

ISSUE 01 2019

TOBB

ETU

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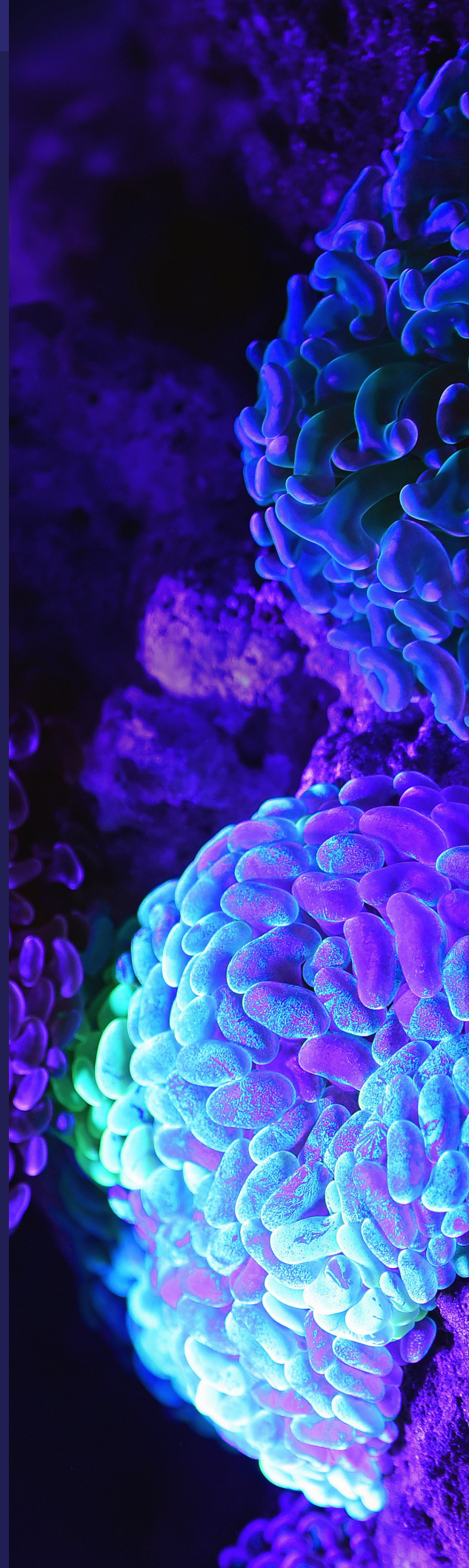
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FIRST TRANSGENIC
ANIMAL STUDIES
IN TURKEY

COMMERCE
AND MEDICAL
ENVIRONMENT IN TURKEY

ROBOTIC SURGERY
AND UROLOGY IN
TURKEY

COOPERATIVE EDUCATION
ABROAD



TOBB ETÜ RANKED 32nd

2018 Young University Rankings:
Millennial Universities



TOBB ETÜ
University of Economics & Technology



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Health and Biomedical Society

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PREFACE

From the Chief Editor...

Dear Readers,

We are here with our first issue! As will be the case for each subsequent issue, we present you in this issue with content filled with different information.

As I have always said, put yourself first and do not work too hard. The following should become a philosophy of life: Considering yourself equal to everyone else and not working hard, but efficiently. There may be those among you who still do not agree with this. Regardless, in this issue, you will be able to see the fruits we reap from this philosophy.

As you know, this is the first issue of our periodical. This being the case, we started by introducing our society in general terms. In this way, we wanted to briefly inform you of the activities we have organized since our establishment. Then, we saw fit to share with you two articles written by our valuable professor Prof. Dr. Osman EROĞUL who provided full support in this process and contributed efforts to the consolidation of the biomedical culture in Turkey. At the end of our interviews, we presented you with an article written by our lead writer for this issue as well as another one selected from the articles written by our members. Finally, we mentioned the developments in the medical field in the world and shared some innovative movements.

The interviews we included in this issue have very interesting titles. We had a very beneficial talk about biotechnology with Prof. Dr. Serhat ALKAN, a member of the team that conducted works for the birth of Cemre, the first calf whose parents are clones. We evaluated in detail the health ecosystem and medical sector in Turkey with Nuri GÜRGÜR, President of the ATO (Ankara Chamber of Commerce) Assembly. Finally, we talked about health entrepreneurship and medical trends with Yavuz Selim SILAY MD, MBA. Moreover, a graduate of the TOBB ETU (TOBB University of Economics and Technology) having completed their cooperative education abroad shared their experience.

Before letting you read the first issue of the ETU BIOMEDICAL periodical, I have something to say. We start every semester with new dreams. Real talented people can make their dreams come true. Since the day we came to this position, we have been excited to be doing what we want for our society. We wish that our excitement elevates with you.

On behalf of the Health and Biomedical Sciences Society, I wish you all a healthy, pleasant and peaceful summer.

Best regards,
Yasin ŞAHİN
ETU SBBT Vice President
ETU BIOMEDICAL Chief Editor





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A Message from the President of ETÜ SBBT

Sağlık tüm insanları ilgilendiren en önemli ortak paydadır. İnsan sağlıklı olduğu vakit çalışabilmekte ve üretebilmektedir. Sağlık denince akla her ne kadar ilk meslek olarak doktorluk gelsede sağlıktaki teknolojik gelişmeler ile birlikte doktorluk kadar sağlığımızda önemli rol oynayan bir diğer meslek grubu ise biyomedikal mühendisleridir.

