### Testi in italiano

#### Lingua insegnamento

<table>
<thead>
<tr>
<th>INGLESE</th>
</tr>
</thead>
</table>

#### Contenuti (Dipl.Sup.)

Overview about neuro-oncology (history of neuro-oncology), neuro-anatomy, epidemiology, tumor grading, tumor classification (WHO), introduction to molecular neuro-oncology, critical thinking in neuro-oncology.

Overview on meningeal development and anatomy; meninges histology, histopathology; tumor subtypes, grading, treatment options, molecular features/subgroups, prognosis.

Overview on hemangiopericytomas; cell of origin, histology, histopathology, grading, treatment options, molecular features, prognosis (see for instance: Armulik et al. Pericytes: Developmental, Physiological, and Pathological Perspectives, Problems, and Promises. Dev Cell 2011)


Levels of evidence and clinical trials.

Epidemiology, histopathology, imaging, current standard of treatment, median survival, definition of tumor progression and recurrence, definition of tumor cell, oncogenes vs. oncosuppressors, RTK - p53 - RB pathways in glioblastoma, hallmarks of cancer and therapeutic targets in glioblastoma, patients' stratification in clinical trials, new trends towards a better glioma histopathological/molecular/genetic classification.

Brain metastases (epidemiology, risk factors, primary tumours which can give rise to brain metastases, treatments, prognosis, new perspectives).
Hypothesis behind glioblastoma malignant behaviour, cancer stem cell hypothesis and its origins, from liquid to solid tumors, key-papers from Dick - Dirks - Weiss - Galli, tumor heterogeneity vs hierarchy, definition of GSC, pitfalls of this hypothesis. Evolution of the glioma stem-like cell hypothesis.

Extra: how to give a good talk in science. Practical and theoretical examples of DOs and DONTs when you have to prepare and deliver a scientific presentation in front of an audience. This lesson is part of the program, since a part of the final examination will deal with that.


History of viral therapy for GBM, viral vectors for GBM, HSV-1 for GBM, hypoxia-GBM-viral therapy, bovine viral vectors for GBM. Definition of translational research, overview on GBM in vitro and in vivo models, serum vs serum-free GBM cell cultures, in vivo models (chemically induced, mutation driven - transgenic models, isograft vs xenograft), virus mediated gene delivery for GBM.

**Testi di riferimento**

WHO Classification of Tumours, fourth edition (2016)
IARC WHO Classification of Tumours, Louis, D.N., Ohgaki, H., Wiestler, O.D., Cavenee, W.K.
IARC

Emerging Concepts in Neuro-Oncology (2013)
Colin Watts (Editor)
Publisher: Springer; 2013 edition (November 9, 2012)
ISBN-10: 0857294571

Lecture slides (provided by the teacher) along with some key papers (cited in the slides).

**Obiettivi formativi**

To understand the basic principles of neuro-oncology, with special regard to the genetic and molecular mechanisms involved.

**Prerequisiti**

None

**Metodi didattici**

Frontal lessons

**Altre informazioni**

For any doubt or for additional information:
alessandro.perin@istituto-besta.it
dsgubin@gmail.com

**Modalità di verifica dell'apprendimento**

Written examination. 4 questions + 1 (bonus) to possibly get 'magna cum laude' score. 50 minutes will be given to complete the exam

**Programma esteso**

Overview about neuro-oncology (history of neuro-oncology), neuro-anatomy, epidemiology, tumor grading, tumor classification (WHO), introduction to molecular neuro-oncology, critical thinking in neuro-oncology.

Overview on meningeal development and anatomy; meninges histology, histopathology; tumor subtypes, grading, treatment options, molecular features/subgroups, prognosis.

Overview on hemangiopericytomas; cell of origin, histology, histopathology, grading, treatment options, molecular features, prognosis (see for instance: Armulik et al. Pericytes: Developmental, Physiological, and Pathological Perspectives, Problems, and Promises. Dev Cell 2011)

Glial cell subtypes, pylocitic astrocytoma (WHO I), neurofibromatosis type I (and NF1 gene/protein), diffuse astrocytoma (WHO II), oligodendroglioma (WHO II), differences between astro- and
Overview about neuro-oncology (history of neuro-oncology), neuro-anatomy, epidemiology, tumor grading, tumor classification (WHO), introduction to molecular neuro-oncology, critical thinking in neuro-oncology.

Overview on meningeal development and anatomy; meninges histology, histopathology; tumor subtypes, grading, treatment options, molecular features/subgroups, prognosis.

Overview on hemangiopericytomas; cell of origin, histology, histopathology, grading, treatment options, molecular features, prognosis (see for instance: Armulik et al. Pericytes: Developmental, Physiological, and Pathological Perspectives, Problems, and Promises. Dev Cell 2011)


Levels of evidence and clinical trials.

Epidemiology, histopathology, imaging, current standard of treatment, median survival, definition of tumor progression and recurrence, definition of tumor cell, oncogenes vs. oncosuppressors, RTK - p53 - RB pathways in glioblastoma, hallmarks of cancer and therapeutic targets in glioblastoma, patients' stratification in clinical trials, new trends towards a better glioma histopathological/molecular/genetic classification.

Brain metastases (epidemiology, risk factors, primary tumours which can give rise to brain metastases, treatments, prognosis, new perspectives).

