



THE COMMON FOOD ADDITIVE E407a PROMOTES ERYPTOSIS IN VITRO

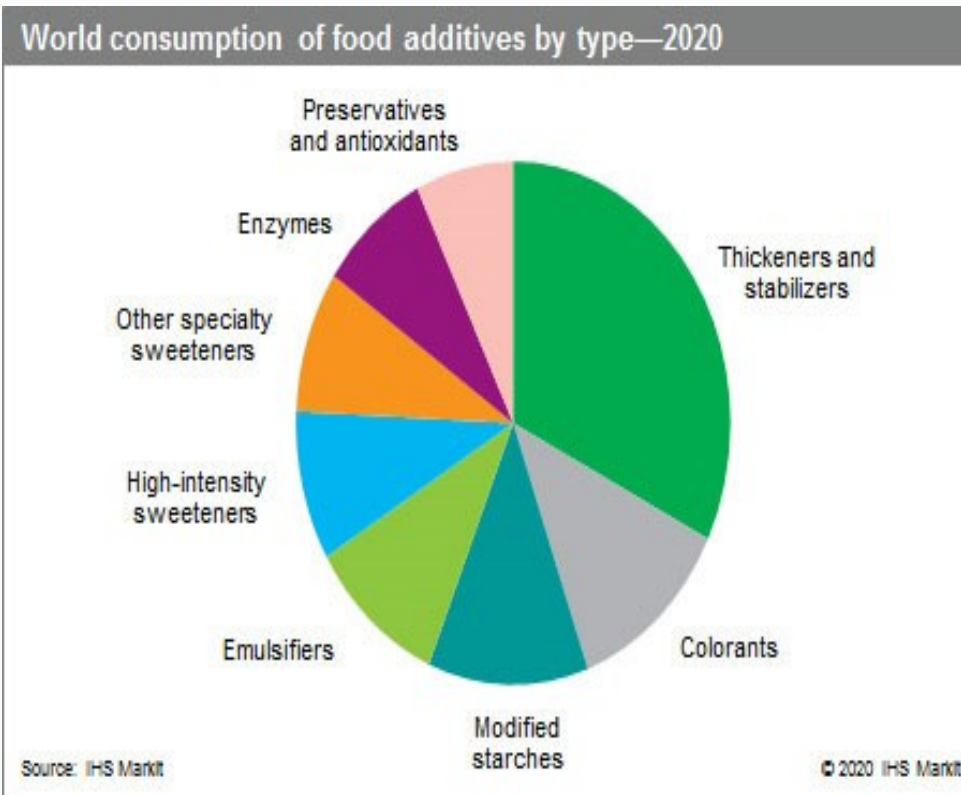
*Director of the Research Institute of Experimental and Clinical Medicine,
Kharkiv National Medical University
Assoc. Prof. Dr. Anton Tkachenko, PhD, MD*

Dr. Anton Tkachenko, Dr. Anatolii Onishchenko, Dr. Volodymyr Prokopiuk

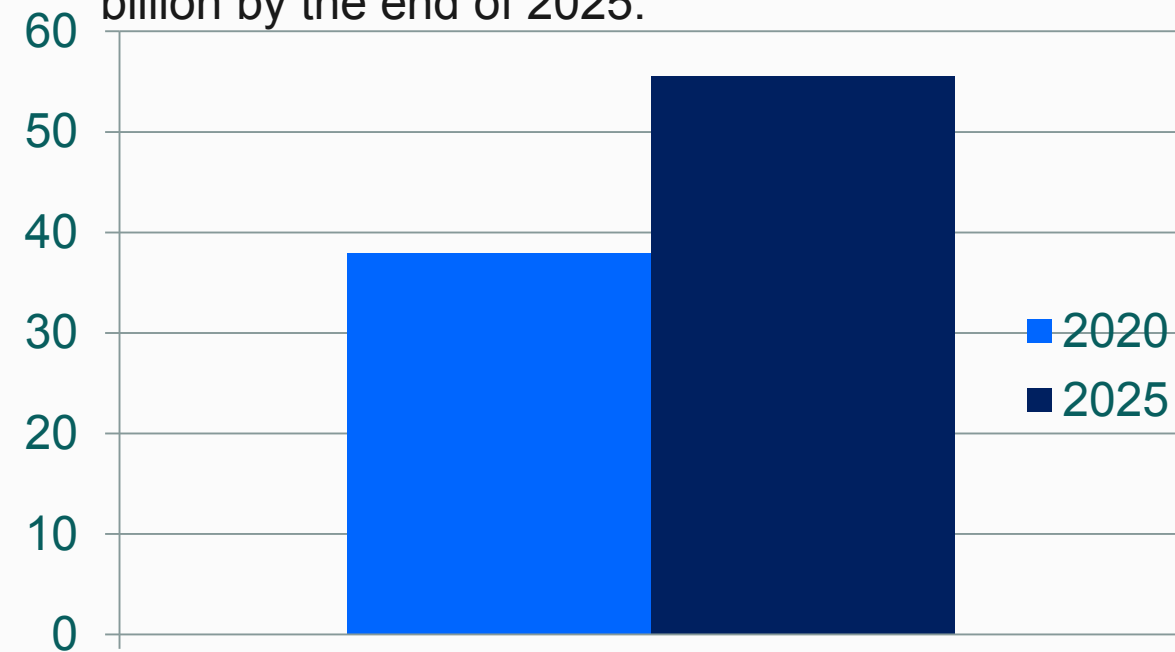
November 17, 2022, Kharkiv



FOOD ADDITIVES



The global Food Additives Market size was worth USD 37.91 billion in 2020, and it is estimated to reach a valuation of USD 55.53 billion by the end of 2025.