Biyomedikal mühendisliği mühendislik bilimlerinin deneyimlerinden yararlanarak, insan sağlığı ile ilgili problemlerin çözümü için çalışan bir mühendislik dalını oluşturmaktadır. Teknolojik çözümler insan sağlığını korumakta, hastalıklarda tedaviyi hızlandırmakta ve genel olarak sağlık hizmetlerinin etkinliğini artırmaktadır. Bugün, çağdaş tıp bilimi, teknoloji ürünü olan sayısız ve karmaşık cihazların varlığına ve güvenilirliğine dayalı bir durumdadır. Birçok alanda çalışma yapan biyomedikal mühendisliği bu yönüyle baktığımızda insan sağlığı ile ilgili her alanda teknoloji geliştiren bir mühendislik olarak tanımlanabilir ve bir bakıma insanlığın geleceğini yansıtmaktadır.

TOBB ETÜ Sağlık ve Biyomedikal Bilimler Topluluğu'nda (ETÜ SBBT), TOBB ETÜ Sağlık, Spor ve Tanıtım Müdürlüğü bünyesinde, biyomedikal bilimlerin tanıtılması, tıp ve diğer sağlık alanlarındaki gelişmelerin takip edilmesi, bu gelişmelerin topluluk üyeleriyle paylaşılması gayeleri ile 2013 yılında kurulmuştur. ETÜ SBBT kurulduğu günden bu yana birçok etkinlik yaparak her zaman

vizyonunu genişletmeye devam etmiştir. Her yıl düzenlediğimiz, biyomedikal alanda öğrenci gruplarının gerçekleştirdiği en büyük ve en kapsamlı etkinlik olarak "FUTURE MEDICINE" bunun en büyük kanıtıdır. FUTURE MEDICINE, ETÜ SBBT'nin markası olmuş ve ulusal tanınırlığını arttırmıştır.

ETÜ SBBT'nin 4. dönem Tanıtım ve İnsan Kaynakları Komitesi Başkanı olduğum dönemde artık topluluğumuzun ulusal alanda olduğu gibi uluslararası alanda tanınırlığının artırılması gerektiğinin farkına vararak bu konuyla ilgili arkadaşlarımızla çalışmalara başladık ve bu çalışmalarımız sonucunda topluluğumuzu ve sağlık-biyomedikal alanını dönemlik bir dergi çıkararak tanıtmaya karar verdik. ETÜ SBBT'nin 5. dönem Yönetim Kurulu Başkanı olarak böyle bir ilke imza atmaktan mutluluk duymaktayım. Siz değerli okurlarımıza iyi okumalar diler, bu vesile ile sizleri ETÜ SBBT ailesine davet etmek isterim.

Saygılarımla,

Selahattin KAHRİMAN
Sağlık ve Biyomedikal Bilimler Topluluğu
Yönetim Kurulu Başkanı



TOBB ETÜ

HEALTH AND BIOMEDICAL

TOBB UNIVERSITY OF ECONOMICS AND TECHNOLOGY

Union of Chambers and Commodity Exchanges of Turkey (TOBB) is the largest umbrella organization of the Turkish business world. Our university, which aims to produce original and universal information thus contributing to the society's development is a successful example of institutional and social responsibility perception. TOBB-ETU applies the university-industry cooperation with an original education model and leads the way in Turkey. Its goal in 2016 is to become a globally acknowledged, distinguished and competitive university in the fields of education, research and application as well as in Turkey. Educating individuals who are entrepreneurs, ready for life and candidates for governing Turkey are among our university's priorities. Our university will open new departments for achieving these goals and will take its place in the global world through establishing collaborations with leading universities, academic institutions and international institutions.

OUR GROUP

TOBB ETU Health and Biomedical Science Society (ETU SBBT) was established in TOBB University of Economics and Technology within the TOBB ETU Health and Sports Directorate in order to introduce biomedical sciences, follow the developments in the fields of medicine and other areas of health and share these developments with group members.

ORGANISATION STRUCTURE

TOBB ETU Health and Biomedical Sciences Society consists of three committees: the Board of Directors, the Board of Auditors and the Disciplinary Committee, the Sponsorship Committee, the Promotion and Human Resources Committee, the Training and Communication Committee and the Organizing Committee. The Board consists of four committees: Board of Directors, Board of Auditors and Disciplinary Board, 3 Committee and Sponsorship Committee, Publicity and Human Resources Committee, Training and Communication Committee and Organizing Committee.

SCIENCES SOCIETY

OUR MISSION

We support university events as much as we can and based on requests we receive from relevant authorities. We try to empower group members' team work spirit and find common solutions to potential problems. We aim to increase members' information on the sector and follow and share developments in biomedical Technologies through webpages, conferences, seminars and meetings. We aim to raise awareness in society regarding biomedical sciences. We contact similar groups of other universities and implement joint projects. We follow developments in medicine and health and inform our members. Our vision is to become a leading student group at the national and international level with its original and innovative structure and the benefits it provides to its members.

OUR VISION

To be a leading student society in the national and international area with its original and innovative structure and benefits to its members.

FROM OUR FOUNDER;

In our university, there was not any society working in the health care sector. For this reason, in 2013-2014 fall semester, we started efforts to establish a society by bringing together both the students of our department and students interested in the health care field. During this process, we set out to select a name for our society with our friends from the department of Biomedical Engineering and decided to name our society as "Health and Biomedical Sciences Society". After our society was established, we held our first general assembly and selected our Executive Board.

At the beginning, we were aware that the first years of our society would be quite difficult as the hardest thing is to put the first stone and build the first floors. Although we were still in our first year, we became one of the most active societies of our university thanks to the activities we organized. We hosted numerous valuable speakers, organized technical trips and solidified the team spirit through our social activities.

Even though I graduated and left the University, I could not drift away from SBBT. I am always trying to do my best to be supportive. Seeing your success makes me that much more happy since what gives a person the greatest happiness is seeing a work of which they laid the foundations continue. Finally, I would like to all of my teammates who contributed to our successful years and you for your good work.

