TARGETED THERAPY FOR THE TREATMENT OF CANCER

Universitat Autònoma de Barcelona

MAELYS THIREAU CHAREL

FACULTAT DE VETERINÀRIA

FINAL DEGREE PROJECT - JUNE 2023

INTRODUCTION

Targeted therapies aim to deliver drugs, genetic material or specific proteins directly to tumor cells or to the tumor microenvironment involved in its proliferation.

OBJECTIVES

Definition of the **mechanism of action** of the different types of targeted therapies, of its main **advantages and limitations** compared to conventional cancer treatment (radiotherapy and chemotherapy) and its **current situation in the veterinary clinic as well as future perspectives.**

INHIBITING PROLIFERATION

The aim is to inhibit the central regulators involved in cell proliferation pathways.

Small molecules: Gleevec®, vemurafenib
Monoclonal antibodies: trastuzumab

INHIBITING ANGIOGENESIS

By preventing the generation of new blood vessels, the supply of oxygen and nutrients arriving to cancer cells is limited in order to prevent their proliferation.

Monoclonal antibodies:
Avastin®

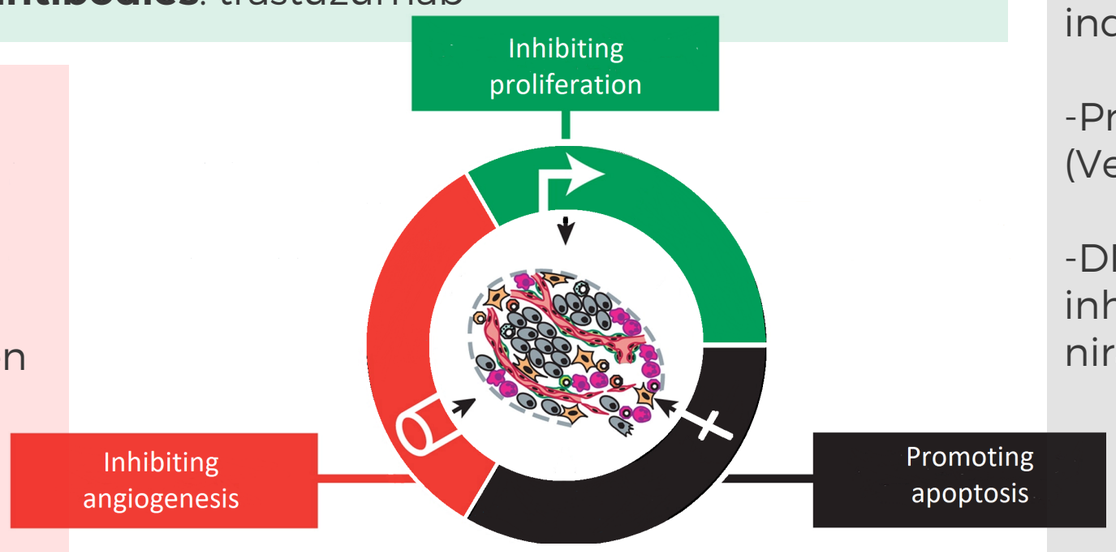

Fig 1. Main goals of targeted therapies (Modified from Hanahan & Weinberg, 2011)

PROMOTING APOPTOSIS

Within this group, several **small molecules** can be found targeting different pathways to eventually end with apoptosis induction:

-Pro-apoptotic molecules (Venetoclax®)

-DNA repair mechanisms inhibitors (Olaparib, rucaparib, niraparib and talazoparib)

-Proteasome inhibitors (Bortezomib, carfilzomib and ixazomib)

ANTIBODY-DRUG CONJUGATES

Drugs that combine monoclonal antibodies with highly potent anti-cancer agents.

Mylotarg®

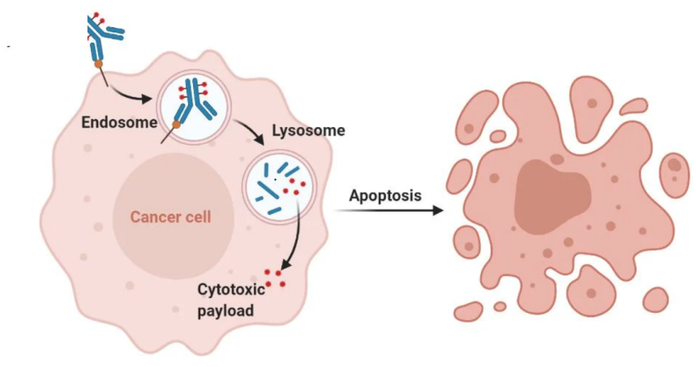

Fig 2. ADCs mechanism of action by BioRender.com (2020)

THERAPEUTIC VACCINES

The aim is to artificially induce an immune response against tumor surface antigens (neoantigens).

CAR-T therapies
Gardasil®
Provenge®

GENE THERAPY

Delivery of specific genetic material to change protein codification or biologic cell properties.

Gendicine®

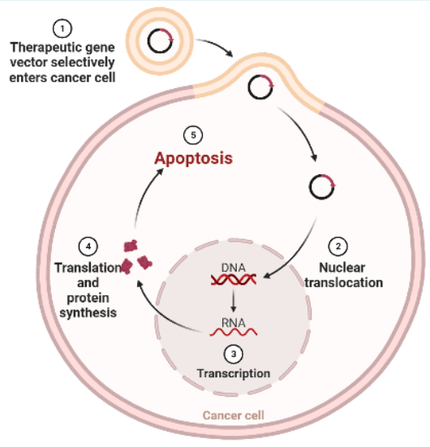

Fig 3. Gene cancer therapy by BioRender.com (2020)

CONCLUSIONS

Targeted therapies represent today one of the most promising treatments against cancer with a very favorable future. A better understanding of cancer development is a critical step for the exploration of new therapeutic approaches like this one.