INTERNATIONAL REGULATORY AUTHORITIES

The Joint Expert Committee on Food Additives (JECFA) of the Food and Agriculture Organization /World Health Organization

The U.S. Food and Drug Administration (FDA)

The European Food Safety Authority (EFSA)



RE-EVALUATION OF FOOD ADDITIVES

26.3.2010

EN

Official Journal of the European Union

L 80/19

Text

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COMMISSION REGULATION (EU) No 257/2010

of 25 March 2010

setting up a programme for the re-evaluation of approved food additives in accordance with Regulation (EC) No 1333/2008 of the European Parliament and of the Council on food additives

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EC) No 1333/2008 of the European Parliament and of the Council of 16 December 2008 on food additives ⁽¹⁾, and in particular Article 32 thereof,

After consulting the European Food Safety Authority,

Whereas:

- (1) Regulation (EC) No 1333/2008 requires the Commission to set up a programme for the re-evaluation, by the European Food Safety Authority (hereinafter referred to as 'EFSA'), of the safety of food additives that were already permitted in the Union before 20 January 2009.
- (2) In 2007, the Commission presented a report to the European Parliament and the Council on the progress of the re-evaluation of food additives ⁽²⁾. That report provides a summary of the recent additive re-evaluations undertaken by the Scientific Committee on Food ('SCF') and EFSA and describes the related actions taken by the European Commission on the basis of the scientific opinions.
- (3) The re-evaluation of food colours has already been started with priority, since these food additives have the oldest evaluations

RE-EVALUATION OF CARRAGEENAN BIOSAFETY



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Call for technical and toxicological data on carrageenan (E 407) for uses in foods for all population groups including infants below 16 weeks of age

Deadline: 31 December 2022

Document (287.31 KB)

EFSA-Q-number: EFSA-Q-2018-00771

- **Published: 10/10/2018**
- **Deadline for registering interest: 21/11/2018**
- **Deadline for submission of data: 30/09/2020**
- **New deadline for submission of data: 31/12/2022**

Background

According to Regulation (EC) No 1333/2008^[1], food additives which were permitted

Subject area

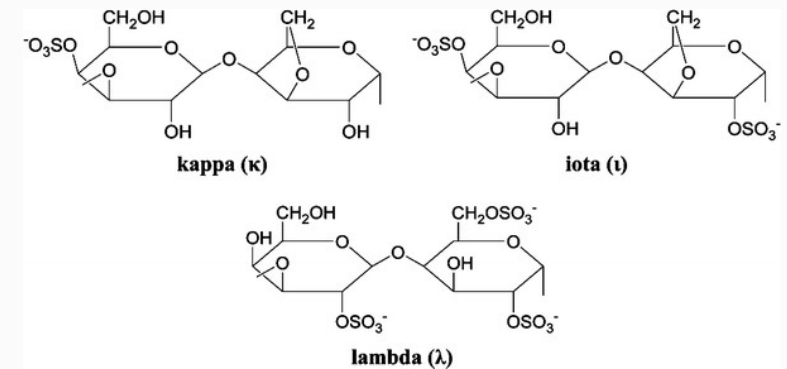
Food additives

Food ingredients and packaging



CARRAGEENANS

Carrageenans are sulfated heteropolysaccharides extracted from *Eucheuma* seaweeds.



Registered as food additives E407 and E407a.



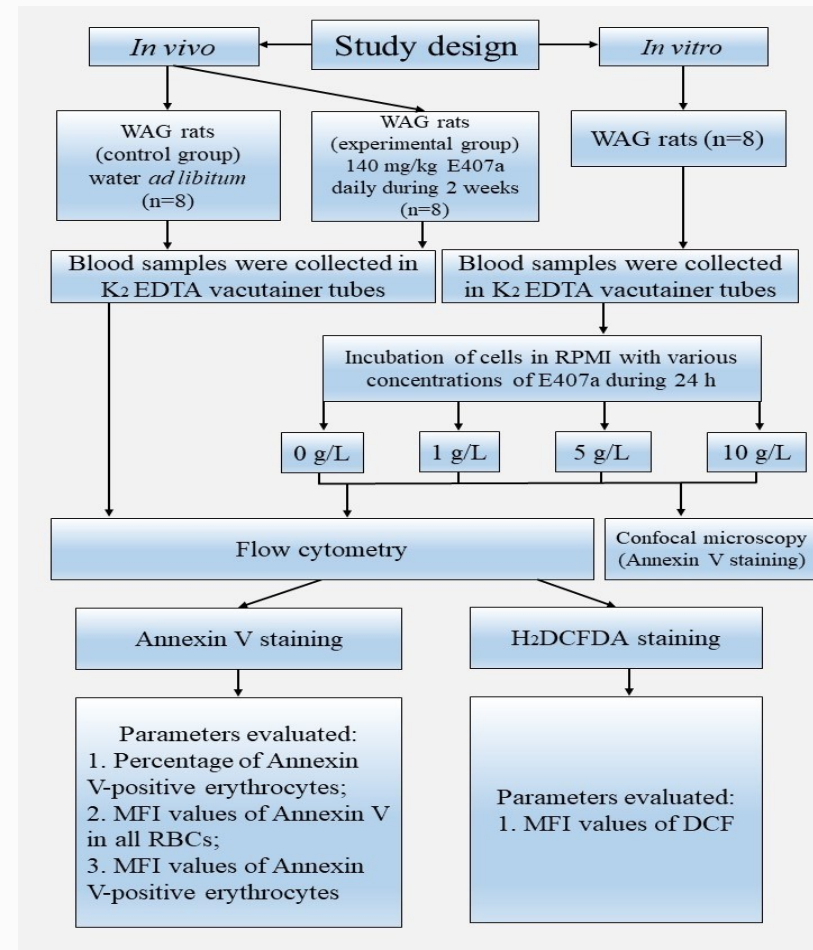


AIM

To assess the impact of carrageenans on eryptosis both *in vitro* and *in vivo*.