İsmail Can GÖZEN

EVENTS AND ACTIVITIES

AWARENESS RAISING EVENTS

SOCIAL AWARENESS



NATIONAL AWARENESS



VOCATIONAL AWARENESS



TECHNICAL VISITS



FACTOR

Abdi İbrahim
Ertunç Özcan
Point Medikal
TMS
Üzümcü



HOSPITAL

Dünya Göz Hospital
Özel Koru Hospital
Ankara Güven Hospital
TOBB ETÜ Hospital
Gülhane Military Medical Academy
Memorial Hospital
Güven Health Campus



Breakfasts (SoFıstıq Lounge...)

Welcome Dinners (Bolu Mangal Keyfi...)

Nature Visits (Abant...)

Evening Entertainments (Sess...)

Dinners (Mangalköy...)

Motivation Dinners

SOCIAL ACTIVITIES



EU 7th supported under the Framework Program and the EU-South Korea cooperation and Turkey in the executive "Nanocellulose Reinforced Composites for Advanced Earthquake-proof Construction Technology (Inspection-CONST)" closing meeting of the project, enriching the content of "Eco-Bio-Nano-Materials Processing and Applications" by name Organized as a summer school with the support of the Society of Health and Biomedical Sciences.

INTERNATIONAL EVENTS



CONFERENCES

Philosophical Perspectives to Death

03.12.2013

Biomed

04.02.2014

Our Mind and Its Control

19.02.2014

Custom Made Implant and Prosthesis Production

07.05.2014

Functions and Responsibilities of Biomedical Engineers in Hospitals

2015

Scaffold Design And Fabrication for Interface Tissue Applications

2015

Hypnosis

11.02.2016

What Technology Brings to Classic Surgery/ Aesthetic Interventions

24.11.2016

Personal Innovation – Happiness, Health and Success

22.01.2018

Robotic Surgery

12.03.2019



FUTURE MEDICINE

FUTURE MEDICINE is a student-based boutique event organized every year by TOBB ETU Health and Biomedical Sciences Society within TOBB University of Economics and Technology. FUTURE MEDICINE, which started as a national one-day event with 5 speakers in 2014, has now become a big international organization with 3-day 25 speakers. The goal of FUTURE MEDICINE is to benefit from the experience of health care managers and individuals who have contributed to this field; at the same time, to be aware of future changes and innovations in the field of health.



FUTURE MEDICINE '2014

Future Medicine '14 Speaker List

Fuat YALÇIN / GE Healthcare PPP Project Manager
Mustafa Uçak / Okuman Medical Systems General Manager
Prof. Dr. Vasıf HASIRCI / Middle East Technical University lecturer
Dr. Lütfi TUNÇ / Gazi University Faculty of Medicine Department of Urology lecturer
Mehmet Ali ÇİFTÇİ / BAMA TEKNOLOJİ – Mechanical Engineer



FUTURE MEDICINE '2015

Future Medicine '15 Speaker List

Prof. Dr. Osman EROĞUL / TOBB ETU Head of Biomedical Engineering Department
Kuntay AKTAŞ / Btech Innovation General Manager
Jeremy GOOSSENS / Materialise Customer Director
Ali Sait SEPTİOĞLU / Turkish Medicines and Medical Devices Agency Deputy Director of Medical Devices and Cosmetic Products
Dr. Altuğ ERGİN / Medtronic Coronary & RDN Turkey and Central Asia officer
Assoc. Prof. Dr. Selçuk TUNALI / TOBB ETU School of Medicine lecturer
Esen TÜMER / Philips Healthcare Turkey General Manager
Assoc. Prof. Dr. Dilek ÇÖKELİLER / Başkent University lecturer
Tolga İPEK / ASELSAN UGES Sector Directorate, Director of Engineering
Assoc. Prof. Dr. Bahattin KOÇ / Sabancı University Faculty of Engineering and Nature Sciences lecturer
Şevket ON / Siemens Healthcare Turkey General Manager
Assoc. Prof. Dr. Sinan CANAN / Ankara Yıldırım Beyazıt University School of Medicine lecturer
Şahin EKŞİOĞLU / Popular Science Turkey Journal Chief Editor
Kozan DEMİRCAN / Popular Science Turkey Journal Science and Technology Editor
Prof. Dr. Mehmet MUTLU / TOBB ETU Biomedical Engineering lecturer
Assoc. Prof. Dr. Fatih BÜYÜKSERİN / TOBB ETU Biomedical Engineering lecturer
Asst. Prof. Dr. Cevat ERİŞKEN / TOBB ETU Biomedical Engineering lecturer
Prof. Dr. Mehmet ÖZSÖZ / Gediz University Head of Biomedical Engineering Department
Dr. Tuna YAVUZ / Abdi İbrahim Otsuka General Manager
Prof. Dr. Erbil OĞUZ / GATA METÜM Director
Dilşad NEVRUZ / Osimplant Foreign Trade and Marketing officer
Ertan HALAÇ / Koru Ankara Hospital Biomedical officer
Op. Dr. Feridun KUNAK / Channel 7 Dr. Feridun Kunak Show Ankara Hospital Biomedical officer

FUTURE MEDICINE '2016

This organization has been canceled for security reasons under the emergency-state.

Today's Problems, Tomorrow's Solutions!

