



## Deliverable 4.2: Open school

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Workpackage:	WP4
Task:	T4.2
Version:	1.0
Date:	28. 02. 2023



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## Basic information

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Project title	Strategies to strengthen scientific excellence and innovation capacity for early diagnosis of gastrointestinal cancers
Project acronym	VISION
Call	H2020-WIDESPREAD-2018-2020
Topic	WIDESPREAD-03-2018
Project type	Coordination and Supporting Action (CSA)
Grant Agreement No.	857381
Nature	<b>R</b>
Dissemination level	<b>PU</b>



## Executive summary

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Deliverable D4.2 describes the tools that have been utilized to widen learning opportunities for undergraduate students and early-stage researchers beyond a formal education system. The main objective of Open school was to allow targeted groups time and location-free access to up-to-date knowledge in the field of molecular biology, genetics, liquid biopsy in oncology, immuno-oncology, nanobiology, and nanomedicine.

## 1 Description of work & main achievements

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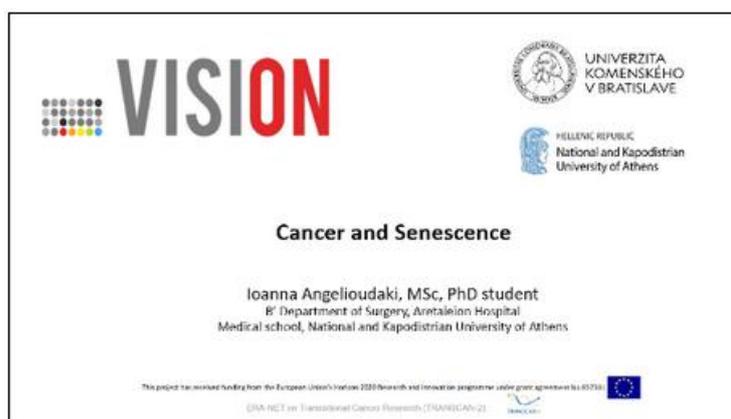
The Open School approach provides students and early-stage researchers with access to online lectures within the Joint Summer School, tutorial videos, recorded courses carried out within the VISION project, e-lectures (both in English and Slovak languages) dedicated on current topics in basic, translational, and clinical cancer research, including biomedical ethics and standard operational protocols. The main idea is to maximize the benefit of the target group from VISION project education activities.

These educational materials are publicly accessible on the VISION website in the separate section **OPEN SCHOOL** - [http://vision.sav.sk/os\\_joint\\_summer\\_school.html](http://vision.sav.sk/os_joint_summer_school.html) .

### 1.1 Joint Summer School - Practical methods in oncological research - Theoretical part

#### 1.1.1 Session II. – Basic and translational research

Number of activities included: 3



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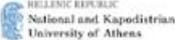
**Translational research  
from bench to bedside and back**

**Anastasia Derventzi, Ph.D.**  
*National and Kapodistrian University of Athens, Greece*

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381



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**How Genetic engineering can affect  
Cancer Research and Treatment:  
CRISPR-Cas9**

*Alexandros Tzinguonis MSc*  
*Biologist, PhD Student at National and Kapodistrian University of Athens, Medical School*  
*2<sup>nd</sup> Department of Surgery, Aretaieion Hospital Athens*

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381

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### 1.1.2 Session III. – Clinical oncology research

Number of activities included: 3



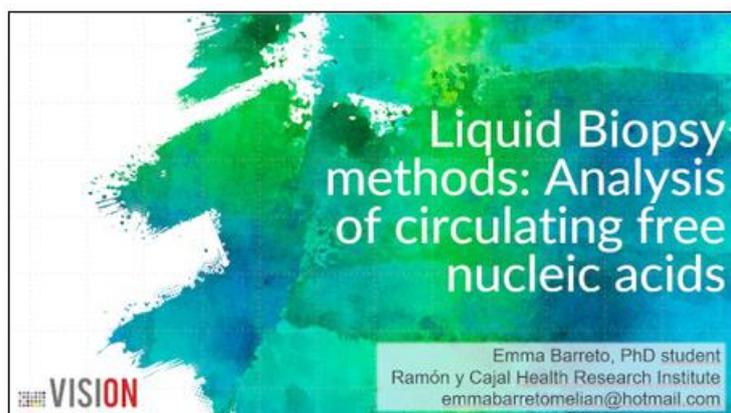
**Session III: Clinical oncology research:**  
The fundamentals of translational research:  
Ethics, Informed consent, sample and data  
collection and storage.

**Julie Earl, Molecular epidemiology and predictive markers in cancer group**  
Instituto Ramón y Cajal de Investigación Sanitaria, IRYCIS, Madrid, Spain

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381



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## 1.2 Tutorial videos of methods

### Number of activities included: 8

Ph.D. students and early-stage researchers from the Biomedical Research Center SAS prepared eight tutorial methodical videos. Their preparation was motivated to show undergraduate students some standard molecular methods commonly used in biomedical research. The videos are in Slovak with English subtitles. In addition to the videos, students can also find detailed protocols for these methods on the VISION website. These videos were highly appreciated by the undergraduate students as well as the teachers from the universities.