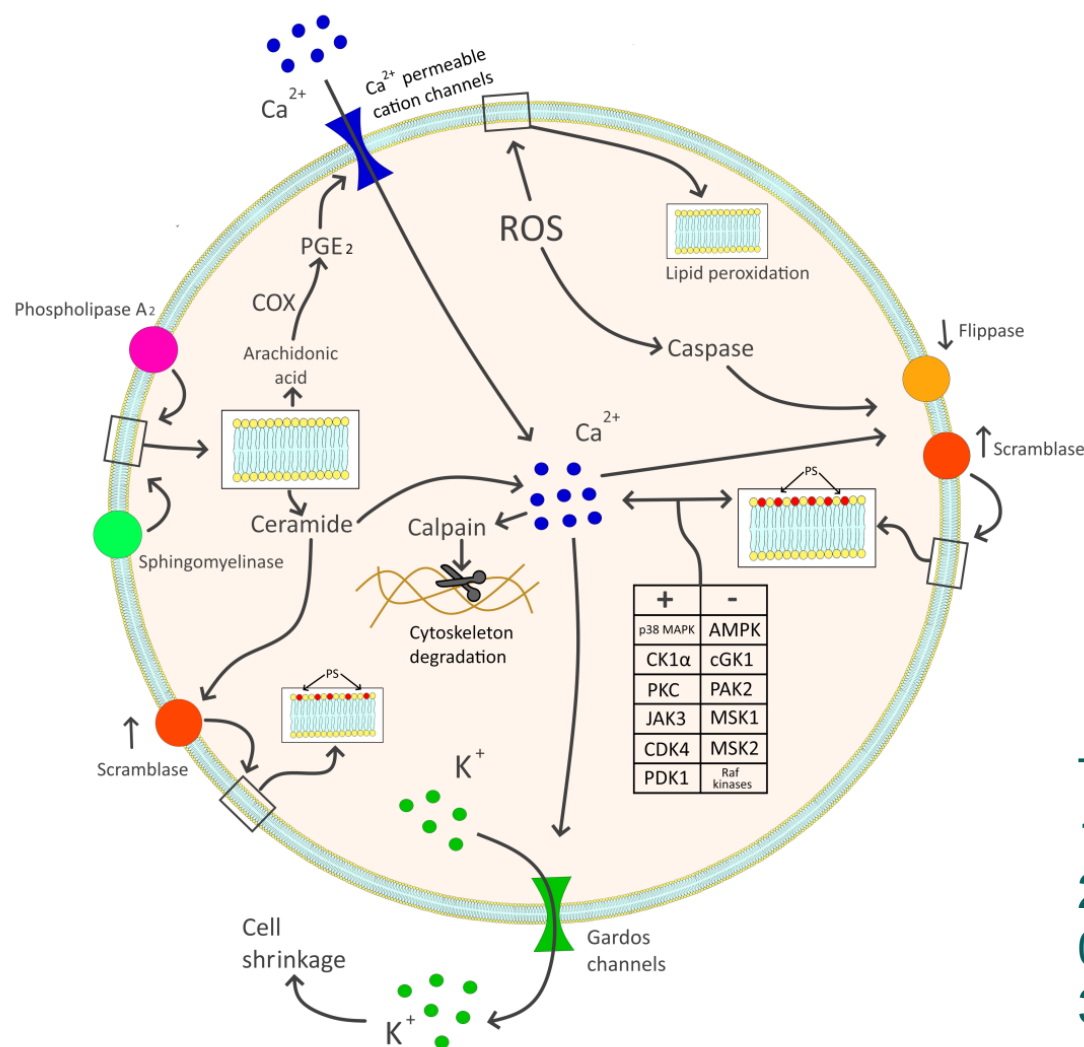


STUDY DESIGN





ERYPTOSIS



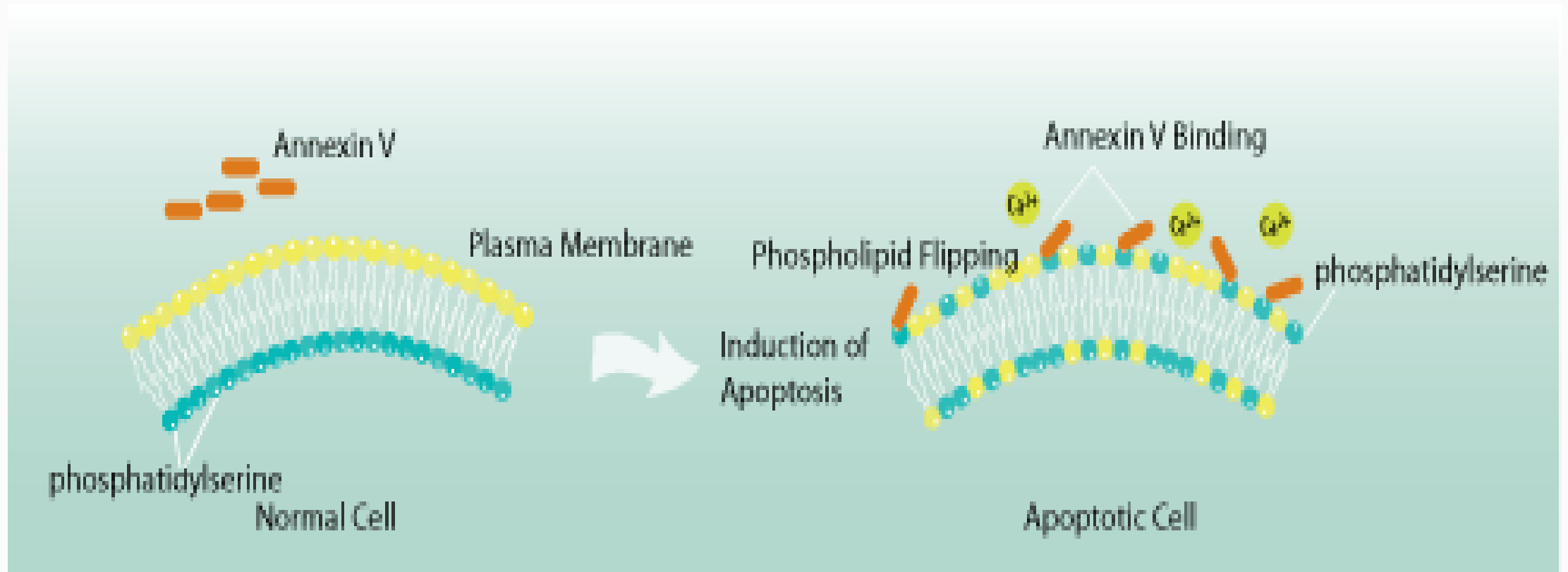
Immunological features:

