UNIVERSITEIT GENT

# Studiefiche

Academiejaar 2018-2019

## Precisiegeneeskunde in kanker (D012494)

Cursusomvang (nominale waarden; effectieve waarden kunnen verschillen per opleiding)

| Studiepunten | Studietijd | Contacturen |
|---|---|---|
| 6.0 | 180 u | 55.0 u |

Aanbodsessies en werkvormen in academiejaar 2018-2019

| | | | |
|---|---|---|---|
| A (semester 1) | Engels | demonstratie | 6.25 u |
| | | microteaching | 5.0 u |
| | | integratieseminarie | 3.75 u |
| | | hoorcollege | 40.0 u |

Lesgevers in academiejaar 2018-2019

| | | |
|---|---|---|
| Vermaelen, Karim | GE01 | Verantwoordelijk lesgever |
| Denys, Hannelore | GE01 | Medelesgever |
| Hendrix, An | GE17 | Medelesgever |
| Kerre, Tessa | GE01 | Medelesgever |
| Mestdagh, Pieter | GE02 | Medelesgever |

| Aangeboden in onderstaande opleidingen in 2018-2019 | stptn | aanbodsessie |
|---|---|---|
| Master of Science in Biomedical Sciences | 6 | A |

Onderwijstalen

Engels

Trefwoorden

targeted therapy, molecular therapy, driver mutaton, passenger mutation, oncogene, resistance, predictive biomarker, next-generation sequencing, liquid biopsy, circulating tumor cells, cell-free DNA, exosomes, omics, connectivity map, drug development, cost-effectiveness, financial toxicity, biobanking

Situering

Precision medicine aims to treat a disease in a more effective and durable way by optimally matching a specific drug to a specific patient. The medication is typically selected on the basis of a patient- or disease-specific characteristic, also known as a biomarker.
The development of cancer therapies is one of the best illustrations of precision medicine.
This course builds upon the different lesson packages in tumor biology from the 1st Master, in order to clarify concepts with regard to antitumoral treatments aimed at oncogenic mutations or critical stromal components, including the immune system.
The importance of predictive biomarkers is emphasized, as well as pioneering diagnostic technologies that link the complexity of tumor biology to a specific drug in a patient-specific way.
Finally, the societal impact of such patient-individual expensive diagnostic technologies and even more expensive therapies is also addressed.

Inhoud

**1. TARGETED THERAPIES**
**Introductory concepts**
- definitions "precision", "target" and (predictive) biomarker (theragnosis)

**Actionable mutations (oncogene-driven tumors): general principles**
- pharmacological inhibition, secondary resistance
- synthetic lethality

**Actionable mutations: Translation to the clinic: typical illustrations**
- Hematology
- Solid tumors (lung cancer)

- DNA repair and cell cycle as target

**Surface molecules as targets:**

- monoclonal antibodies: mechanism of action (ADCC, CDC ...)

**Stroma-directed therapies:**

- angiogenesis inhibitors
- immunotherapy (cell therapy, immune checkpoint inhibition)

**2. EMERGING TECHNOLOGIES IN PRECISION MEDICINE**

**Tools and applications for drug and biomarker discovery**

- Organoids / xenografts / PDX
- NGS
- Liquid biopsy: CTCs / ctDNA / ctRNA / exosomes
- High-throughput compound screening
- Connectivity folder
- Biomarker signatures (MammaPrint, OncotypeDX, Rosetta genomics, PCA3, Oncomethylome, tumor-educated platelets)

**Towards novel therapeutic strategies in cancer**

- ncRNAs (e.g., SAMSSON)
- neo-antigen and the development of personalized cancer vaccines

**3. NEW CLINICAL TRIAL DESIGNS for PRECISION ONCOLOGY**

- umbrella / basket / adaptive trial designs

**4. PRECISION MEDICINE TODAY SOCIAL IMPACT AND CHALLENGES**

- Ethical and economic aspects of biobanking and new technologies (eg NGS)
- Precision medicine from cost-effectiveness perspective

**5. INTEGRATION SEMINARS:**

- Virtual tumor board (moc) with case

**6. MICROTEACHING**

- Paper discussion
- Case: development of a compound and related biomarker

**7. DEMONSTRATION**

- Visit to the molecular diagnostic platform in the Pathology department (IHC and PCR-based biomarker diagnostics, Idylla device)

Begincompetenties

- having succesfully completed the bachelor training in Biomedical Scences
- having succesfully assimilated key concepts as offered in the 1st Master in Biomedical Sciences, specifically from the courses **Proliferation and survival**, **Cancer genetics**, **Communication and metastasis**, and **Clinical aspects**.

Eindcompetenties

1 To understand the concept of a prognostic vs theranostic biomarker

2 To learn prototypical examples of oncogene-targeted therapies, and understanding the mechanism of action as well as the resistance mechanisms.

3 To understand current bottlenecks in targeted therapies.

4 To see how novel diagnostic technologies can better predict disease progression and response to specific therapies.

5 To be able to situate developments in precision medicine in cancer in a socio-economical context.

6 To be able to apply concepts of precision medicine in oncology in a scenario of drug and/or biomarker development

Creditcontractvoorwaarde

Dit opleidingsonderdeel kan niet via creditcontract gevolgd worden

Examencontractvoorwaarde

Dit opleidingsonderdeel kan niet via examencontract gevolgd worden

Didactische werkvormen

Demonstratie, hoorcollege, integratieseminarie, microteaching

Toelichtingen bij de didactische werkvormen

group teaching, demonstratio, integration seminar and micro-teaching

Leermateriaal

slides/handouts of the different course modules in PDF, publications

Referenties

http://www.nature.com/nature/supplements/insights/precision_medicine/index.html

Vakinhoudelijke studiebegeleiding

possibility to ask questions during after each course module

Evaluatiemomenten

periodegebonden en niet-periodegebonden evaluatie

Evaluatievormen bij periodegebonden evaluatie in de eerste examenperiode

Schriftelijk examen met open vragen

Evaluatievormen bij periodegebonden evaluatie in de tweede examenperiode

Schriftelijk examen met meerkeuzevragen

Evaluatievormen bij niet-periodegebonden evaluatie

Mondeling examen, gedragsevaluatie op de werkvloer, verslag

Tweede examenkans in geval van niet-periodegebonden evaluatie

Examen in de tweede examenperiode is enkel mogelijk in gewijzigde vorm

Eindscoreberekening

Periodic evaluation: 75%: open questions
Non-periodic evaluation: 25%: participation and microteaching
Note: Unjustified absence in the permanent evaluation will give rise to a total maximum score of 9/20 (highest failing mark) regardless of the score on the periodic evaluation.