### 1.2.1 Cell cycle analysis using flow cytometry



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### 1.2.2 Determination of oxidative stress



<https://drive.google.com/drive/folders/1kZw5sMK5O4WptgpzXiGYdwqusZ813Hde?usp=sharing>



### 1.2.3 Immunocytochemistry – Immunofluorescence



<https://drive.google.com/drive/folders/1OYdTjWISYuOxdnqF8414uAPQWcXU4QBi?usp=sharing>

### 1.2.4 Analysis of DNA methylation by pyrosequencing



<https://drive.google.com/drive/folders/1mtqNQHPseUz4HWqVuhJV4wEgrJgy9GKc?usp=sharing>



## 1.2.5 Immunohistochemistry



[https://drive.google.com/drive/folders/1\\_w22lanlaxp9W--hh-RKm8VQuBZHVazs?usp=sharing](https://drive.google.com/drive/folders/1_w22lanlaxp9W--hh-RKm8VQuBZHVazs?usp=sharing)

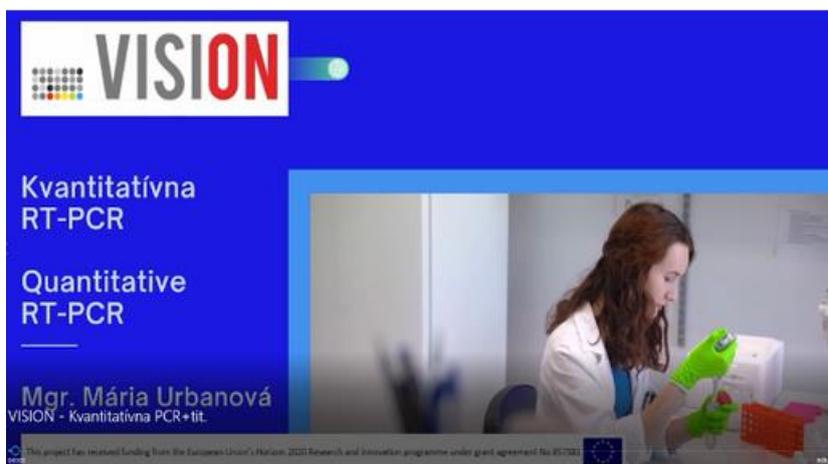
## 1.2.6 Protein analysis – Western blot



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### 1.2.7 Quantitative RT-PCR



<https://drive.google.com/drive/folders/1SoC-hPHc3mu43BwDSZFAtvHrIMxSQFLB?usp=sharing>

### 1.2.8 3D models – Organoids



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## 1.3 Courses

Number of Activities included: 26

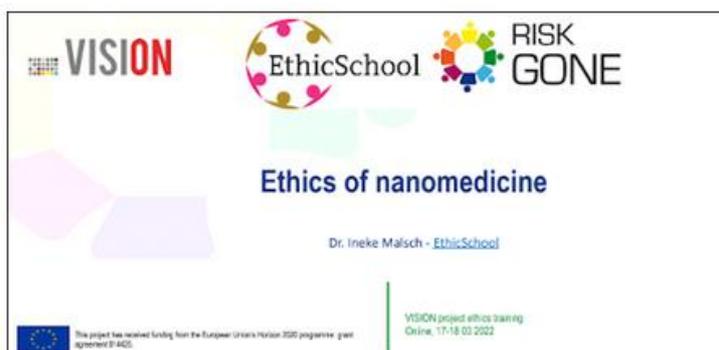
### 1.3.1 Course on Ethics in biomedical research



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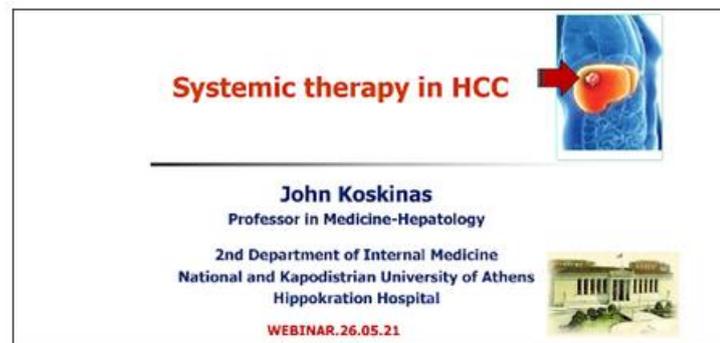


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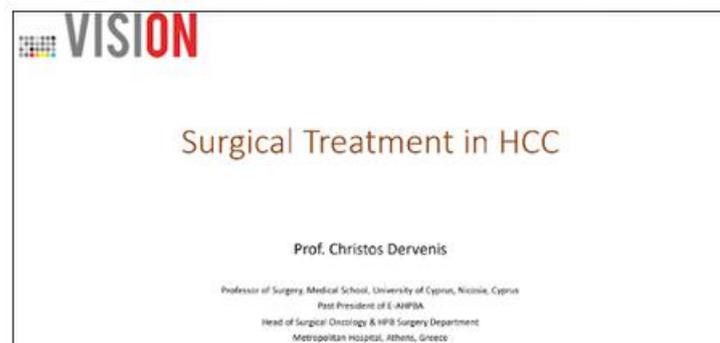


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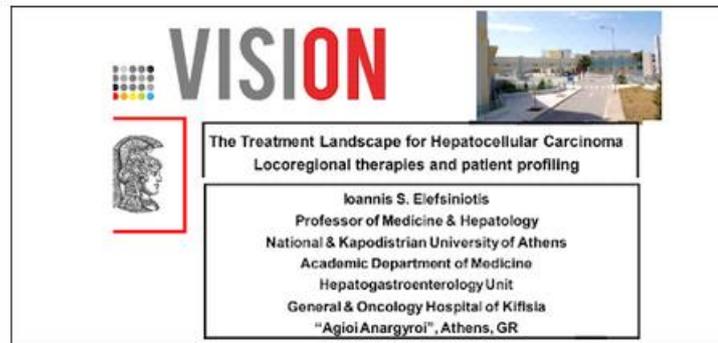
### 1.3.2 The Treatment Landscape for Hepatocellular Carcinoma



