

## Thesis topics for Biotechnology BSc students:

### Faculty of Natural Sciences

#### Institute of Agrobiolgy, Department of Biology

Capacity max 2 students/topic. The titles are broad on purpose: you can agree on a more precise topic with the teachers.

1. **Study of plant bioactive compounds from different aspects.**  
*Supervisor: Dr. Hevér László <hever.laszlo@pte.hu*
2. **Special metabolic products of plant origin.**  
*Supervisor - Dr. Kocsis Marianna <mkocsis@gamma.ttk.pte.hu*

#### Institute of Chemistry

Capacity max 2 students

**Assay development for various immunological applications including flow cytometry.** *Supervisor: Dr Árpád Czéh, aczeh@gamma.ttk.pte.hu*

#### Research Institute of Viticulture and Enology of the University of Pécs (SZBKI)

1. **Investigation of genetic background of susceptibility and resistance to black rot in grapes.**

*Supervisor: Dr. Teszlák Péter. [teszlak.peter@pte.hu](mailto:teszlak.peter@pte.hu) 2 students/topic*

2. **Chromatographic analysis of plant polyphenols.** *Supervisor: Dr. Kőrösi László Tamás korosi.laszlo@pte.hu 2 students/topic*

### Faculty of Pharmacy

#### Institute of Pharmaceutical Biotechnology:

*Capacity: 1 student/topic*

1. **Evaluating the role of milk exosomal miRNA species on cancer growth.** - *Supervisor: Dr. Kvell Krisztián [kvell.krisztian@pte.hu](mailto:kvell.krisztian@pte.hu); Co-Supervisor: Dr. Garai Kitti [garai.kitti@pte.hu](mailto:garai.kitti@pte.hu) (TAKEN)*
2. **Exercise-derived miRNAs and cellular senescence.** - *Supervisor: Ádám Zoltán <[adam.zoltan.mihaly@pte.hu](mailto:adam.zoltan.mihaly@pte.hu)>*
3. **Investigating the anti-tumour effect of exercise-induced miRNAs.** - *Supervisor: Dr. Kvell Krisztián [kvell.krisztian@pte.hu](mailto:kvell.krisztian@pte.hu); Co-Supervisor: Dr. Garai Kitti [garai.kitti@pte.hu](mailto:garai.kitti@pte.hu)*
4. **Influence of long-term exercise on exosomal and microvesicular miRNA.** - *Supervisor: Ádám Zoltán <[adam.zoltan.mihaly@pte.hu](mailto:adam.zoltan.mihaly@pte.hu)>*

5. **IPA software analysis of the effect of miRNAs induced by exercise.** - Supervisor: Dr. Kvell Krisztián <kvell.krisztian@pte.hu>; Co-Supervisor: Dr. Garai Kitti <garai.kitti@pte.hu>
6. **Modern nanotechnological applications of traditional active pharmaceutical ingredients.** - Supervisor: Dr. Kvell Krisztián <kvell.krisztian@pte.hu> (**TAKEN**)
7. **Mitochondrial dysfunction.** - Supervisor: Bóvári-Biri Judit <bovari.judit@pte.hu>
8. **Mitochondrial metabolism.** - Supervisor: Bóvári-Biri Judit <bovari.judit@pte.hu>
9. **Mitochondria and antioxidants.** - Supervisor: Bóvári-Biri Judit <bovari.judit@pte.hu>
10. **TSC mutations in lung cancer subtypes.** - Supervisor: Draskóczy Lilla <draskoczy.lilla@pte.hu>
11. **The structure of mitochondria and the formation of reactive oxygen species.** - Supervisor: Draskóczy Lilla <draskoczy.lilla@pte.hu>
12. **Main characteristics and biochemistry of lung cancer.** - Supervisor: Prof. Dr. Pongrácz Judit <pongracz.e.judit@pte.hu> (**TAKEN**)
13. **Bioprinting in pharmaceutical tissue modeling.** - Supervisor: Prof. Dr. Pongrácz Judit (**TAKEN**)
14. **3D bioprinting of bone tissue.** - Supervisor: Prof. Dr. Pongrácz Judit. (**TAKEN**)  
Co-Supervisor: Bóvári-Biri Judit, Steinerbrunnerné Nagy Alexandra <steinerbrunner.alexandra@pte.hu>
15. **Tumor tissue models.** - Supervisor: Prof. Dr. Pongrácz Judit (**TAKEN**)
16. **Liver tissue – use of bioprinting.** - Supervisor: Prof. Dr. Pongrácz Judit (**TAKEN**)
17. **Skin tissue and the role of bioprinting.** - Supervisor: Prof. Dr. Pongrácz Judit (**TAKEN**)
18. **2D vs 3D cell cultures.** - Supervisor: Prof. Dr. Pongrácz Judit (**TAKEN**)
19. **Barrier functions in model cultures.** - Supervisor: Prof. Dr. Pongrácz Judit (**TAKEN**)
20. **Cyp450 in lung cancer** - Supervisor: Prof. Dr. Pongrácz Judit (**TAKEN**)
21. **Biotechnological therapies in lung cancer** - Supervisor: Prof. Dr. Pongrácz Judit (**TAKEN**)
22. **Directing the growth of blood vessels** - Supervisor: Nemes Balázs <balazs.nemes@aok.pte.hu> (**TAKEN**)

