lymph node)

HUMAN PRIMARY CELLS

Immune cell populations from PMBC + BO-112

Analysis of the effect of BO-112 on activation and function of myeloid and lymphoid cells

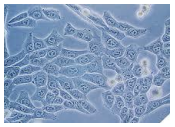
BIOMARKERS

CELL SCREENING

30 human tumor cell lines

Markers of response to BO-112 (apoptosis, cytotoxicity, cytokine expression, autophagy)

GENETIC STUDY



Selection of cell lines high- and non-responders to BO-112

Transcriptional study, NanoString Technology

BO11X PRODUCT DEVELOPMENT

FORMULATION
PRODUCTION

PRECLINICAL
RESEARCH

CLINICAL
STUDIES

Better knowledge of BO-112

Definition of next phase of the clinical trial

Increased value of BO-112

Better market positioning

PCT/EP2010/059593: Process for the identification of compounds for treating cancer

A pharmaceutical composition consisting in a combination of polyinosine-polycytidylic acid (pIC) which is at least 1000 nucleotides per chain and PEI for the treatment of cancer (melanoma, pancreatic cancer, colon cancer, bladder cancer, breast cancer,prostate cancer, lung cancer, and ovarian carcinoma.)

EP15194864.3: Novel Pharmaceutical Composition

Novel formulations of particles comprising poly (I:C) that not only improve properties of medical interest but also are more efficiently produced.
Our candidate has proved to be more effective than other pIC formulations, showing a direct anti-tumoral effect combined with its ability to activate innate immunity.

THE PRODUCT: Pitfalls & Risks to be considered

CMC : Development of specific analytical methods

Manufacture: Reliable and scalable GMP campaigns

Clinical Trial: Definition of the study

PARTNERING OPPORTUNITIES

Bioncotech is interested in partnerships to explore the therapeutic opportunities of BO-112 in combination with other agents.

We would like to establish collaborations for the development of combination studies in the immuno-oncology area.

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