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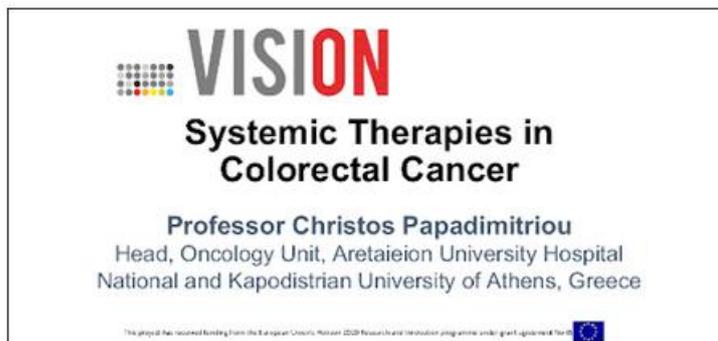


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### 1.3.3 Overview and Future Perspectives in Colorectal Cancer



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Overview and Future Perspectives in Colorectal Cancer

Prof. Christos Dervenis MD, PhD, FRCS  
Athens Greece

<https://drive.google.com/drive/folders/1W4mrgllmwMVZvHOOD84MeOMHC2Dtc0-J>

HISTOLOGICAL AND MOLECULAR SUBTYPES OF COLORECTAL CANCER

Dr. Efthymios Koniaris  
Consultant Pathologist  
Pathology Department of General Hospital of Athens "Hippocratio"

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381

<https://drive.google.com/drive/folders/1W4mrgllmwMVZvHOOD84MeOMHC2Dtc0-J>

Hereditary colorectal cancer syndromes

12<sup>th</sup> May 2021

Agapi Kataki, Biologist, MSc, PhD

HELLENIC REPUBLIC  
National and Kapodistrian  
University of Athens

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381

<https://drive.google.com/drive/folders/1W4mrgllmwMVZvHOOD84MeOMHC2Dtc0-J>



### 1.3.4 Diagnostic and Therapeutic Aspects of Handling GPNETs



**Therapeutic Spectrum in  
gastropancreatic(GP)NETs**

Krystallenia Alexandraki  
Honorary Academic – Clinical Fellow  
Endocrinologist, Aretaieio Hospital, University of  
Athens, Member of ENETs Center of Excellence,  
Laiko Hospital

<https://drive.google.com/drive/folders/1BY-tqtJKoYCK3qQU9rK9fbKS8s3H0hC9>



**Surgery as a Treatment for GP-NETs**

Prof. Christos Dervenis

Professor of Surgery, Medical School, University of Cyprus, Nicosia, Cyprus  
Past President of E-AHPBA  
Head of Surgical Oncology & HPB Surgery Department  
Metropolitan Hospital, Athens, Greece

<https://drive.google.com/drive/folders/1BY-tqtJKoYCK3qQU9rK9fbKS8s3H0hC9>

**Introduction to GPNETS (NEN):  
epidemiology and diagnostic approach**

George MASTORAKOS

Professor of Endocrinology  
2<sup>nd</sup> Dpt of Surgery  
ARETAIEION Hospital,  
National and Kapodistrian University of Athens



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### 1.3.5 Course: Patenting of medical inventions



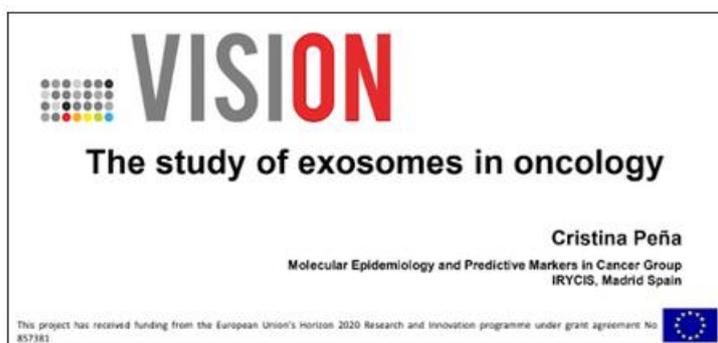
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### 1.3.6 Comet Assay – Practical online course/video learning



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### 1.3.7 Online course on the use of liquid biopsy in medical oncology



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This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381



# VISION

The liquid biopsy in precision medicine  
in oncology

Alfredo Carrato MD, PhD  
Ramón y Cajal University Hospital, IRYCIS, CIBERONC  
Alcalá University, Madrid

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381



<https://drive.google.com/drive/folders/1rDz9-7y8q0-Qmosjzk7YBYOER5iAj6n9>



# VISION

## The identification of tumor cells and cancer stem cells in blood

Bruno Sainz, PhD  
"Alberto Sols" Biomedical Research unit, CSIC, UAM,  
IRYCIS, Madrid Spain

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381



<https://drive.google.com/drive/folders/1rDz9-7y8q0-Qmosjzk7YBYOER5iAj6n9>



## Identification of serum circulating miRNAs useful in the clinical practice

M. Laura García-Bermejo

Ramón y Cajal Health Research Institute  
(IRYCIS), Madrid, Spain



<https://drive.google.com/drive/folders/1rDz9-7y8q0-Qmosjzk7YBYOER5iAj6n9>



**VISION**

**Future perspectives of the liquid biopsy in Oncology**

Laura Muñelo Romay  
Liquid biopsy analysis Unit  
Translational Medical Oncology Group  
Health Research Institute of Santiago (IDIS)