#### Department of Pharmaceutics and Central Clinical Pharmacy

1. **Drug shortages: risk factors and reporting systems** - Supervisor: Dr. Róbert Vida Senior Lecturer <vida.robert@pte.hu>
2. **The evaluation of monoclonal antibodies drug-drug interactions** - Supervisor: Dr. Róbert Vida Senior Lecturer <vida.robert@pte.hu>, Dr. Anna Somogyi-Végh Pharmacologist <vegh.anna@pte.hu>
3. **Sustainable Pharmacy - Environmental Aspects of Safe Pharmaceutical Use (Ecopharmacovigilance).** - Supervisor: Dr. András Fittler Associate Professor <fittler.andras@pte.hu>, Dr. Gábor Maász external collaborator

#### Institute of Pharmaceutical Technology and Biopharmacy:

Supervisor: Dr. Pál Szilárd <szilard.pal@aok.pte.hu>

Capacity: 1 student/topic

2. **Application of artificial neural networks in pharmaceutics**
3. **Design and manufacture of modified drug release preparations**
4. **Implementation and Evaluation of Drug Release Studies**
5. **Application of Liposome-Based Drug Delivery Systems**

#### Department of Pharmacology:

1. **Pathomechanisms and novel therapeutic strategies for gynecological diseases.**  
Supervisor: Hartnerné Dr. Pohóczky Krisztina <pohoczkykriszti@gmail.com>

2. **Monoclonal antibodies as novel drugs for different diseases.** *Supervisor: Dr. Horváth Ádám <adam.horvath@aok.pte.hu>*
3. **Drug induced immunological reactions and complication.** *Supervisor: Dr. Kriszta Gábor <gabor.kriszta@aok.pte.hu>*
4. **Ciraparantag as a potential universal anticoagulant reversal agent**  
*Supervisor: Dr. Nagy András <nagy.andras@pte.hu>*
5. **Medical relevance and use of cyclodextrins.** *Supervisor: Dombi Ágnes <agnes.dombi@pte.hu>*

#### Institute of Organic and Medicinal Chemistry

1. Adsorption on biosorbents. - *Supervisor: Dr. Kiss László <kissl@gamma.ttk.pte.hu*
2. Redox properties of quinone and its derivatives. - *Supervisor: Dr. Kiss László*
3. Organic polymerization of small organic building blocks. - *Supervisor: Dr. Kiss László*
4. **Synthesis and study of non-natural antioxidants.** - *Supervisor: Dr. Bognár Balázs <balazs.bognar@aok.pte.hu>*
5. **In vivo applications of non-stable nitroxides.** - *Supervisor: Dr. Bognár Balázs*
6. **Enzymatic transformation of organic functional groups.** - *Supervisor: Pápayné Dr Sár Cecilia <cecilia.sar@aok.pte.hu>*
7. **Utilization of inclusion complexes in controlling the solubility properties of small molecules.** - *Supervisor: Dr. Kunsági-Máté Sándor <sandor.kunsagi-mate@aok.pte.hu>*
8. **Study of protein-substrate interactions by fluorescence polarization method.** – *Supervisor: Dr. Kunsági-Máté Sándor <sandor.kunsagi-mate@aok.pte.hu>*
9. **Bioorthogonal modifications of proteins by paramagnetic species** (synthetic work, after some literature studies) French knowledge may be useful. - *Supervisor: Dr. Kálai Tamás <tamas.kalai@aok.pte.hu>*