- no membrane rupture. Thus, DAMPs are not released;
- efferocytosis by macrophages;
- -efferocytosis changes the phenotype of macrophages to the anti-inflammatory

Tkachenko A, Onishchenko A. Casein kinase 1α mediates eryptosis: a review. *Apoptosis*. 2022 Oct 29. doi: 10.1007/s10495-022-01776-3. Epub ahead of print. PMID: 36308624.

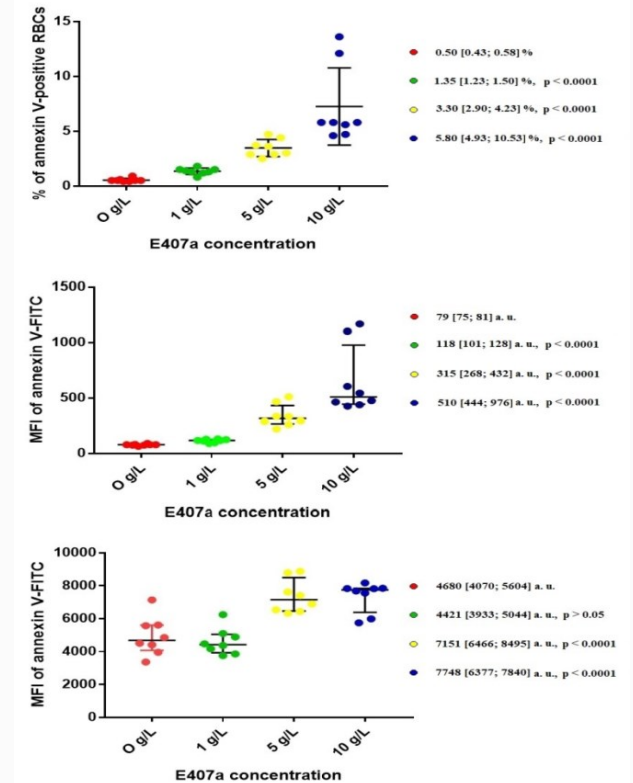
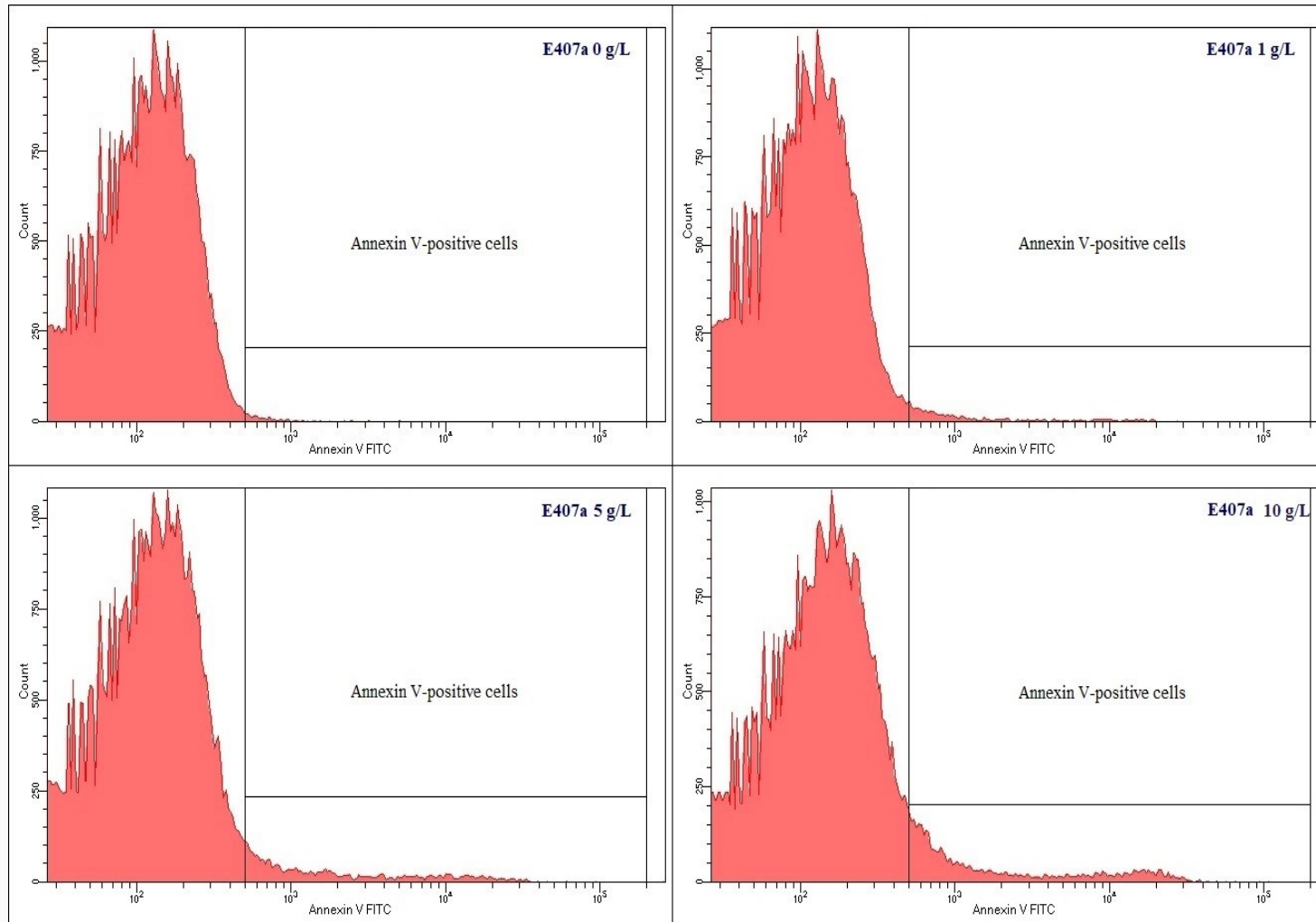