<https://drive.google.com/drive/folders/1rDz9-7y8q0-Qmosizk7YBYOER5iAj6n9>



**VISION**



**Circulating free DNA in plasma as a biomarker in oncology**

Julie Earl

Molecular Epidemiology and Predictive Markers in Cancer Group, IRYCIS, Madrid, Spain

<https://drive.google.com/drive/folders/1rDz9-7y8q0-Qmosizk7YBYOER5iAj6n9>

### 1.3.8 Online course on Gastrointestinal Stromal Tumours (GIST)

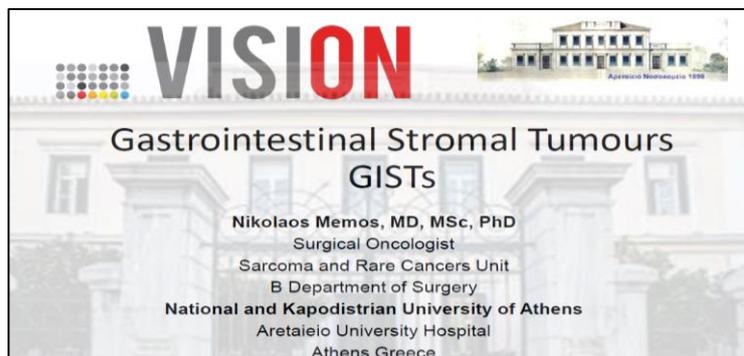


**VISION**

The pathology and molecular mapping of GIST.

George Agrogiannis, Histopathologist,  
Assoc. Professor  
1<sup>st</sup> Department of Pathology  
School of Medicine – National and Kapodistrian University of Athens

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## 1.4 E-lectures

Number of activities included:17

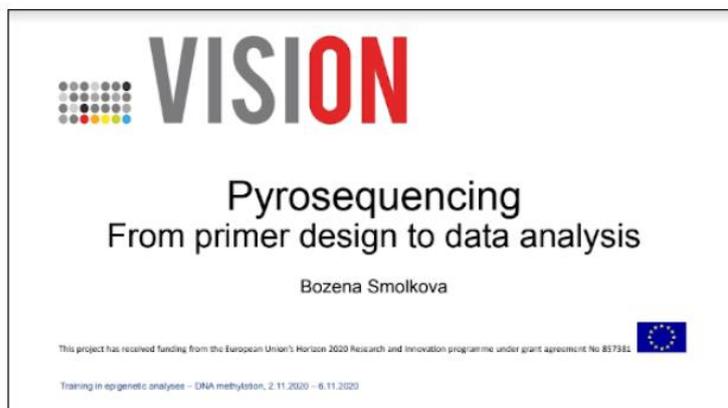
### 1.4.1 Training in advanced *in vitro* models



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#### 1.4.2 Training in epigenetic analyses – DNA methylation



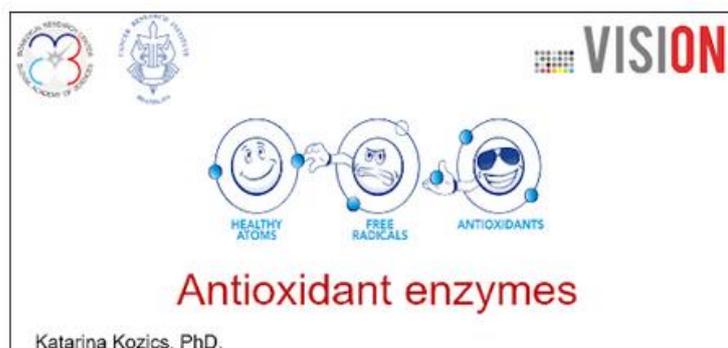
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#### 1.4.3 Training in qPCR and gene expression

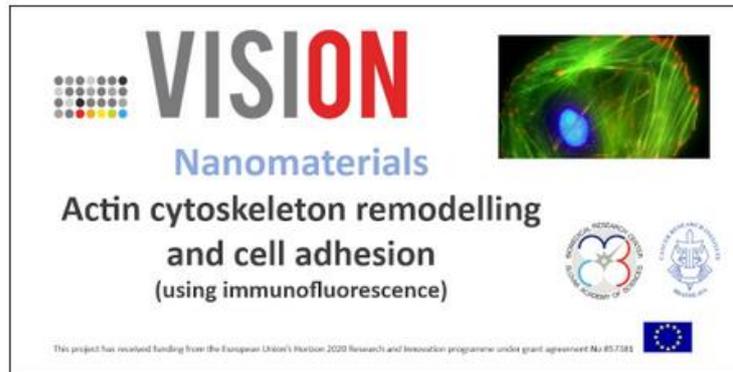


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#### 1.4.4 Training in cellular stress response



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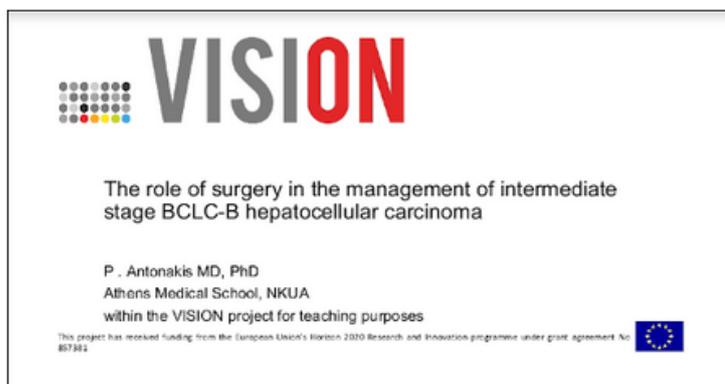
#### 1.4.5 Training in enrolling patients with GI tumors in research protocols