FUTURE MEDICINE 2017

Future Medicine '17 Speaker List

Seda YEKELER / SEYEV Head of Board

Tuncay PAŞAOĞLU / representing Ministry of Health

Prof. Dr. Cüneyt GÖKSOY / Health Sciences University
Gülhane Medical School, Biophysics Department

Dr. Cenk TEZCAN / B-Wise Founding Partner and Ankara
Head of Board member of Futurists Association

Prof. Dr. Emin ÖZMERT / Europe Eye Grad School Turkey
Director and Ankara University School of Medicine Head of
Eye Diseases Department

Dr. Tarık ÖĞÜT / Asst. Prof. Dr. Erdem ÖĞÜT - Levent
KANDEMİR / FIGES A.Ş. Head of Board-Senior Project
Leader, Control Design and Automation Team Leader

Ersun NASIRLIOĞLU / GEOTEK Founder & Ostim Medikal
Clustering Board Member

Elvan ODABAŞI / FORMEO Deputy General Manager and
FITIZDIET Executive Dietician

Dr. Erol TEBEROĞLU / BTECH INNOVATION and EKMOB
Investor & ERIH VENTURES Executive Partner

Baran KALAYCI / 2013 Athletic Physics Champion & 2013
Athletic Physics World 5th

Merthan ÖZTÜRK / INOFAB and SPIROHOME Founder

Prof. Dr. İbrahim A. SARAÇOĞLU / Chief Consultant of the
President and SARAÇOĞLU Tur. and Çev. Tek. San. Tic. Inc.
Founder

Canan OKUTANOĞLU / LIMATEK SYSTEM General Manager
Yavuz S. SILAY M.D., M.B.A / ICG (İstanbul Consulting
Group) Inc. Head of Board & SoPE (Society of Physician
Entrepreneur) Turkey Director

Uğur BAYRAKTAR / BOZLU Holding PPP Operation Manager
Dilara Balkan TEZER / PFIZER Turkey Medical Director and
Innovative Products Medical Leader

Seyyal HACIBEKİROĞLU / SEY Consulting Founder

Çağrı ÜNAL / ANKARUNNING Founder & PASİNOKS End.
Ltd. Şti. General Manager

Fuat YALÇIN / PHILIPS Business Development Director

Dr. Nazife Selcan TÜRKER / TÜBİTAK ARDEB Chief Expert



FUTURE MEDICINE 2018

Future Medicine '18 Speaker List

Bülent ERGAN / CEO Group Chairman

Dr. İbrahim BEKAR / ASELSAN Vice President and UGES
Sector Head

Mete ŞAYLAN / BAYER Market Access Director

Professor Dr. Cüneyt GÖKSOY / Department of Biophysics,
University of Health Sciences
Head & Amp; Neuroscientist

Assoc. Dr. Ayhan OLCAY / Innovay RG Chairman of the Board

Onur KOÇAK / Samtotech Engineering Inc. General Manager

İpek YILDIRIM / 2017 WBFF Diva Fitness Pro World Champion
Barış Okan BELOVACIKLI / Founder of Bob GYM & Fitness
Coach

Atilla ERGÜVEN / ABBOTT CHAFER Turkey General Manager

Professor Dr. Alper ÇELİK / Head of Turkey Metabolic Surgery
Foundation

Gülçin TÜRKMEN SARIYILDIZ / Medicana International
Hospital General Manager

Professor Dr. Osman EROĞUL / TOBB ETU Head of Biomedical
Engineering
Department

Professor Dr. Tayfun AYBEK / President of TOBB ETU Medical
Faculty Cardiovascular Surgery Department

Fatma Gülşah DİZAR / Create the Craft Chairman

Professor Dr. Mehmet MUTLU / TOBB ETU Biomedical Engineering
Assistant Professor

Mustafa DAŞÇI / President of All Medical Device Manufacturers
Association & Editor-in-Chief

Surgeon Gökçen ERDOĞAN / 2012 Businesswoman of the Year
Awarded Gynecologist & Sexual Therapist

FUTURE MEDICINE
will take place on
September 2019 at
TOBB ETÜ!



Your ideas can change the world!

Having an entrepreneurial spirit is to have the capacity and the sense of willingness to develop, organize and manage business venture along with any of risk it might have in order to make a profit. With the advent of technology, entrepreneurial spirit is easily characterized by innovation to succeed in an ever changing and increasingly competitive global market place. Yes, if you are an entrepreneur who wants to start a business thanks to your innovative idea and product, following the global market place in its own language is a must. When I ask young entrepreneurs;

“What do you need for your idea or product?” They immediately reply me all with the same answer, “Investment”

When I get this same answer from almost all of the young entrepreneurs, I continue to ask them “What is the best investment for you? In this case, the first answer should be: THE BEST INVESTMENT IS THE ONE WHICH IS MADE FOR ONE’S HIMSELF. Therefore, at first, you should invest in your English language skills so as to be able to learn more about global business economy. You should explore business English through authentic reading and videos, while learning about vocabulary, concepts and issues. Unless you follow basics of market research, including how to identify an opportunity in the market of your product or idea, it is impossible to focus on your business plans, why these plans are important and what will give you a chance to practice composing a business plan, because the language of entrepreneurship is English and you have to follow this world in English. Don’t forget that your ideas can change the world, so when you start from scratch, you should define what it is in its own language.



It is an honor to share my ideas in this magazine’s first issue. I congratulate the society of HBS for their contributions to their university so far. Societies at Universities are of great significance so that students are able to transfer what they have learnt theoretically at the university into practice and to gain experience in the real scene of life. And the Society of HBS is one of the best examples of this. I hope the number of Societies which really generate ideas and business and universities which support these societies will increase.

SEDA YEKELER
FOUNDER OF SEYEV

A Message from the Academic Counsellor of ETU SBBT



PROF. DR. OSMAN EROĞUL

TOBB ETU Director of the Graduate School of Engineering and Science
TOBB ETU Head of Biomedical Engineering Department
TOBB ETU Health and Biomedical Sciences Group Academic Advisor

Dear Readers,

First of all, I would like to thank TOBB ETU Health and Biomedical Sciences Group and all those who contributed to the publication of this journal and congratulate all of them for their vision.

As you are aware biomedical engineering is an interdisciplinary field bringing together the expertise of engineering, physics, chemistry, materials science, biology and medicine science in order to develop diagnoses and treatments beneficial for human health and to facilitate the understanding of diseases. Biomedical engineers on the other hand, use their knowledge on health sciences, the principles of science and engineering sciences to solve the problems of living organisms and serve as the new members of the health sector's outreach team.

