

June 26 - 30, 2023
Smolenice Castle, Slovakia

BenBedPhar Training School 2023

NRF2 in noncommunicable diseases:
From bench to bedside



Model of chicken chorioallantoic membrane (CAM) *ex ovo*

Iveta Bernatova, PhD., DSc.

Institute of Experimental Medicine, Slovak Acad Sci, Bratislava, Slovakia

Model CAM

The chicken chorioallantoic membrane (CAM) model is used in pharmaceutical and biological research as an alternative or complementary test to other animal models:

- for toxicological studies (evaluation of skin, eye and embryonic toxicity)
- for pharmacokinetic and pharmacodynamic studies
- to evaluate the metastatic potential of various tumors
- to test the efficacy of new anticancer therapies *in vivo*
- to study angiogenesis
- in recent years, its use has greatly expanded in other areas of evaluation of new anti-infective substances, the study of biodistribution and in tissue engineering

Model CAM

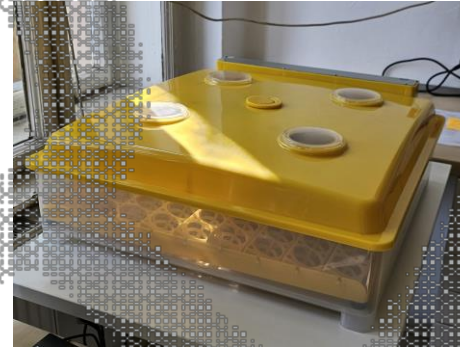
Advantages

- cheap and fast method of use - the possibility of performing several tests on individual CAMs
- rapid growth of vessels, complete availability of the circulatory system (for intravascular administration of substances),
- availability of vessels of different diameters in vivo environment - excellent for modeling more complex systems (intermediate between in vitro and mammalian models)
- visualization of tests in real time reproducibility and reliability
- cost-effective method compared to animal models under certain conditions,
- easier obtaining a work permit within 14 days of embryonic development (depends on the country's legislation)

Disadvantages

- rapid CAM changes, resulting in a short time to perform the experiment
- immunodeficiency
- sensitivity to environmental factors (temperature, humidity, environmental cleanliness)
- differences in drug metabolism in mammals and birds
- interspecies differences (differences in drug metabolism/pharmacokinetics)
- it is not possible to test oral administration of substances
- the possibility of non-specific inflammatory reactions

Model CAM in ovo and ex ovo



BENBEDPHAR

Model CAM ex ovo



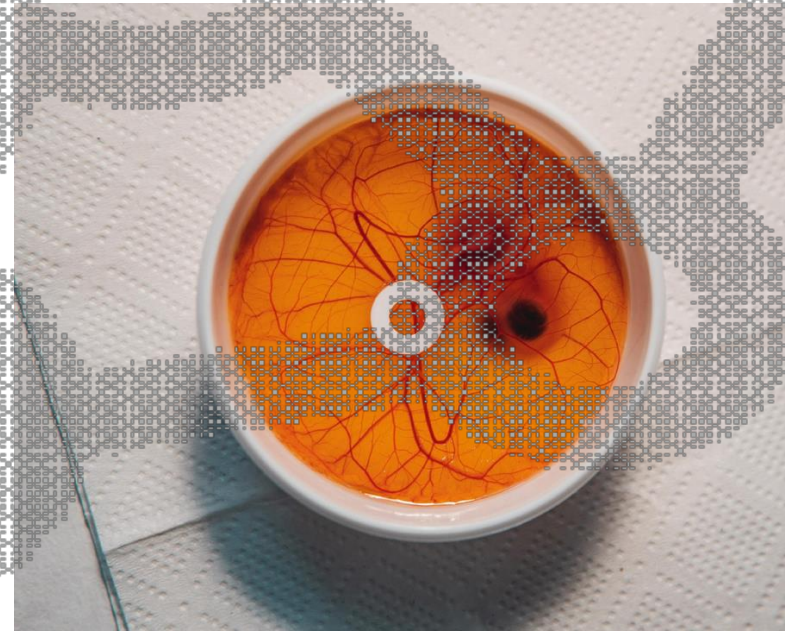
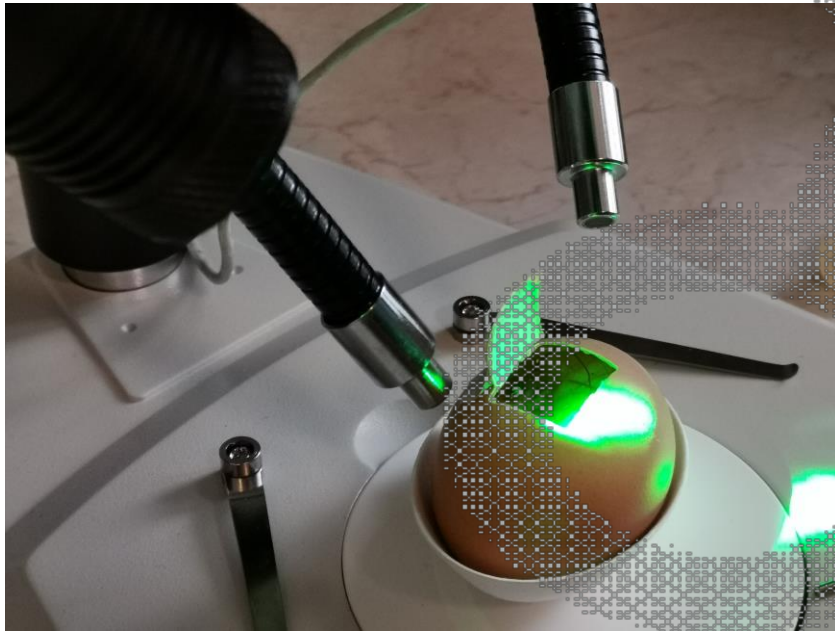
B E N B E D P H A R