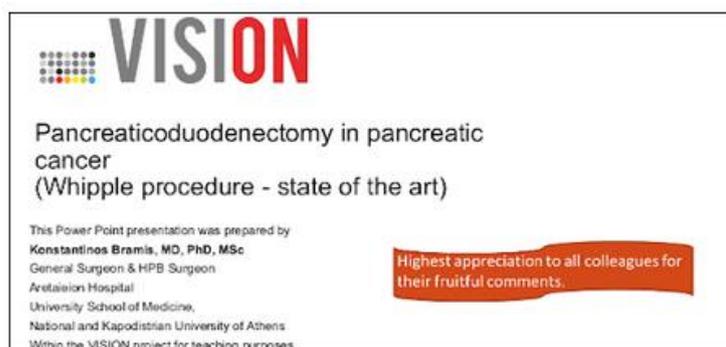
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### 1.4.6 Training in surgical operational procedures aiming to treat patients with GI tumors



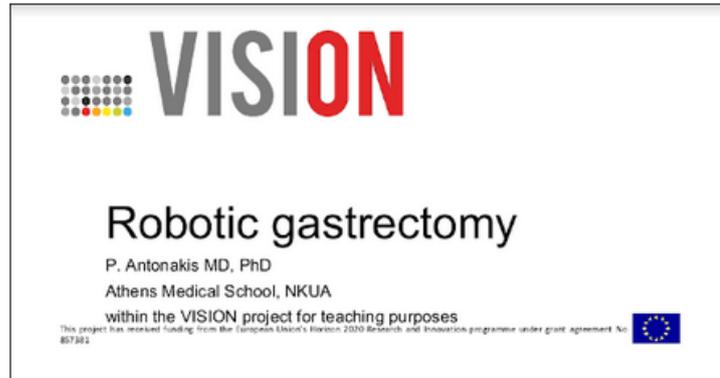
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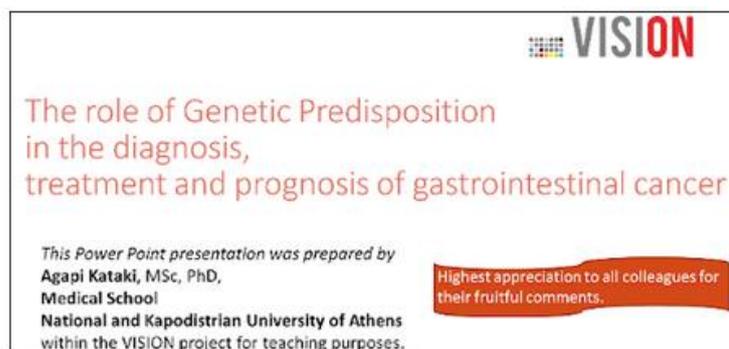


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#### 1.4.7 Initiation in Medical Genetics and Genetic Counselling



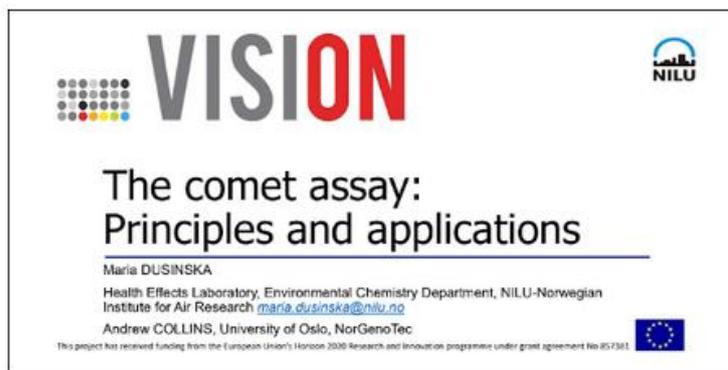
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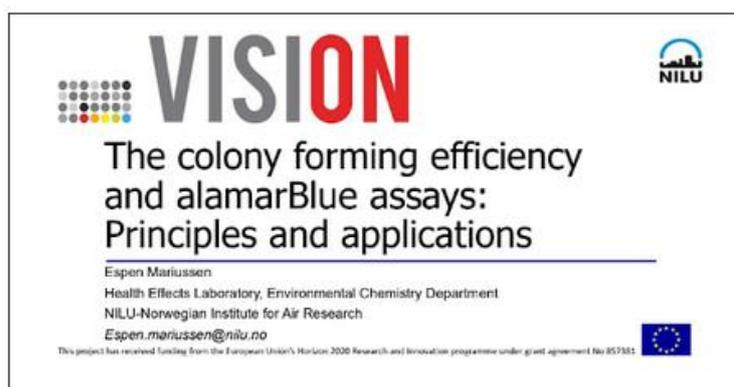
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### 1.4.8 High throughput genotoxicity testing training