With its distinguished scientists who are qualified to keep pace with the vision of this interdisciplinary field, the academic staff of TOBB ETU Biomedical Engineering, provide the philosophy of biomedical engineering to students. Prof. Dr. Mehmet Mutlu who is globally acknowledged as an authority on plasma technology, works in the fields of biosensors, nanobiosensors, plasma technologies, electro spinning and medical textile; associate professor Dr. Fatih Büyükserin who was deemed worthy of the Turkish Academy of Sciences' 2016 Outstanding Young Scientist Award works in the fields of colloidal particles, membranes and pattern replication, nanomedicine and silica-based nanoplatfoms; assistant professor Dr. Ersin Emre Ören who was deemed worthy of the Turkish Academy of Sciences' 2012 Outstanding Young Scientist Award works in the fields of nanotechnology, nanobiotechnology, biosimilarity, bioinformatics, theoretical and computational materials sciences; associate professor Dr. Birsen Can Demirdöğen who was deemed worthy of the 2008 Balkan Award works in the fields of biomarkers, pharmacogenetics, genetic polymorphism, personalized medicine,

multiple sclerosis, pseudoexfoliation syndrome, disease-genetics relations in humans and genetic polymorphisms; and myself conduct works in the fields of biomedical signal and image processing, medical implant production and design, processing of sound signals, medical imaging systems, sleep studies and artificial neural networks and we all strive to bring a global added value to our counterpart candidates.

Through its contractual companies and overseas connections, TOBB ETU Biomedical Engineering provides students with the opportunity of pursuing their joint education in multidisciplinary fields. For example, Elif Candaş and Hamdi Tuna Yener who are continuing their joint education at the Columbia University Medical Center in New York, USA; Gizem Gökçe and Mervenaz Şahin who went to the University of Washington in Seattle, USA; Zeynep Mutlu who is at the University of Akron in Ohio, USA for her joint education or Zeren Su Yıldız who received an acceptance for joint education at the University of Leeds in Leeds, UK as well as many of our other engineer candidates or our other students who are pursuing their joint education in world's leading companies such as GE, Siemens, Philips, Baxter, Johnson&Johnson and Medtronic, get the chance of analysing events in a global perspective. I strongly advise you to take a look at Osman Hamdi Tuna's interview in the following pages of this journal.

Finally, I am pleased to reap the fruits of my years' worth studies in biomedical engineering by witnessing such delightful developments and wish the continuation of even better developments. I hope that you grasp the signs of the growth of this field and serve humankind in the light of science.

As the Director of the TOBB University of Economics and Technology Graduate School of Engineering and Science, Head of Department of Biomedical Engineering and TOBB ETU Health and Biomedical Sciences Group academic advisor I salute you all with love.

COOPERATIVE EDUCATION ABROAD

What are your views about our society, what do you think about its position?

First, I would like to thank my professors who devoted their time and did their best to contribute to the Health and Biomedical Sciences Society (SBBT) during its establishment process and you for giving me the opportunity to make this interview. Since SBBT was established in 2013, the number and variety of its activities have increased. I think that especially the technical trips and hosting biomedical engineers working in the sector have a guiding effect on students. Although it is a relatively newly established society, I see that there is a positively ambitious team that is extremely organized and working continuously for their objectives. I have had the opportunity to experience this one more time during this interview. I hope that SBBT will gain a more important position in time throughout the country especially with the influence of Future Medicine.

What are the differences between graduating from the department of engineering of our university and graduating from other universities?

Although our university is newer compared to established universities, it has obtained an important place in the field of engineering by making continuous and rapid progress thanks to its three-semester policy and academic staff. It has managed to enter the lists of the Department of Human Resources of companies that only recruit people from major universities and according to certain criteria. Another difference is that the students of our university graduate with almost one-year work experience. In this way, grad students apply for a job being aware of the area in which they want to work and being confident thanks to their work experience.

Can you tell us about cooperative education abroad, including the application, acceptance and preparation process as well as departure, procedures, life, learning outcomes and return?

Generally, when you agree with the school where you want to do your internship and with the instructor on a 14-week internship program, the rest is only formal paperwork. For example, for the US, you need to go through security clearances and medical exams, obtain a student visa (J1) and complete paperwork such as filling out and other university's documents and these can

take a longer time than expected. I would like to thank once again Asst. Prof. Ersin Emre Ören for his help during this process. He was especially supportive in the communication with the other side and always followed the progress. When we started our internship at Columbia University, our professors, supervisor and our assistant friends working part-time in the laboratory helped us as much as they could both in academic and social issues. From the first day, I did not have any difficulty fitting in. In the tissue engineering laboratory, I learned how to produce not only cell culture but also tissue scaffold through bio printing. As for the material dimension of the issue, which is the object of curiosity, since the university I attended was private, I had to pay a semester tuition fee. However, as a result of mutual talks, my professor at Columbia University (Chang Hun Lee) took on a significant portion of these expenses. My flight expenses were covered by my university and as I was a full scholarship student, I obtained housing assistance provided in out-of-town internships. I will answer the questions of our friends regarding this matter in as much detail as possible.

How did the cooperative education abroad benefit you mentally?

Alongside the academic benefits, the most important benefit of cooperative education abroad was its contributions both in mental and social sense. I believe that I have broadened my horizons and changed my mentality by living in a different city and country together with people being raised in different cultures.

What are the breakthroughs made through the works conducted abroad in the field of Biomedical Engineering, how are they different from our works?

In Turkey, biomedical education was provided for many years as a two-year program only within the scope of technician education and when the Department of Biomedical Engineering was opened, several universities only focused on its electronic dimension. Our university is trying to change this perception with its curriculum, professors competent in different fields and comprehensive laboratories. However, important tasks fall on our society as the highest-ranking department of Turkey, our professors, students and especially graduates in order to carry Biomedical Engineering to a higher place and increase its recognition.