ANNEXIN V STAINING





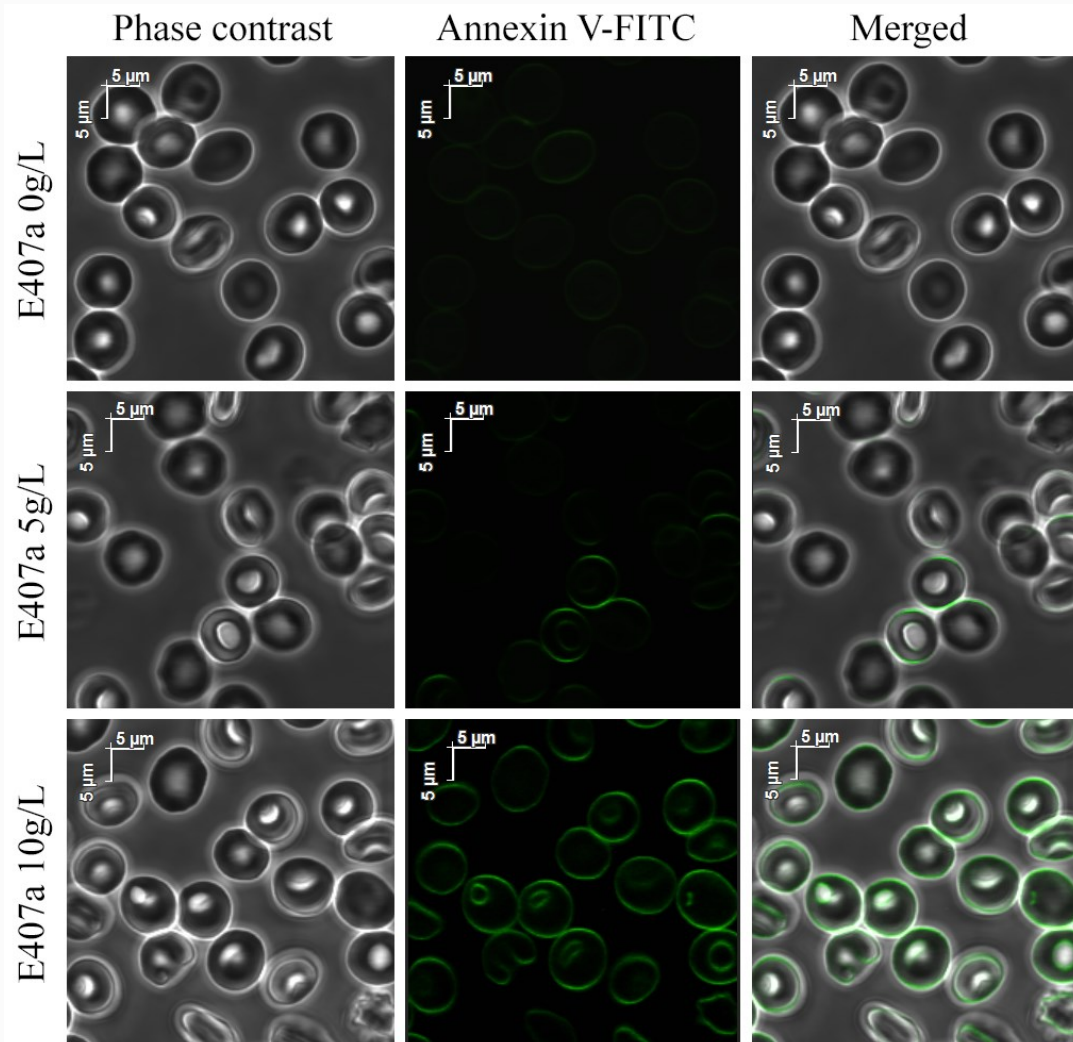
ANNEXIN V STAINING (FLOW CYTOMETRY)



Tkachenko A, Kot Y, Prokopyuk V, Onishchenko A, Bondareva A, Kapustnik V, Chumachenko T, Perskiy Y, Butov D, Nakonechna O. Food additive E407a stimulates eryptosis in a dose-dependent manner. *Wien Med Wochenschr.* 2021 Aug 12. doi: 10.1007/s10354-021-00874-2. Epub ahead of print. PMID: 34383224.