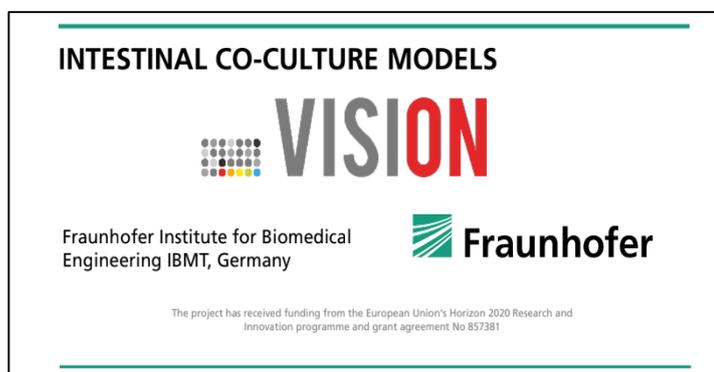


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### 1.4.9 Training in advanced co-culture intestine model



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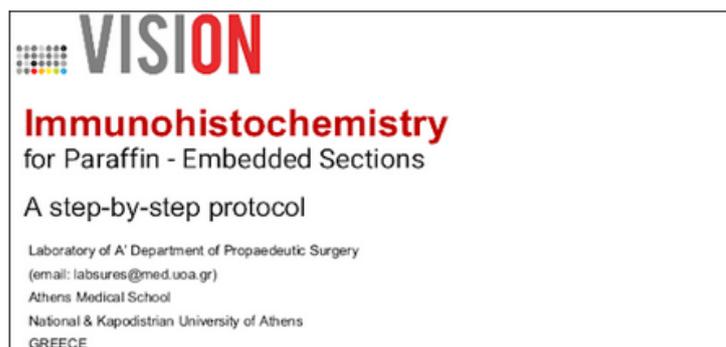
#### 1.4.10 Training in in vitro 3D cell cultivation and stem cell differentiation



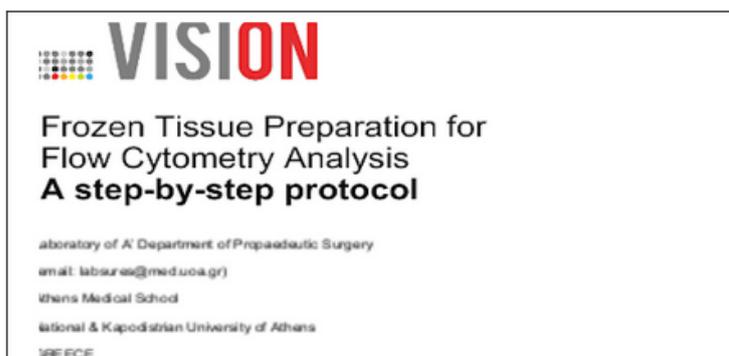
<https://drive.google.com/drive/folders/1jzyHYSDIK3ORgjSDP2fPgM5RrgiHddr>

### 1.5 Protocols

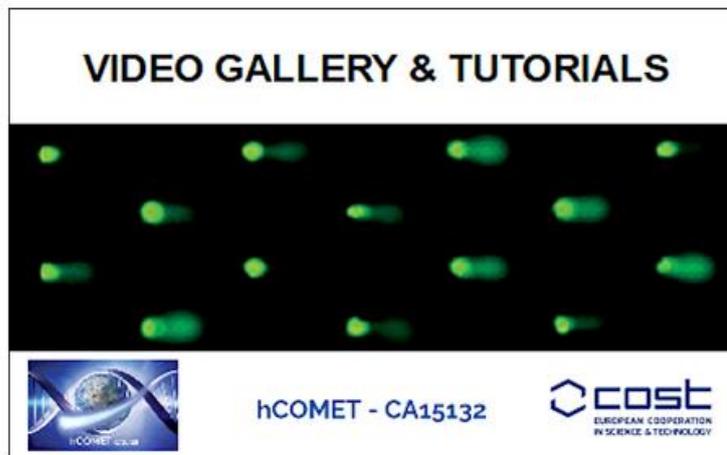
Number of activities included: 4



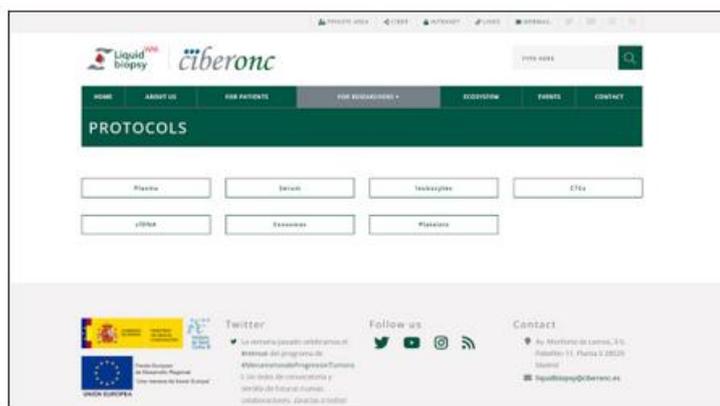
[https://drive.google.com/file/d/1JhjSvW69Wz6vWj79-jyyHy1DE3voYT4Y/view?usp=share\\_link](https://drive.google.com/file/d/1JhjSvW69Wz6vWj79-jyyHy1DE3voYT4Y/view?usp=share_link)



[https://drive.google.com/file/d/15LcgyuZTWVEtIpI2j5\\_LOkVVzMngqVRE/view?usp=share\\_link](https://drive.google.com/file/d/15LcgyuZTWVEtIpI2j5_LOkVVzMngqVRE/view?usp=share_link)



<https://www.hcomet.eu/video-gallery-tutorials/>



<https://biopsia-liquida.ciberonc.es/protocols/>

## 1.6 Online lectures in Slovak

Number of activities included: 8



<https://drive.google.com/file/d/113IXfRPIFWVAvm-7iVxl8i2KncavpJFz/view?usp=sharing>



