



# How can we increase the quality of scientific production: ideas from Szeged

POSDRU 63117  
International Conference

**Dr. habil. Zoltán Rakonczay**  
Associate Professor  
University of Szeged  
First Department of Medicine

# What is science?

**Systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe. Refers to the body of reliable knowledge itself, of the type that can be logically and rationally explained. (Wikipedia)**

**Knowledge covering general truths of the operation of general laws, especially as obtained and tested through scientific method [and] concerned with the physical world.**

**In modern use, "science" or research more often refers to a way of pursuing knowledge in a broad sense denoting reliable knowledge about a topic.**

## Scientific production

**Publications: journal articles, books, book chapters, conference presentations, patents, dissertations (Ph.D., D.Sc.)**

# Main stages in research

1. **Undergraduate/graduate researcher**
2. **Ph.D. Student > Ph.D. Degree**
3. **Postdoc**
4. **Senior researcher > D.Sc. degree**

# What are the steps of scientific production?

- 1. Idea – good question**
- 2. Scientific background**
- 3. Aim (significant, important, novel)**
- 4. Research plan**
- 5. Conditions of research**
  - infrastructure
  - methods (not just those available in the lab)
  - personal
  - financial
- 6. Research grant application (preliminary expts)**

# What are the steps of scientific production?

- 7. Experimentation in the laboratory**
- 8. Summary of experiments (results), drawing conclusions (evaluate alternative explanations)**
- 9. Familiarize conclusions with the scientific community (at conferences, as a publication)**
- 10. Promote discussions**

# Publication criteria

- **Novel and important research**
- **Meets all applicable standards for the ethics of experimentation and research integrity**
- **Experiments, statistics, and other analyses are performed to a high technical standard and are described in sufficient detail (in order to reproduce or replicate the study)**
- **Results have not been published elsewhere**
- **Conclusions are presented in an appropriate fashion and are supported by the data**
- **The article is presented in an intelligible fashion and is written in standard English**
- **The article adheres to appropriate reporting guidelines and community standards for data availability**
- **Conform to journal standards / format**

# How can you measure scientific productivity?

- **NUMBER OF PUBLICATIONS**
  - **IMPACT FACTORS**
    - **CITATIONS**
      - **HIRSCH (H) INDEX**  
scientific productivity *and* the apparent scientific impact

*Deutsche Forschungsgemeinschaft* (German Foundation for Science).  
“Quality not quantity” (2010)

# Impact factor

Average: 2.030  
 0.005 - 94.262

A measure reflecting the average number of citations to recent articles published in journals; calculated yearly for journals that are indexed in Thomson Reuters *Journal Citation Reports*

<b>2010</b>	<b>1.8 %</b>	<b>&gt;10:</b>	<b>144</b>
<b>7911 papers with IF</b>	<b>4.4 %</b>	<b>9-10:</b>	<b>41</b>
		<b>8-9:</b>	<b>36</b>
		<b>7-8:</b>	<b>42</b>
		<b>6-7:</b>	<b>87</b>
		<b>5-6:</b>	<b>139</b>
		<b>4-5:</b>	<b>324</b>
		<b>3-4:</b>	<b>580</b>
	<b>93.8 %</b>	<b>2-3:</b>	<b>1179</b>
		<b>1-2:</b>	<b>2150</b>
		<b>&lt;1:</b>	<b>3189</b>

Source: Prof. Péter Hegyi

# From 2001 to 2011...

Takács T, Hegyi P, Jármay K, Czakó L, Góg C, **Rakonczay Z Jr**, Németh J, Lonovics J. Cholecystokinin fails to promote pancreatic regeneration in diabetic rats following the induction of experimental pancreatitis. *Pharmacol Res* 44:363-372 (2001). **IF: 0.863**

**Rakonczay Z Jr**, Takács T, Mándi Y, Iványi B, Varga I, Pápai G, Boros I, Lonovics J. Water immersion pretreatment decreases pro-inflammatory cytokine production in cholecystokinin-octapeptide-induced acute pancreatitis in rats: possible role of HSP72. *Int J Hyperthermia* 17:520-535 (2001). **IF: 1.086**

**Rakonczay Z Jr**, Takács T, Iványi B, Mándi Y, Pápai G, Boros I, Varga I, Jost K, Lonovics J. The effects of hypo- and hyperthermic pretreatment on sodium taurocholate-induced acute pancreatitis in rats *Pancreas* 24:83-89 (2002). **IF: 1.456**

---

Biczó G, Hegyi P, Dósa S, Shalbuyeva N, Berczi S, Sinervirta R, Hracskó Z, Siska A, Kukor Z, Jármay K, Venglovecz V, Varga IS, Iványi B, Alhonen L, Wittmann T, Gukovskaya A, Takács T, **Rakonczay Z Jr**. The crucial role of early mitochondrial injury in L-lysine-induced acute pancreatitis. *Antioxid Redox Signal* 15: 2669-2681 (2011). **IF: 8.456**

Hegyi P, Pandol S, Venglovecz V, **Rakonczay Z Jr**. The acinar-ductal tango in the pathogenesis of acute pancreatitis. *Gut* 60:544-52 (2011). **IF: 10.111**

Pallagi P, Venglovecz V, **Rakonczay Z Jr**, Borka K, Korompay A, Ózsvári B, Judák L, Sahin-Tóth M, Geisz A, Schnúr A, Maléth J, Takács T, Gray MA, Argent BE, Mayerle J, Lerch M, Wittmann T, Hegyi P. Trypsin reduces pancreatic ductal bicarbonate secretion by inhibiting CFTR Cl<sup>-</sup> channels and luminal anion exchangers. *Gastroenterology* 141:2228-2239 (2011). **IF: 11.675**

# Factors influencing quality

- Specific research questions
- Overall study design
- Methods
- Coherence
- Consistency of findings

Quality evidence typically requires more than a single research study

# Things worth taking into consideration: publications

- Publish or perish
- Native vs English language
- Publish in the right journal
- Think outside the box (non-profile journals)
- Write paper according to journal profile
- Provide the necessary information to reproduce or replicate the study
- Even if your paper is rejected, consider reviewer comments
- Participate in peer-reviewing
- Write review publications (cited more)

# The PLOS ONE concept

- Open access, peer-reviewed journal
- Covers primary research from any discipline within science and medicine
- Acceptance depends on whether experiments and data analysis were conducted rigorously
- Submissions are not excluded on the basis of lack of perceived importance (!)

# Things worth taking into consideration: facilities

- Try to work with the best people
- Think critically – alternative explanations
- Collaborations (national and international)
- Establish new techniques (aim for uniqueness)
- Utilize methods that best address the research questions (not just those found in the lab)
- Visits abroad – coming back
- Apply for research grants (national and international)
- Establish own laboratory

# Summary, conclusions

- Learning curve
- Work hard and in a team with bright and talented colleagues
- Collaborate
- Gain experience in other labs
- Aim for high impact journals
- Prepare for a lengthy process
- Don't give up!

„Our *future will be* like,  
our schools are today”

Albert Szent-Györgyi



**THANK YOU FOR YOUR  
ATTENTION!**

**Acknowledgements: Prof. Péter Hegyi**