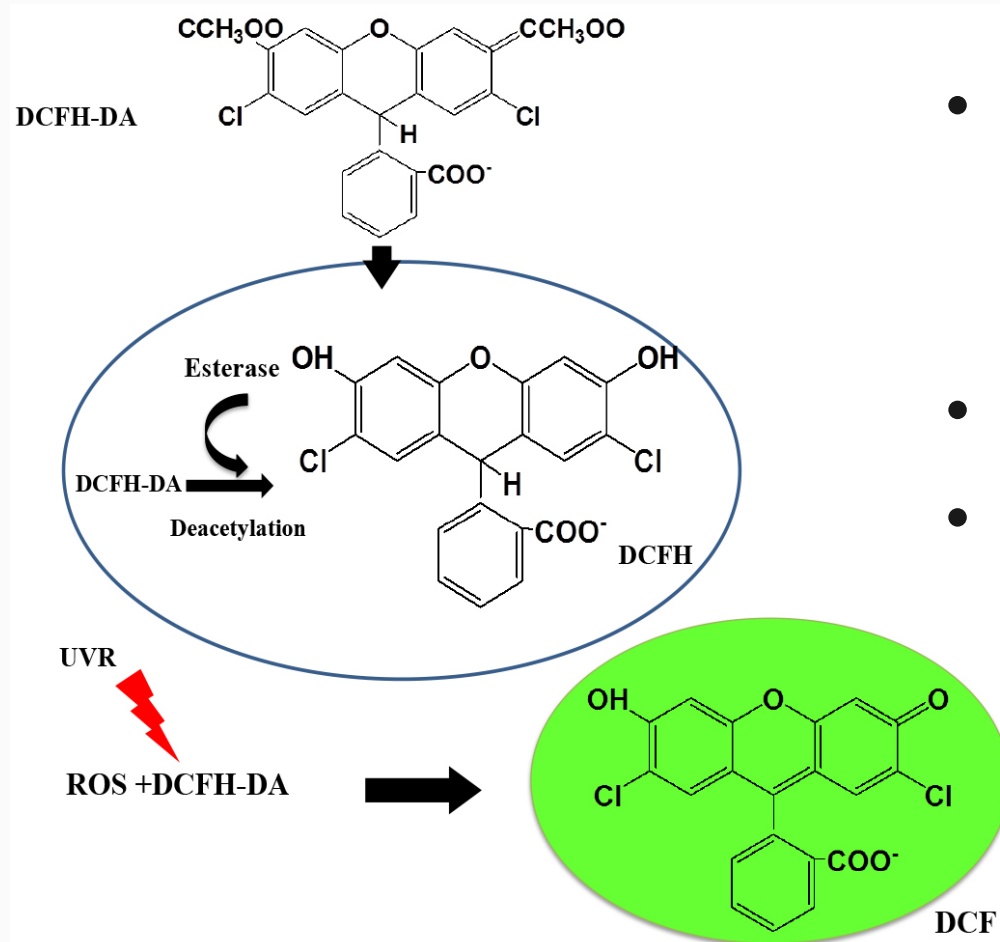
ANNEXIN V STAINING (CONFOCAL MICROSCOPY)



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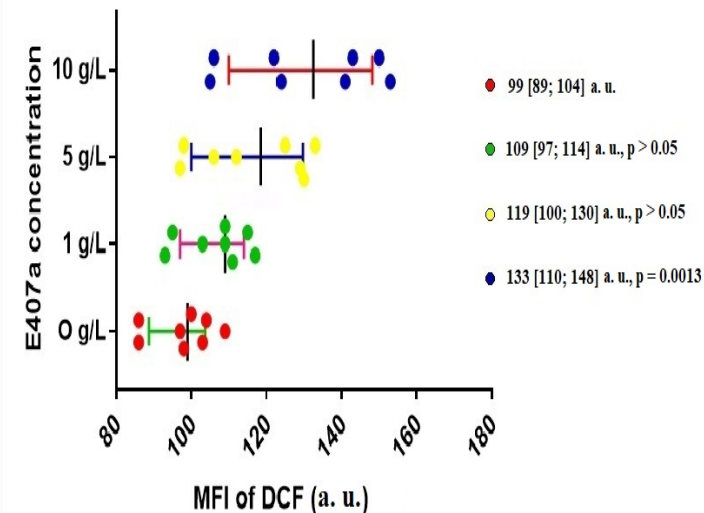
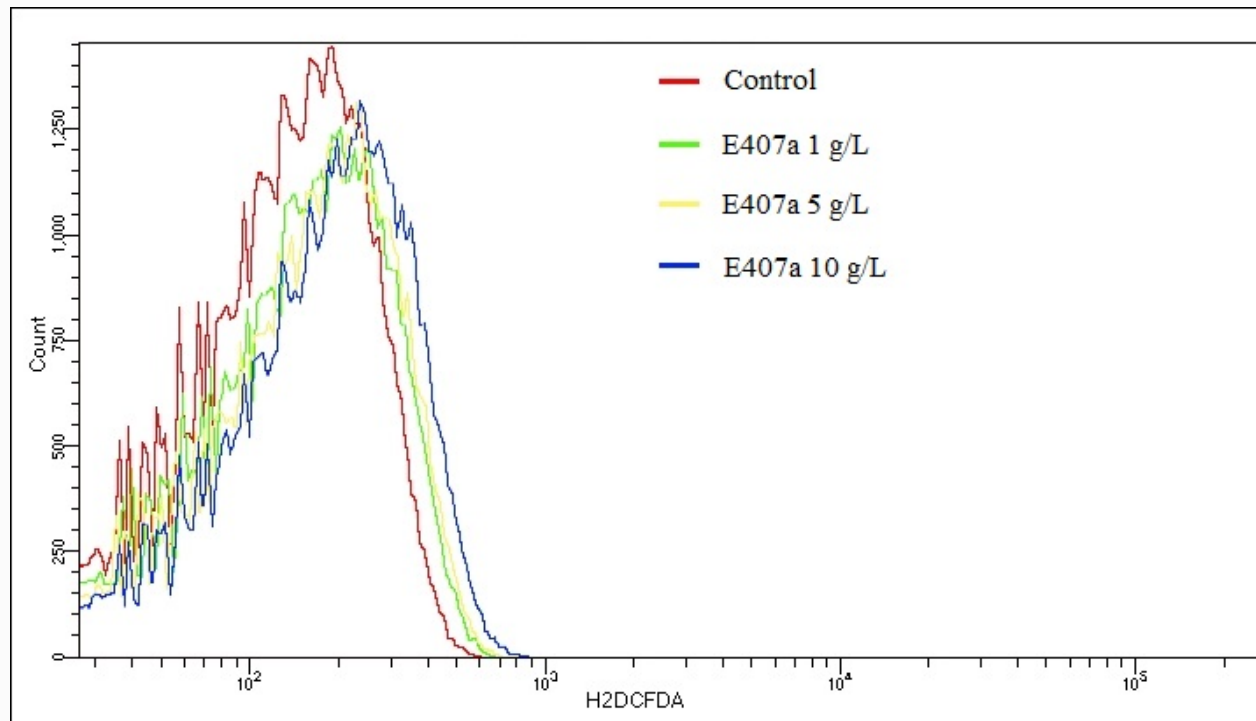
H2DCFDA AS A ROS SENSOR