**Recombinational Repair**

**Miroslav Chovanec**



Department of Genetics  
Cancer Research Institute  
Biomedical Research Centre SAS  
Dúbravská cesta 9  
845 05 Bratislava

[https://drive.google.com/file/d/1MdseMJaK5MayTPZAT5mBD-MqEwIB7\\_Id/view?usp=sharing](https://drive.google.com/file/d/1MdseMJaK5MayTPZAT5mBD-MqEwIB7_Id/view?usp=sharing)

**Jednokrokové typy opravy DNA  
a mechanizmy tolerancie  
poškodenia DNA**

**Miroslav Chovanec**



Biomedicínske centrum SAV, v.v.i.  
Ústav experimentálnej onkológie  
Oddelenie genetiky  
Dúbravská cesta 9  
845 05 Bratislava

[https://drive.google.com/file/d/1Rog6n3K0Ugc\\_H0DcPZG201i8STW5rssK/view?usp=sharing](https://drive.google.com/file/d/1Rog6n3K0Ugc_H0DcPZG201i8STW5rssK/view?usp=sharing)

**Excízne typy opravy DNA**

**Miroslav Chovanec**



Biomedicínske centrum SAV, v.v.i.  
Ústav experimentálnej onkológie  
Oddelenie genetiky  
Dúbravská cesta 9  
845 05 Bratislava

[https://drive.google.com/file/d/1\\_IBQtso7fyjvsDqw5ZTD4GCSSQp6r4o/view?usp=sharing](https://drive.google.com/file/d/1_IBQtso7fyjvsDqw5ZTD4GCSSQp6r4o/view?usp=sharing)



Logo of the European Union and the logo of the Biomedical Research Center, Slovak Academy of Sciences (BMC SAV) are in the top left. The VISION logo is in the top right. The title is "Nanomateriály – prínos či riziko?". The presenter is Alena Gábelová, Ústav experimentálnej onkológie, BMC SAV. The date is 8. März 2021. A small text at the bottom right states: "This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381" with the EU flag logo.

<https://drive.google.com/drive/folders/115xFiyH2RZOXTS08AuNou4-kRm-WRMEq>

The VISION logo is on the left. Logos of the Biomedical Research Center, Slovak Academy of Sciences (BMC SAV) and the Center for Research Initiative Bratislava are on the right. The title is "Gene therapy". The presenter is Miroslava Matúšková. A small text at the bottom states: "This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381" with the EU flag logo.

[https://drive.google.com/drive/folders/1W\\_Zgx3CJhbIE2Vq-QI-9-zyNH2NRVpT-](https://drive.google.com/drive/folders/1W_Zgx3CJhbIE2Vq-QI-9-zyNH2NRVpT-)

The VISION logo is at the top left. The title is "EPIGENETICS & CARCINOGENESIS". The presenter is Bozena Smolkova, Biomedical Research Center, Slovak Academy of Sciences. The date is 09.3.2022.

[https://drive.google.com/drive/folders/1MVlra9mf7FlqZFTThAmU76sazh\\_gp3l1m](https://drive.google.com/drive/folders/1MVlra9mf7FlqZFTThAmU76sazh_gp3l1m)

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381



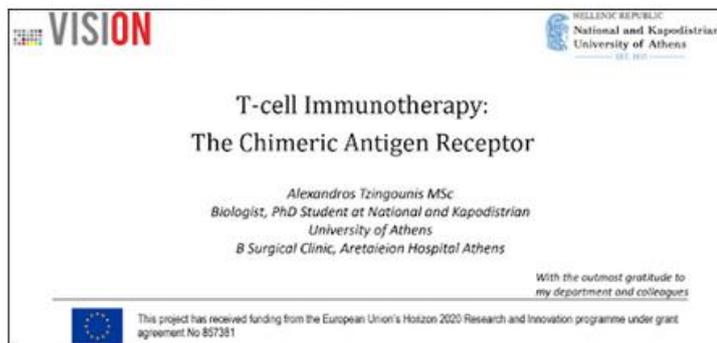
<https://drive.google.com/drive/folders/15WbrumQwuL0Bb-BlryJ2zDWFljwlr76>

## 1.7 Online e-lectures in English

Number of activities included: 5



[https://docs.google.com/presentation/d/12RV\\_YKs-tN8nC1cxiAIXjiTuwfc37k/edit?usp=share\\_link&ouid=118152212087836923118&rtpof=true&sd=true](https://docs.google.com/presentation/d/12RV_YKs-tN8nC1cxiAIXjiTuwfc37k/edit?usp=share_link&ouid=118152212087836923118&rtpof=true&sd=true)



[https://drive.google.com/file/d/1fctsnW309caiRiUG3Q6a9vuorLeHwTOe/view?usp=share\\_link](https://drive.google.com/file/d/1fctsnW309caiRiUG3Q6a9vuorLeHwTOe/view?usp=share_link)

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381



[https://drive.google.com/file/d/1EcSIrihU8aljCy7kUZuxQHJFXlyfEquI/view?usp=share\\_link](https://drive.google.com/file/d/1EcSIrihU8aljCy7kUZuxQHJFXlyfEquI/view?usp=share_link)



[https://drive.google.com/file/d/1lpdnqQHpJo-RW-07FzVENTKP2cSLyext/view?usp=share\\_link](https://drive.google.com/file/d/1lpdnqQHpJo-RW-07FzVENTKP2cSLyext/view?usp=share_link)