Model CAM ex ovo



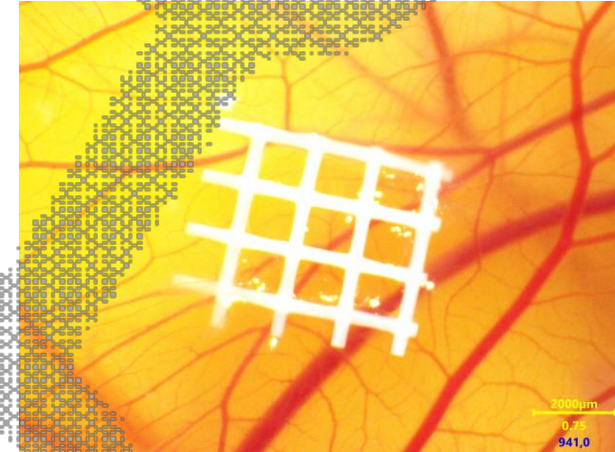
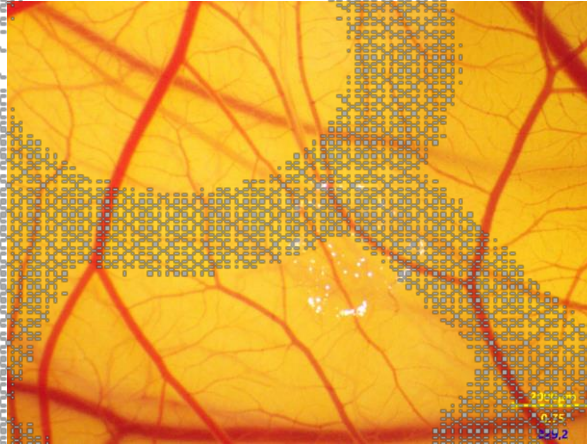
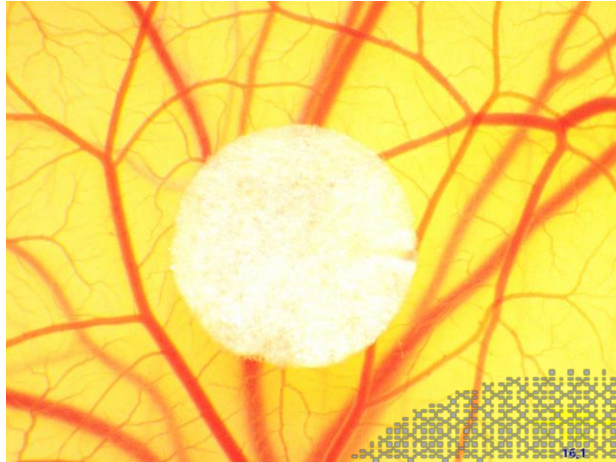
BENBEDPHAR