Hamdi Tuna YENER



aselsan

aselsan

“Proven Technology”

FIRST TRANSGENIC



Prof. Dr. Serhat ALKAN
Istanbul University
Faculty of Veterinary Department of Clinical Sciences
Fertilization and Artificial Insemination Department

It is known by many people that you are a well-regarded name in the field of veterinary medicine in Turkey. However we should not overlook some of your studies not known by a majority of people such as artificial insemination, breeding and reproduction. Could you tell us a little about yourself and the studies of your field of expertise?

I am a lecturer at the Istanbul University Faculty of Veterinary Medicine Department of Reproduction and Artificial Insemination. The Turkish word for reproduction is "dölerme". This is where the name of our department comes from. Simply put, our work area is the reproduction of animals. However, unlike natural reproduction, we expect more than normal reproduction in animals. Our area of work is a field that puts in efforts to gain the maximum benefit from the males and females with superior features. Our department includes artificial insemination, embryo transfer practices, gene transfers and cloning techniques. We diagnose and treat problems pertaining to livestock reproduction and ensure the reproduction of animals that we want in the quantities and features that we want.

Do you encounter serious problems during these studies?

We face a lot of challenges specifically in livestock because livestock animals are away from their natural environments and live in sheds no matter how modern these sheds are. I can provide an example from cows. Normally the milk produced by an animal is only enough for its calf; therefore this amount is not enough for us. We treat cows so that we can obtain at least 35-40 kilos of milk from them. Therefore animals that are treated for milk production have problems becoming pregnant. The major challenge we face in livestock is the diagnosis and treatment of these animals for their reproductive problems.

As you know a majority of the Turkish population are Muslims and the Eid-al-adha is an important feast for Muslims. Since Muslims need to make a sacrifice during these feasts, there is a high demand for bovine animals and our country meets this demand by importing bovine animals. Do you think this is due to the inadequacies of the animals in Turkey to reproduce? What do you think is the reason for the increased imports of animals lately?

That is not quite correct. The countries from which we import animals face similar challenges in breeding. Our challenge is more to do with our country's natural structure. In fact, Turkey is poor in terms of pastures, our natural grasslands are not sufficient. However, a profitable livestock breeding can be achieved if our livestock graze in natural grasslands. Normally, countries who breed cattle, specifically America, England and France care for their animals in natural grasslands and ensure that these animals feed from nature thus making the production cheaper. Because we are a poor country in terms of grasslands, we feed the animals we will use for meat production; therefore meat production is expensive for us. This is why we need to import animals. In fact, Turkey also faces a challenge in animal improvement, we don't have a lot of races for meat production. This combined with challenges of feed and grasslands, leaves us no other choice but to import.

While we're on the subject, "Cemre" who is the first clone calf born from "Efe", a cloned gray bull and "Ecem", a cloned cow and which gained wide coverage in the media in the years 2009 and 2010 with their births came to existence through you and your team's works. Cloning works had already been conducted previously. Really, the question people are most curious about is why we need cloning. Why do we do cloning?

The first cloned calf is "Efe". "Cemre" is born from a cloned mother and father. This is how cloning works: in a normal birth, 50% of the genetic structure the calf acquires comes from the mother and the other 50% from the father. In other words, in genetic improvement, when we use natural reproduction conditions i.e. sexual reproduction, we can only work with 50%. Moreover, since the genetic distribution is not mathematically calculated, we may not even get 50%. Through genetic improvement, you can interfere with one side's genes but with cloning you can make a 100% copy of the individual whose genes you are using; therefore it is not like sexual reproduction. This gives you the opportunity to clone an individual whose genetic structure you are using and make a copy ensuring that the same is born. Therefore, a faster progress can be made through cloning compared to animal improvement. We are well aware of insulin which is a protein used by people with diabetes. We can show the production of animals, which can produce insulin along with their milk as an example of cloning and gene transfer techniques. The importance of cloning for us is much different. The animals we import from other countries also need time to adapt to our country's conditions. In other words, the duration required to adapt to the diseases in our country, the

STUDIES IN TURKEY

geographical conditions, feed and climatic conditions is always a challenge. The gray race that you just mentioned is well adapted to our nutritional style, our geography and climatic conditions, they are resilient against our diseases and genetically transfer these qualities. Therefore we want to protect this gene and try cloning with these races. The name of the project in which we realized these cloning is "protecting Turkey's local gen sources".

How was "Cemre"s, the first and only calf born of cloned parents, process executed?

Cemre came to this World as part of a scientific study. First, we had a male clone 'efe', then we had female twin clones 'ece'and 'ecem'. All three grew up in our department and raised the question how would their baby be. Because there are always different ideas about these clones, everyone is commenting differently and there were ideas that the calf of the clones would be born at the same age of the individual we are cloning. We did this project to find out the answers to these questions.

And what is Cemre's current condition?

Currently she is in Namik Kemal University Faculty of Veterinary Medicine living healthily under the supervision of our faculty's vet Prof. Dr. Sezen Arat.

What kind of tools did you need for your studies, what did you use. What were the effects of the equipment you couldn't use in the project if any?

The artificial insemination and gene transfer laboratory in Istanbul University is one of the best laboratories in Turkey. We have a very advanced and good embryo and gene transfer laboratory, and very skilled, successful professors and very successful embryo and gene transfer teams that these professors have brought together. All our projects were implemented in this advanced laboratory with these successful professors and teams. All our projects succeeded thanks to the abundance of our means. Of course every study has different requirements. Various chemicals and different species of animals are needed therefore project needs have to be planned separately, needs have to be listed and the listed needs have to be acquired meticulously before projects start. For this, our university has support funds. We have the Scientific and Technological Research Council of Turkey (TUBITAK) and projects are being implemented through its support; therefore it would not be correct for me to say a specific need for our studies.

Usually they say problems arise regarding the ethics of embryonic studies. Have you encountered such a problem?