- **H2DCFDA** – 2',7'-dichlorodihydrofluorescein diacetate;
- **DCF** – 2',7'-dichlorofluorescein;
- **ROS** – reactive oxygen species



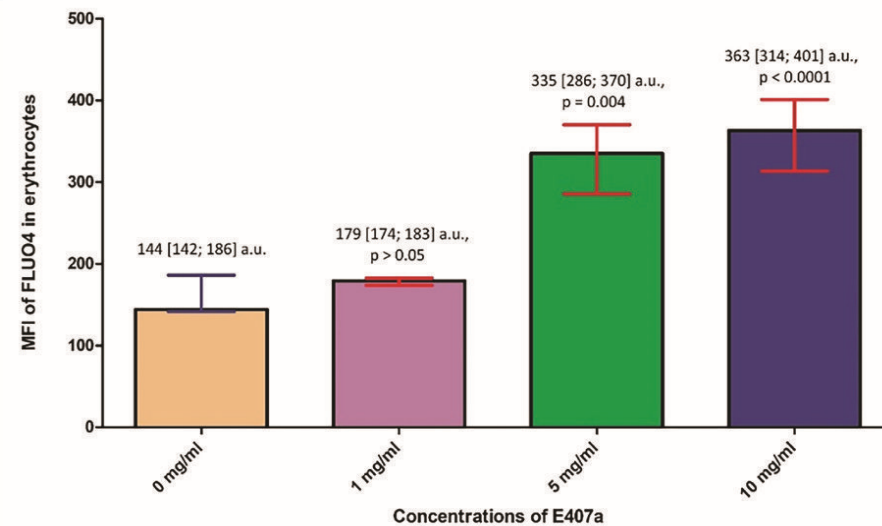
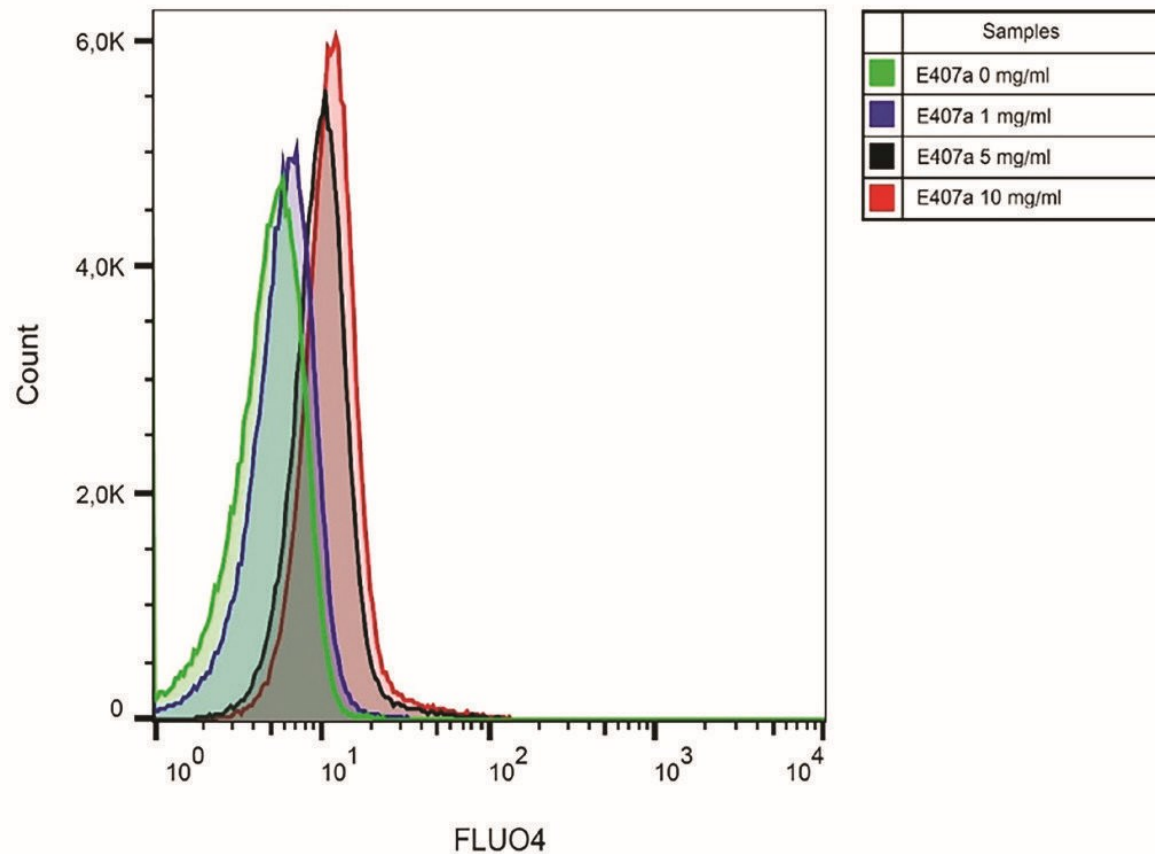
H2DCFDA STAINING



