C U R R I C U L U M V I T A E

Name (Family, First) – ***T R C H O U N I A N K A R E N***

Citizenship – Republic of Armenia (RA); Nationality – Armenian
Date of birth – May 14th 1989, Place of Birth - Yerevan, Armenia
Sex – Male, Marital Status – Single

Languages – Armenian, Russian, English (speak and write fluently C1/C2), German and Spanish (speak and read good with dictionary); Computer skills: Windows, Microsoft Office

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Present position –Professor Department of Biochemistry, Microbiology and Biotechnology, Faculty of Biology, Yerevan State University (YSU), ARMENIA;
Head, Laboratory of Microbiology, Bioenergetics and Biotechnology of Scientific-Research Institute of Biology, Yerevan State University (YSU), ARMENIA;
Director, YSU Microbial Biotechnologies and Biofuel Innovation Center, Yerevan State University (YSU), ARMENIA;

Scopus Author ID: 23974981000; h index - 26, scholar.google citation - ~ 1600
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Visiting positions

07/2019-10/2019, 10/2012-07/2013 Research fellow (host – Prof. G. Sawers), Institute of Biology/ Microbiology, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany
05/2018-06/2018 Visiting researcher, Hanze University of Applied Sciences, Groningen, The Netherlands
07/2015-10/2015 Research postdoc fellow (host – Prof. B. Schink), Department of Microbial Ecology, Limnology and General Microbiology, University of Konstanz, Konstanz, Germany
07/2012-10/2012 Research fellow (hosts - Prof. A. Stams, Assistant Professor S. Kengen), Laboratory of Microbiology, Wageningen University, Wageningen, The Netherlands
08/2010-11/2010 Research fellow (host – Prof. G. Sawers), Institute of Biology/ Microbiology, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany

Education / Qualifications

1995-2005 8th Public School after Alexander S. Pushkin (with certificate of excellence), Yerevan
2005-2009 Bachelor Degree in Biophysics from YSU (diploma with honor)
2009-2011 Master Degree in Biophysics from YSU; Master thesis title: "Role of *Escherichia coli* different hydrogenases in molecular hydrogen production during glycerol fermentation" (supervisor – Prof. Dr. A. Trchounian)

2011-2013 Ph.D. in Biophysics and Biotechnology at YSU; Ph.D. Dissertation title: "Hydrogenase activity and peculiarities of hydrogen production by *Escherichia coli* during glycerol fermentation" (Supervisor – Prof. Dr. A. Trchounian)

2017 D. Sc. in Biochemistry at YSU; Dissertation title: "Improving routes of molecular hydrogen production and hydrogenase activity in bacteria during dark fermentation" (Academic consultant – Prof. Dr. A. Trchounian)

Main areas Microbiology, Biochemistry, Biotechnology, Biophysics, Bioenergetics

Topics ***Environmental regulation of bacterial growth and metabolism, hydrogenase activity and hydrogen production by bacteria, bioenergetics of fermentation, waste to biobased products technologies***

Significance of environmental factors (pH, ionic content, osmolarity, redox potential etc) during bacterial growth under different conditions (anaerobic or aerobic) and upon differential processes of energy transformation (substrate or oxidative phosphorylation) has been studied in Prof. Dr. Trchounian's group. We have proposed pathways implicated in control of growth, extrusion of the end products, production of fermentative gas – molecular hydrogen and others. It has been determined that FHL-2, composed of formate dehydrogenase and hydrogenase 4, is responsible for hydrogen production by *E. coli* under sugar (glucose) fermentation at slightly alkaline and neutral pH; regulation of FHL by pH and external formate is suggested, a role of FHL-1 composed of formate dehydrogenase and hydrogenase 3 is defined, expression of different genes is determined. Hydrogen production under glycerol fermentation is also studied, hydrogenase enzyme responsible for H_2 production has been determined. Comparable effects with formate, glucose and glycerol fermentation on hydrogenase activity at different pH, as well as a role of proton-translocating ATPase are studied using supplied and newly constructed single, double and triple mutants with deletion of different hydrogenases and proton ATPase. A requirement of ATPase was shown. Oxidation reduction routes to enhance hydrogen production was established, effects of oxidizers and reducers on hydrogenase activity and hydrogen production setup was shown. Osmotic stress effects on hydrogenase activity were also established for different hydrogenases but at different pHs. Hydrogen production activity during mixed carbon fermentation has been determined at different pHs. These would be of significance to improve H_2 biotechnology with future application in the energy industry; widening organic wastes is suggested.