We don't face such a problem because we usually use materials taken from slaughter houses. This problem is

faced more in studies pertaining to humans. The ethics departments at universities do not permit behaviours that are cruel and painful for animals. Because we use the ovaries, organs and specific tissue samples of animals that have been cut in slaughter houses for our embryo studies, we don't face problems pertaining to ethics. However, following all these gene and embryo studies, we hear whispers and concerns among the public on whether humans are next, or this and that person will be cloned next. Of course all our studies are for humans but I don't think that it will cause any problems as long as we don't hurt and living and we conduct our works within ethical rules and under control.

While we are at it, globally there are many ideas regarding the roles of biomedical engineers. As an academic who closely uses medical equipment are there any equipment, methods or materials you wish your biomedical engineers to use, and if so what are they?

Let me tell you some events that I witnessed first-hand. The use of an ultrasound in veterinary medicine is much later compared to human medicine. As a person who frequently works with ultrasound I can say that at first our ultrasound use caused a lot of anxieties. It was an equipment which needed at least two people to only carry it. As you know, we work in sheds. While two people carried the ultrasound for a cow, they would have to carry it again for the next cow. Today however, the ultrasound that I also use is only 300 grams, you put it on your hand and you wear the screen like a hat. The screen stands in front of your eyes and your hands are free. Having free hands is great for working comfortably. This is an invention pertaining completely to biomedical engineering. It is a progress in which a certain vocational group observed the need and made it happen with other vocational fields. We can work so comfortably and I can examine approximately 150 cows a day with the ultrasound I mentioned. I believe that different occupational groups can invent such things by working together, thinking what do we need and how can we do it so that we facilitate the health sector or how can we develop current equipment, how can we do something more beneficial. Let me give another example. Currently we have a sperm freezing machine. Previously we would add liquid nitrogen to freeze sperm. We would ensure that sperm was frozen. Our current equipment is fully automatic, in other words they have been developed according to needs. Now we add the sperm to the machine, it automatically adds the liquid nitrogen, automatically adjusts freezing settings and works connected to a computer software. But these are all equipment that have been developed abroad. My advice to you in medicine is, and I include veterinary medicine as well, is to work in these fields while observing. I would like to tell something simple. We went to the faculty of veterinary medicine in Sweden with our faculty's dean. They have an excellent working faculty. We went to the department of oncology where we joined a seminar and this is what they told us at the seminar: chemotropic medicine used in cancer treatment, also harm healthy people. For example it also harms the nurses and doctors applying the medicine to the patient. Therefore our biomedical engineers developed practical devices so that nurses and doctors do not





directly come into contact with these medications. You insert chemotropic medication to very different and special plastics and close it. You do not come into contact with it again. You insert the injection from the outside and they demonstrated us how the medication gradually contacts the patient. They were proud of this and they had said that this has been developed by Swedish biomedical engineers and that they use it proudly. As I've said, these are works that came to life based on observations and needs.

Swedish scientists have shown you some of the equipment they have produced. In Turkey there is also a goal of becoming national and is on its way towards this goal especially in the medical field. What do you think Turkey's current status is? Do we have a problem of becoming national? For example there was a project on domestic vaccination but this project was halted. How do you evaluate the current situation?

I don't think the project on domestic vaccinations was halted. In the veterinary field we have a fully domestic company called ege vet. I just had a meeting with their officials this week. Our friend told me that they produce many of the vaccinations we use. As far as I know the import of some of the vaccinations were stopped due to a system called Gmp and this is something to do with the Government. But as far as becoming national goes, there is no reason for why there can't be any production in Turkey. I have full confidence in all science environments in Turkey and our scientists as well. I was a student in 1984 and an assistant in 1989 and when I compare the students of my time with our current students, I can say that I fully trust them as well. I believe that there is nothing we cannot do in Turkey. As I said, I am a person who have personally witnessed the evolution of the ultrasound in veterinary medicine. The same goes for injections. When I first became a veterinarian, our syringes were made of glass, we would take out the needle, boil it and then use it. The use of plastic injections and disposable injections is serious progress and there is no reason whatsoever for why these cannot be realized in Turkey. We can easily succeed in such progress.

We have many scientists whose names are mentioned with respect in the world. In an environment where everything is developing what would you like to say to young people who are the light of the future?

I can say based on my own students that I fully trust youth and I am a university lecturer who is very hopeful of our young people. As a country we are really proud of Aziz SANCAR and I believe that our country will have many Aziz SANCARs. I only ask our young people of this. Compared to the past, we always had a complex and thought western countries can do it but we cannot. This has definitely decreased in today's youth. They should never think like this. They should know that we have nothing less than anyone and that we can put forward opportunities by working.



COMMERCE AND MEDICAL ENVIRONMENT IN TURKEY



Osman Nurettin GÜRGÜR
The President of the ATO
Assembly*

*He has left office with
the April 19, 2018 ATO
Parliamentary Elections.

You have been undertaking your duty in capacity as the President of Ankara Chamber of Commerce (ATO) for about 20 years. Ankara Chamber of Commerce supports tradesmen of Ankara in different ways, functions as a leading mechanism for Turkey's commerce of some sort, ensures that members progress conforming to their professions and has over 125 thousand employees trying to come up with solutions to problems. To what do you owe having and keeping this position for so long? What is the secret behind your success?