Hypothesis behind glioblastoma malignant behaviour, cancer stem cell hypothesis and its origins, from liquid to solid tumors, key-papers from Dick - Dirks - Weiss - Galli, tumor heterogeneity vs hierarchy, definition of GSC, pitfalls of this hypothesis. Evolution of the glioma stem-like cell hypothesis.

Extra: how to give a good talk in science. Practical and theoretical examples of DOs and DONTs when you have to prepare and deliver a scientific presentation in front of an audience. This lesson is part of the program, since a part of the final examination will deal with that. See for instance: Alon, U. (2009) Molecular Cell 36, 165-167.

History of viral therapy for GBM, viral vectors for GBM, HSV-1 for GBM, hypoxia-GBM-viral therapy, bovine viral vectors for GBM.

Definition of translational research, overview on GBM in vitro and in vivo models, serum vs serum-free GBM cell cultures, in vivo models (chemically induced, mutation driven - transgenic models, isograft vs xenograft), virus mediated gene delivery for GBM.
Epidemiology, histopathology, imaging, current standard of treatment, median survival, definition of tumor progression and recurrence, definition of tumor cell, oncogenes vs. oncosuppressors, RTK - p53 - RB pathways in glioblastoma, hallmarks of cancer and therapeutic targets in glioblastoma, patients' stratification in clinical trials, new trends towards a better glioma histopathological/molecular/genetic classification.

Brain metastases (epidemiology, risk factors, primary tumors which can give rise to brain metastases, treatments, prognosis, new perspectives).

Hypothesis behind glioblastoma malignant behaviour, cancer stem cell hypothesis and its origins, from liquid to solid tumors, key-papers from Dick - Dirks - Weiss - Galli, tumor heterogeneity vs hierarchy, definition of GSC, pitfalls of this hypothesis. Evolution of the glioma stem-like cell hypothesis.

Extra: how to give a good talk in science. Practical and theoretical examples of DOs and DONTs when you have to prepare and deliver a scientific presentation in front of an audience. This lesson is part of the program, since a part of the final examination will deal with that. See for instance: Alon, U. (2009) Molecular Cell 36, 165–167.

History of viral therapy for GBM, viral vectors for GBM, HSV-1 for GBM, hypoxia-GBM-viral therapy, bovine viral vectors for GBM. Definition of translational research, overview on GBM in vitro and in vivo models, serum vs serum-free GBM cell cultures, in vivo models (chemically induced, mutation driven - transgenic models, isograft vs xenograft), virus mediated gene delivery for GBM.

WHO Classification of Tumours, fourth edition (2016)
IARC WHO Classification of Tumours, Louis, D.N., Ohgaki, H., Wiestler, O.D., Cavenee, W.K.
IARC

Emerging Concepts in Neuro-Oncology (2013)
Colin Watts (Editor)
Publisher: Springer; 2013 edition (November 9, 2012)
ISBN-10: 0857294571

Lecture slides (provided by the teacher) along with some key papers (cited in the slides).

To understand the basic principles of neuro-oncology, with special regard to the genetic and molecular mechanisms involved.

None

Frontal lessons

For any doubt or for additional information:
alessandro.perin@istituto-besta.it
dsgubin@gmail.com

Written examination. 4 questions + 1 (bonus) to possibly get 'magna cum laude' score. 50 minutes will be given to complete the exam

Overview about neuro-oncology (history of neuro-oncology), neuro-anatomy, epidemiology, tumor grading, tumor classification (WHO), introduction to molecular neuro-oncology, critical thinking in neuro-
Overview on meningeal development and anatomy; meninges histology, histopathology; tumor subtypes, grading, treatment options, molecular features/subgroups, prognosis.

Overview on hemangiopericytomomas; cell of origin, histology, histopathology, grading, treatment options, molecular features, prognosis (see for instance: Armulik et al. Pericytes: Developmental, Physiological, and Pathological Perspectives, Problems, and Promises. Dev Cell 2011)


Levels of evidence and clinical trials.

Epidemiology, histopathology, imaging, current standard of treatment, median survival, definition of tumor progression and recurrence, definition of tumor cell, oncogenes vs. oncosuppressors, RTK - p53 - RB pathways in glioblastoma, hallmarks of cancer and therapeutic targets in glioblastoma, patients’ stratification in clinical trials, new trends towards a better glioma histopathological/molecular/genetic classification.

Brain metastases (epidemiology, risk factors, primary tumours which can give rise to brain metastases, treatments, prognosis, new perspectives).

Hypothesis behind glioblastoma malignant behaviour, cancer stem cell hypothesis and its origins, from liquid to solid tumors, key-papers from Dick - Dirks - Weiss - Galli, tumor heterogeneity vs hierarchy, definition of GSC, pitfalls of this hypothesis. Evolution of the glioma stem-like cell hypothesis.

Extra: how to give a good talk in science. Practical and theoretical examples of DOs and DONTs when you have to prepare and deliver a scientific presentation in front of an audience. This lesson is part of the program, since a part of the final examination will deal with that. See for instance: Alon, U. (2009) Molecular Cell 36, 165–167.

History of viral therapy for GBM, viral vectors for GBM, HSV-1 for GBM, hypoxia-GBM-viral therapy, bovine viral vectors for GBM. Definition of translational research, overview on GBM in vitro and in vivo models, serum vs serum-free GBM cell cultures, in vivo models (chemically induced, mutation driven - transgenic models, isograft vs xenograft), virus mediated gene delivery for GBM.