Journal Editorial Boards and Reviewers

2020-present BMC Microbiology Editorial Board Member
2019-present Nature Scientific Reports Editorial Board Member
2016-present Frontiers in Microbiology, Microbial physiology and metabolism (**REVIEW EDITOR**)

Reviewer - Biotechnology for Biofuels, International Journal of Hydrogen Energy, Journal of Biotechnology, Frontiers in Microbiology, Journal of Industrial Microbiology and Biotechnology, Biomass and Bioenergy, BMC Microbiology, FEMS Microbiology Letters etc.

Expert - Biotechnology and Biological Sciences Research Council (BBSRC, UK), National Center for Professional Education Quality Assurance Foundation (ANQA) (Armenia), European Commission, (Brussels, EU)

MOST IMPORTANT PUBLICATIONS >80

Reviews and opinions

1. *Trchounian A.,* ***Trchounian K.*** (2019) Fermentation revisited: how to survive under energy-limited conditions. ***Trends in Biochem Sci.* 44,** 391-400 https://doi.org/10.1016/j.tibs.2018.12.009
2. ***Trchounian K.,*** *Sawers R.G. and Trchounian A* (2017) Improving biohydrogen productivity by microbial dark- and photo-fermentations: Novel data and future approaches. ***Renew. Sust. Energy Rev.* 80**, 1201-1216.
3. ***Trchounian K.,*** *Poladyan A., Vassilian A., Trchounian A.* (2012) Multiple and reversible hydrogenases for hydrogen production by *Escherichia coli*: Dependence on fermentation substrate, pH and the F_0F_1-ATPase. ***Crit. Rev. Biochem. Mol. Biol***. **47**, 236-249.

Research Papers

1. *Mirzoyan S., Aghekyan H., Vanyan L., Vassilian A.,* ***Trchounian K*** (2022) Coffee silverskin as a substrate for biobased production of biomass and hydrogen by *Escherichia coli*. ***Int. J. Energy Res.*** 46, 23110-23121 https://doi.org/10.1002/er.8612.
2. *Gevorgyan H., Vassilian A., Poladyan A.,* ***Trchounian K*** (2022) The influence of hydrogen production on the formation of metabolic pathways and regulation of ΔpH in *Escherichia coli*. ***Int. J. Hydrogen Energy,*** 47, 40264-40274 https://doi.org/10.1016/j.ijhydene.2022.07.227.
3. *Vanyan L and* ***Trchounian K.*** (2022) "HyfF subunit of hydrogenase 4 is crucial for regulating F_OF_1 dependent proton/potassium fluxes during fermentation o various concentrations of glucose". ***J. Bioenerg. Biomembr.*** 54, 69-79 https://doi.org/10.1007/s10863-022-09930-x.
4. *Karapetyan L, Mikoyan G, Vassilian A, Valle A, Bolivar J, Trchounian A,* ***Trchounian K*** (2021) *Escherichia coli* Dcu C_4-dicarboxylate transporters dependent proton and potassium fluxes and F_OF_1-ATPase activity during glucose fermentation at pH 7.5. ***Bioelectrochemistry*** 141, 107867.
5. *Petrosyan H., Vanyan L., Trchounian A.,* ***Trchounian K.*** (2020) Defining the roles of the hydrogenase 3 and 4 subunits in hydrogen production during glucose fermentation: A new model of a H_2-producing hydrogenase complex. ***Int. J. Hydrogen Energy, 45,*** *5192-5201.*
6. *Karapetyan L., Valle A., Bolivar J., Trchounian A.,* ***Trchounian K.*** (2019) Evidence for *Escherichia coli* DcuD carrier dependent F_OF_1 ATPase activity during fermentation of glycerol. ***Scientific Reports 9***, 4279
7. *Mirzoyan S., Trchounian A.,* ***Trchounian K.*** (2018) Role of hydrogenases 3 and 4 in *Escherichia coli* growth and H_2 producing hydrogenase activity during anaerobic utilization of lactose ***Int. J. Hydrogen Energy* , 43,** 18151-18159.
8. *Gevorgyan H., Trchounian A.,* ***Trchounian K.*** (2018) Understanding the role of *Escherichia coli* hydrogenases and formate dehydrogenases in the F_OF_1-ATPase activity during the mixed acid fermentation of mixture of carbon sources. ***IUBMB Life* 70**, 1040-1047.
9. *Mirzoyan S., Romero-Pareja P. M., Coello M. D, Trchounian A.,* ***Trchounian K***. (2017) Evidence for hydrogenase-4 catalyzed biohydrogen production in *Escherichia coli*. ***Int. J. Hydrogen Energy***, **42**, 21697-21703.
10. ***Trchounian K.,*** *Müller N., Schink B. and Trchounian A.* (2017) Glycerol and mixture of carbon sources conversion to hydrogen by *Clostridium beijerinckii* DSM791 and effects of various heavy metals on hydrogenase activity, ***Int. J. Hydrogen Energy***, **42**, 7875-7882.