#### Department of Pharmaceutical Biology

1. **The role of fractalkine in health and disease** – Supervisor: Dr. Pandur Edina <edina.pandur@aok.pte.hu>
2. **Biotechnological approaches of iron chelators** – Supervisor: Dr. Pandur Edina (**TAKEN**)
3. **Grapevine in biotechnology** – Supervisor: Dr. Sipos Katalin <katalin.sipos@aok.pte.hu>
4. **Plant cell culture in biotechnology** – Supervisor: Dr. Sipos Katalin
5. **The functions of mitochondria** – Supervisor: Dr. Sipos Katalin
6. **Importance of enzymes in food biotechnology** – Supervisor: Dr. Sipos Katalin
7. **The role of lutein in the central nervous system** – Supervisor: Dr. Pap Ramóna <pap.ramona@pte.hu>
8. **Exploring the role of Vitamin D in the biotechnology of fortified foods** – Jánosa Gergely, <janosa.gergely@gytk.pte.hu>, Sipos Katalin katalin.sipos@aok.pte.hu (**TAKEN**)
9. **The anti-inflammatory effects of various essential oils.** – Pap Ramóna (**TAKEN**)
10. **Neuroinflammation and neurotoxic processes in brain cells.** – Pap Ramóna (**TAKEN**)

#### Department of Pharmacognosy

1. **The role of biotechnology in propagation of chamomile (*Matricaria recutita* L.)**  
*Supervisors: Dr. Bencsik Tímea <timea.bencsik@aok.pte.hu>, Dr. Horváth Györgyi <horvath.gyorgyi@gytk.pte.hu>*

The thesis covers botanical, cultivational, phytochemical, phytotherapeutical and biotechnological aspects of chamomile.

**2. Therapeutic potential and biotechnology of camptothecin**

*Supervisors: Dr. Bencsik Tímea <[timea.bencsik@aok.pte.hu](mailto:timea.bencsik@aok.pte.hu)>, Dr. Horváth Györgyi <[horvath.gyorgyi@gytk.pte.hu](mailto:horvath.gyorgyi@gytk.pte.hu)>*

The thesis covers the following topics: herbal or other sources of camptothecin, camptothecin derivatives and their clinical use, role of biotechnology in production of camptothecin, and future perspectives.

**3. Study of plant bioactive compounds from different aspects.**

*Supervisors: Dr. Kocsis Marianna <[mkocsis@gamma.ttk.pte.hu](mailto:mkocsis@gamma.ttk.pte.hu)> Dr. Balázs Viktória <[viktoria.balazs@aok.pte.hu](mailto:viktoria.balazs@aok.pte.hu)>*

Literature summary: study of secondary metabolites in plants, or plant derived bioactive compounds in honey. Students have the possibility to complete their literature summary with basic laboratory skills, e.g. TLC of polyphenols.

**4. Honey production with biotechnological methods.**

*Supervisors: Dr. Farkas Ágnes <[agnes.farkas@aok.pte.hu](mailto:agnes.farkas@aok.pte.hu)> Nagy-Radványi Lilla <[lilla.radvanyi@aok.pte.hu](mailto:lilla.radvanyi@aok.pte.hu)>*

During their literature survey students explore different biotechnological methods that can be used to produce honey without bees.

**5. Honey adulteration – the role of biotechnology.**

*Supervisors: Dr. Farkas Ágnes <[agnes.farkas@aok.pte.hu](mailto:agnes.farkas@aok.pte.hu)> Nagy-Radványi Lilla <[lilla.radvanyi@aok.pte.hu](mailto:lilla.radvanyi@aok.pte.hu)>*

Students can compare conventional and biotechnological methods that can be applied in detection of honey adulteration.

**6. Honey analysis with biotechnological methods.**

*Supervisors: Dr. Farkas Ágnes <[agnes.farkas@aok.pte.hu](mailto:agnes.farkas@aok.pte.hu)> Nagy-Radványi Lilla <[lilla.radvanyi@aok.pte.hu](mailto:lilla.radvanyi@aok.pte.hu)>*

Students should review biotechnological methods that can be used to assess the quality and authenticity of honey.