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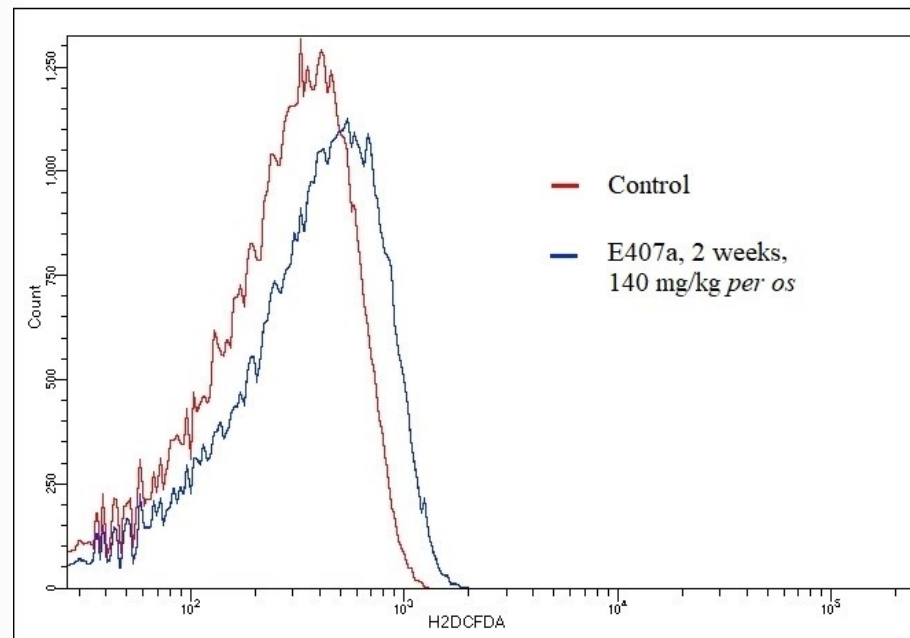
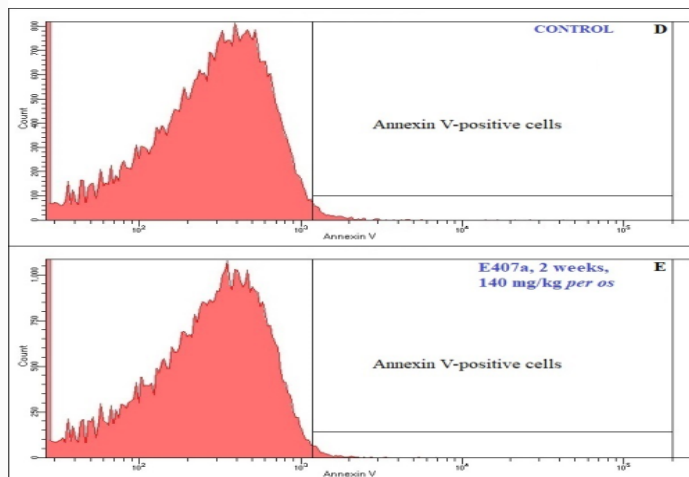
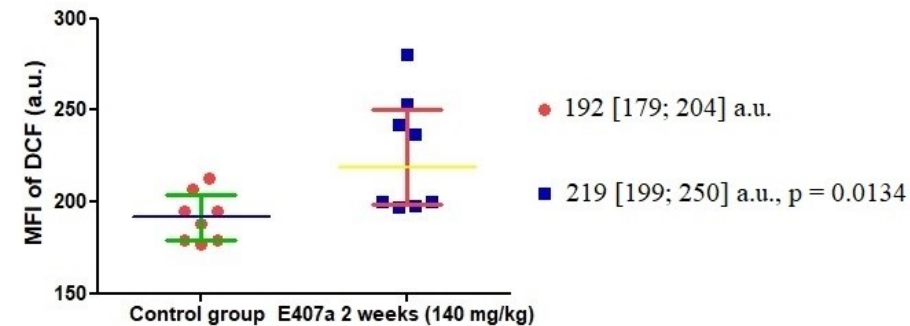
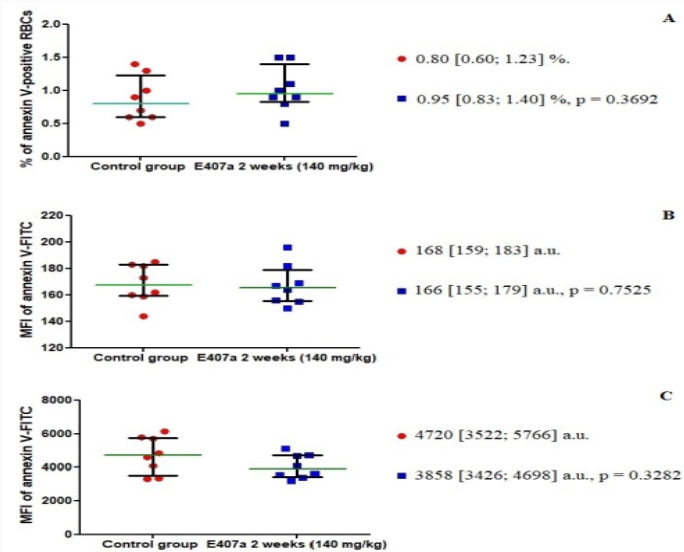
FLUO4 STAINING



Tkachenko A, Prokopiuk V, Onishchenko A. Semi-refined carrageenan induces eryptosis in a Ca^{2+} -dependent manner. J Clin Med Kaz 2022; 19(1):42-45. DOI: <https://doi.org/10.23950/jcmk/11576>



ERYPTOSIS OF CIRCULATING RBCs IN RATS ORALLY EXPOSED TO E407a



Tkachenko A, Kot Y, Prokopyuk V, Onishchenko A, Bondareva A, Kapustnik V, Chumachenko T, Perskiy Y, Butov D, Nakonechna O. Food additive E407a stimulates eryptosis in a dose-dependent manner. *Wien Med Wochenschr.* 2021 Aug 12. doi: 10.1007/s10354-021-00874-2. Epub ahead of print. PMID: 34383224.

**THANK YOU FOR
YOUR ATTENTION!**