Model CAM in ovo and ex ovo



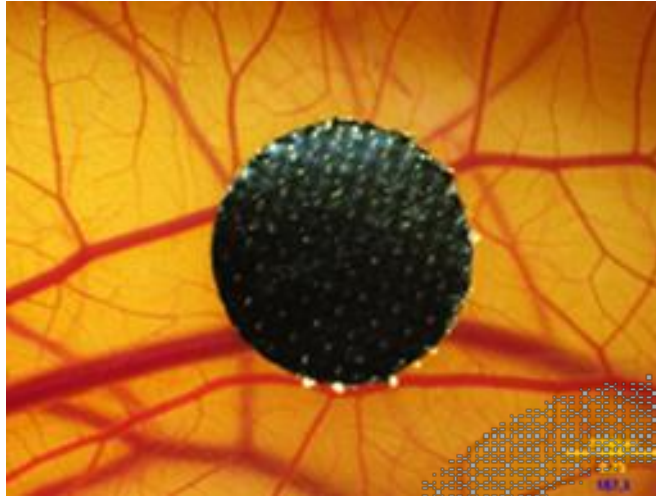
BenBedPhar

Substance application



BenBedPhar

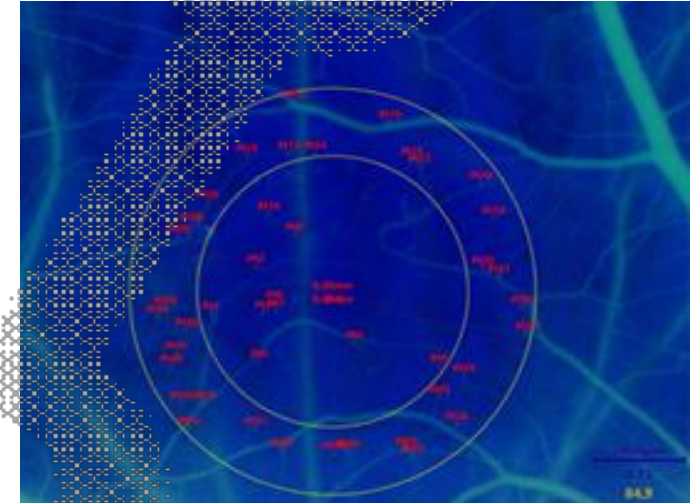
Results quantification



Teflon ring



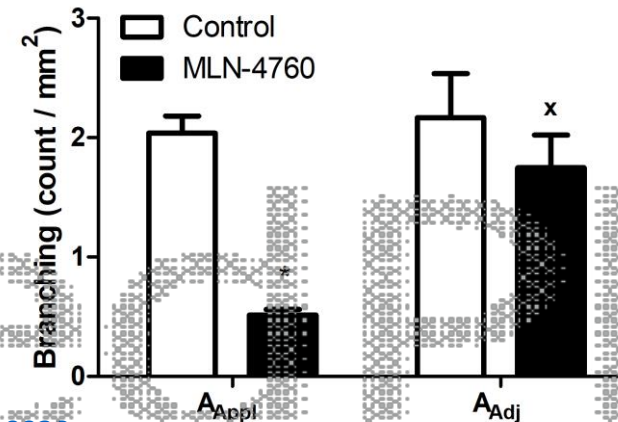
Control egg



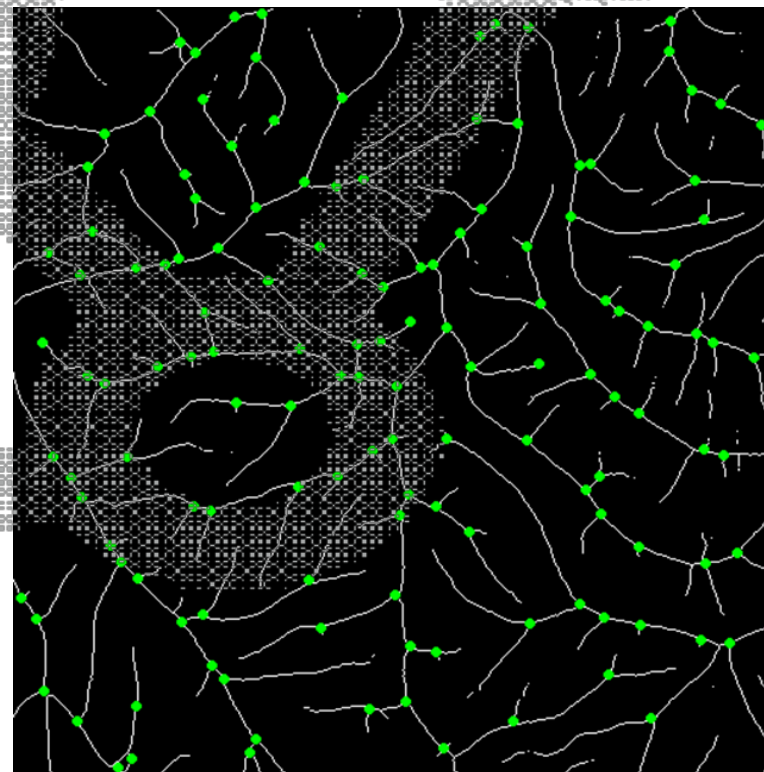
MLN-4760-treated egg

Examples of variables for quantification:

- arterial branching
- total length of the arteries
- number of arterial endings



Results quantification



Original picture

Using arteficial neuronal net