**Institute of Pharmaceutical Chemistry:**

**1. Effect of some curcuminoid analogs on cell proliferation and motility**

*Supervisor: Dr. Fülöpné Kiss Edit <[kiss.edit@pte.hu](mailto:kiss.edit@pte.hu)> (TAKEN)*

**2. Curcumin and its derivatives as potential tubulin-active compounds.** *Supervisor: Dr. Fülöpné*

*Kiss Edit <[kiss.edit@pte.hu](mailto:kiss.edit@pte.hu)>*

**3. Pharmacopoeal characterization of heparines.** *Supervisor: Dr. Perjési Pál*

*<[pal.perjesi@aok.pte.hu](mailto:pal.perjesi@aok.pte.hu)>, Co-supervisor: Pintér Zoltán Mihály*

**4. Manufacturing and applications of heparines.** *Supervisor: Dr. Perjési Pál, Co-supervisor: Dr.*

*Bognár Gábor <[bognar.gabor@pte.hu](mailto:bognar.gabor@pte.hu)>*

## Center for Health Technology Assessment and Pharmacoeconomic Research

1. **Efficacy of health technologies used in the treatment of prostate cancer.**  
*Supervisor: Dr. Rózsa Péter [rozsa.peter@pte.hu](mailto:rozsa.peter@pte.hu)*
2. **Effectiveness of health technologies used in the treatment of prostate cancer among patients treated at the University of Pécs** [rozsa.peter@pte.hu](mailto:rozsa.peter@pte.hu)

## The Medical School

### Institute of Biophysics

*Capacity: 2 students/topic*

1. **Functional dynamics of fluorescent proteins revealed by fluorescence spectroscopy**  
*Supervisor: Dr. Lukács András <[andras.lukacs@aok.pte.hu](mailto:andras.lukacs@aok.pte.hu)>*
2. **Investigation of morphological and functional changes of human erythrocytes in blood samples from patients afflicted with type 1 diabetes applying biophysical methods**  
*Supervisor: Szeiliné Dr. Türmer Katalin <[katalin.turmer@aok.pte.hu](mailto:katalin.turmer@aok.pte.hu)>*  
*Co-supervisor: Dr. Szatmári Dávid <[david.szatmari@aok.pte.hu](mailto:david.szatmari@aok.pte.hu)>*
3. **Superresolution microscopy applied for the discovery of intercellular communication**  
*Supervisor: Dr. Szabó-Meleg Edina <[edina.meleg@aok.pte.hu](mailto:edina.meleg@aok.pte.hu)>* Capacity: 1 student
4. **New direct communication pathways between the cells. Study of nanotubes by microscopy.**  
*Supervisor: Dr. Szabó-Meleg Edina (TAKEN)*

### Institute of Physiology

All the topics shared by this department are up to date. You can find them at the following site:  
<https://aok.pte.hu/en/egyseg/70/tdk-temak>

### Institute of Medical Biology

*Capacity: 2 students/topic*

1. **Structure-function coordination of actin-associated proteins in thin filament assembly**  
*Supervisor: Dr. Bugyi Beáta [beata.bugyi@aok.pte.hu](mailto:beata.bugyi@aok.pte.hu) (TAKEN)*
2. **Formin proteins in the regulation of the neuronal cytoskeleton**  
*Supervisor: Dr. Bugyi Beáta [beata.bugyi@aok.pte.hu](mailto:beata.bugyi@aok.pte.hu); Co-supervisor: Dr Szűtsné Tóth Mónika Ágnes (TAKEN)*

### Department of Human Genetics

**„Genetic etiology of non-syndromic hearing loss (literature review)“**  
*Supervisor: Dr Berenténé Dr Bene Judit [bene.judit@pte.hu](mailto:bene.judit@pte.hu)*

## Department of Behavioural Sciences

*Supervisor: Dr. Gács Boróka <[boroka.gacs@aok.pte.hu](mailto:boroka.gacs@aok.pte.hu)>*

*Co-Supervisor: Dr. Laki Beáta [beata.laki@aok.pte.hu](mailto:beata.laki@aok.pte.hu)*

*Capacity: 1 student/topic*

1. **Career motivations in relation to psychological factors and burnout (and/or engagement) among biotechnology students. (TAKEN)**
2. **The level of negative affect (and/or ADHD/ drug abuse) and its impact on performance among biotechnology students. (TAKEN)**
3. **Career motivations as an indicator of forming attitudes toward moral questions among biotechnology students. (TAKEN)**
4. **Moral obligation to decrease the negative impacts that influence the mental and social health and performance of medical students and healthcare workers. (Whose responsibility? Optional plans? Required background?) (TAKEN)**