[https://drive.google.com/file/d/1ARjtzn4Fyu1JRfxhLRXCy4VynhIPNNBw/view?usp=share\\_link](https://drive.google.com/file/d/1ARjtzn4Fyu1JRfxhLRXCy4VynhIPNNBw/view?usp=share_link)



## 1.8 Young Oncologist Award 2020 - Online presentations

**VISION** instituto español y cajal de investigaciones sanitarias **irycis**

**The somatic mutation profile in familial pancreatic cancer cases and KRAS negative sporadic cases includes potentially druggable genes**

Emma Barreto, Julie Earl and Alfredo Carrato

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381

Molecular epidemiology and predictive tumor markers group, Ramón y Cajal Health Research Institute (RYCIS) Madrid, Spain

[https://drive.google.com/file/d/1HexVkB8\\_oSaMc1wtGDYH77jLZ8tbWIK2/view?usp=sharing](https://drive.google.com/file/d/1HexVkB8_oSaMc1wtGDYH77jLZ8tbWIK2/view?usp=sharing)

**VISION** instituto español y cajal de investigaciones sanitarias **irycis**

**The effects of Low Intensity Ultrasounds (LIUS) on tumor and fibroblast cells in vitro as a novel strategy in the treatment of pancreatic cancer**

Jesús Frutos Diaz-Alejo, Iciar González Gómez and Julie Earl

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381

Hospital Universitario Ramón y Cajal, Universidad de Madrid, Instituto español y cajal de investigaciones sanitarias, irycis, UFI

[https://drive.google.com/file/d/1YQ\\_-1OWarqiD7po9YeiHggW7Uvd\\_ogwG/view?usp=sharing](https://drive.google.com/file/d/1YQ_-1OWarqiD7po9YeiHggW7Uvd_ogwG/view?usp=sharing)

**VISION** instituto español y cajal de investigaciones sanitarias **irycis**

**Mir-326 is an important mediator in colorectal cancer progression**

Young Oncologists Award for the best scientific work in Cancer Research

**Silvia Serrano Huertas**

Directors: Elisa Conde Moreno & M<sup>a</sup> Laura Garcia Bermejo  
Instituto Ramón y Cajal de Investigación Sanitaria (RYCIS)

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381

[https://drive.google.com/file/d/1MaVy4dmG42E\\_FjItEygVXAX50ehxCuKw/view?usp=sharing](https://drive.google.com/file/d/1MaVy4dmG42E_FjItEygVXAX50ehxCuKw/view?usp=sharing)



## 1.9 Useful links

**Academic publishing**

**Useful links:**

- [www.dfg.de/download/pdf/foerderung/rechtliche\\_rahmenbedingungen/gute\\_wissenschaftliche\\_praxis/kodex\\_gwp\\_en.pdf](http://www.dfg.de/download/pdf/foerderung/rechtliche_rahmenbedingungen/gute_wissenschaftliche_praxis/kodex_gwp_en.pdf)
- [www.ombudsmen-fuer-die-wissenschaft.de](http://www.ombudsmen-fuer-die-wissenschaft.de)
- [www.aacc.org/publications/clin\\_chem/ccsw/Pages/default.aspx#](http://www.aacc.org/publications/clin_chem/ccsw/Pages/default.aspx#)
- [www.nature.com/authors/author\\_resources/how\\_write.html](http://www.nature.com/authors/author_resources/how_write.html)
- [http://apps.webofknowledge.com/WOS\\_GeneralSearch\\_input.do?product=WOS&search\\_mode=GeneralSearch&SID=D5a8ePmQUHf5WwQzv4&preferencesSaved](http://apps.webofknowledge.com/WOS_GeneralSearch_input.do?product=WOS&search_mode=GeneralSearch&SID=D5a8ePmQUHf5WwQzv4&preferencesSaved)
- <https://scholar.google.de/>
- <https://pubmed.ncbi.nlm.nih.gov/>

**Publications:**

- Björk, B-C & Solomon, D. 2013, 'The publishing delay in scholarly peer-reviewed journals' Journal of Informetrics, vol 7, no. 4, pp. 914-923., 10.1016/j.joi.2013.09.001
- Friedman GD. Be kind to your reader. Am J Epidemiol.1990 Oct;132(4):591-3.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381

[https://drive.google.com/drive/folders/1YAFa\\_ZqNLadv5nHSawlk9vWJAYKq5L9t](https://drive.google.com/drive/folders/1YAFa_ZqNLadv5nHSawlk9vWJAYKq5L9t)

**How to interact with industry**

**Funding opportunities:**

- <https://www.lira-sme.net/>
- <https://www.zim.de/ZIM/Navigation/DE/Meta/Englisch/englisch.html>

**Running ZIM networks in Germany (as example)**

- <http://www.nano-pharm.de>
- <http://www.zim-morpheus.de>
- <http://www.zim-smartlife.de/index.html>

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 857381

<https://drive.google.com/drive/folders/15hFWLuoKaP68PL78APD647ewdlsZCSTk>

## 2 Deviation from the workplan

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There is no deviation from the initially scheduled workplan.

## 3 Conclusion

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All the above-mentioned activities were implemented successfully and created a legacy aiming to accomplish the specific objectives of WP4 orientating to enhance the impact of novel scientific discoveries on the quality of education in Slovakia via more effective education strategies, targeting undergraduate students of medical and natural science faculties (Medical Faculty of Comenius University Bratislava, Jesenius Medical Faculty of Comenius University in Martin, Slovak Medical University and Faculty of Natural Sciences of Comenius University Bratislava) to increase their interest in biomedical science.