The election of bodies carried out within ATO is maybe the most democratic election among all other elections run in Turkey. These elections are conducted in two stages. To begin with, ATO profession committees run elections within their own structures and determine assembly members. Afterwards, these elected members elect the president of the assembly. We can say that ATO constitutes an example of the ongoing parliamentary regime in Turkey. This is why each election period is challenging and requires intense efforts. I became the president of the assembly in the year of 2000 and witnessed 3 election periods. I have been undertaking this position since then with the support of our members. I also served as the Chairman of Turkish Hearths until 2016 and handed my position over to another colleague in 2012. During my service as the president of assembly, I was also the Chairman of Turkish Hearths. This way, thanks to my position, I was able to take part in activities carried out within the latter. The Assembly of Ankara Chamber of Commerce is a colorful community where almost all thoughts, beliefs and opinions are represented. During our presidency, we tried to hold all these different colors in harmony and maintain the same difference towards all of them. Through this, we managed to establish good relations with our assembly members during each term

Have you ever been exposed to criticism as the Chairman of Turkish Hearths on the ground that you are closer to a certain segment despite having adopted an embracing attitude towards all fractions?

No, I have never been criticized since I have separated my duties as the Chairman of Turkish Hearths and President of the Assembly of ATO. These were two different things. Therefore, nobody had any complaints.

Could you tell us about the progress that ATO has made since you became the President of the Assembly? What kind of future expectations and objectives do you have for ATO?

ATO is not only a professional non-governmental organization but also one of the vital organizations required for a democratic governing. ATO constitutes one of the most significant baselines for Turkey's democratic appearance. We primarily try to use this place as a tool to discuss professional matters with bureaucrats and government officials and to seek solutions to them. Furthermore, we also try to use ATO's institutional nature for the sake of our members. From time to time, when it comes to legal regulations or potential changes, we strive to establish contacts within the boundaries of our capacity in order to reflect our opinions. Moreover, we try to make public declarations regarding Turkey's fundamental issues, particularly in the field of economy, thereby aiming to reflect the opinion of the circle we are representing. Each term, Ministers participate in ATO assembly meetings and share their opinions on the related issue. Thereafter, our members ask questions and convey their wishes. In this respect, our assembly functions as a beneficial media that enables the government to learn about the opinions of the grass roots. We try to be useful to our members through providing them with professional courses and organizing various activities.

Do you find the courses or activities offered by ATO for professional groups to be satisfactory? What else can be done?

Turkey needs to conduct certain organized actions to pave the way for a developing economy. That being said, Turkey needs to go beyond the efforts undertaken by ATO, which is solely a professional institution. The state/government not only needs to adopt a visionary understanding and to follow a prospective strategy for fundamental industrial matters, but also to take part in institutions such as ATO, not begrudging its support. Turkey's economy will gain vitality to the extent of Turkey's compliance with this balance. The most essential need of our economy is to produce value-added products and to ensure their export. Our production in the field of technology meets five percent of Turkey's need. In fact, Korea's export rate is five times higher than that of Turkey. This situation reflects itself on Turkey's economy as a current account deficit. In

order to prevent this from happening, Turkey needs to engage in the Fourth Industrial Revolution (4IR), make a breakthrough and undertake a structural transformation enabling the manufacture of technological added-value products. In this respect, we try to help and do our part and on this matter. For instance, in the last couple of weeks, a symposium on the purchasing and sales power of our domestic production was held at TOBB ETU. Symposium also supported by the Ministry of Industry and received feedbacks stating that this symposium was highly beneficial.

It is a reality in Turkey that large businesses, such as Siemens, are still principally preferred over domestic producers in the field of health. Do you have any criticizing comments for the state's attitude regarding this issue?

Through meetings conducted on this issue we have realized that they intend to increase the number of domestic producers. However, we cannot see any production-oriented actions in the field of health. As such, there are major shortcomings. A process of development and a certain strategy are in question in the pharmaceutical industry. However, other fields of industry should not be ignored since the field of health does not only consist of the pharmaceutical industry.

One of the organizations that come first to mind is undoubtedly the Scientific and Technological Research Council of Turkey (TÜBİTAK) when it comes to science in Turkey. As a person who served for the Science Board of TÜBİTAK between 2003-2011, could you tell us about the beginning, development and commercialization of the output of the activities carried out during this period? How would you evaluate the current reflections of this case?

Prof. Dr. Nükhet Yetiş was serving as the president of TÜBİTAK during the time when I was working there. Nükhet Yetiş implemented successful strategies at TÜBİTAK. She always stood behind the support deserving projects. This was her regular approach. We witnessed how beneficial these incentives were. She also united science and industry. TÜBİTAK tried its best to ensure that Research & Development is applied on behalf of private entrepreneurs and industrialists. Even though TÜBİTAK contacted a wide range of relevant industrial segments/sectors in regard to this issue, the overall performance failed to reach a sufficient level for Turkey.



It is obvious that 65% of the youth want to become an entrepreneur. Depending on this, everyone tries to create a product. However, unfortunately, these products are sometimes useless prototypes. TÜBİTAK constantly supports/creates and funds projects. As a consequence, problems arise at the stage of transforming these prototypes into projects and realizing their commercialization. Thus, these prototypes remain as projects. What kind of initiatives may TÜBİTAK and ATO undertake for the commercialization of these prototypes?

TÜBİTAK and ATO alone will not be sufficient. All segments of the society interested in these issues must work in harmony with the political circle. For instance, there is a group of industrialists and private businesses that have become aware of the importance of Research & Development. These are progressing towards allocating a greater share to this field and it is definitely not sufficient. We have to tell this to workers of the private sector and ensure that this initiative turns into a mobilization. If they want to earn more and be more successful, they should give the necessary importance to work with scientific methods, thus to Research & Development. At this stage, private small and medium sized enterprises (SMEs) should step in and provide even greater assistance to those conducting Research & Development studies.

After the launch of the Health Transformation Program, the current Turkish health system has yet again been taken to a new level with the foundation of City Hospitals, which we have been considering as a necessity. What do you think the next step should be?

Health is one of the most significant aspects of the society. Thereby, it is of paramount importance that the society is provided with a functional health system. Since the development of such a system requires a great amount of spending, this sector calls for a good strategy. To illustrate, I do not think that the City

Hospitals is a well thought out project. I have certain doubts as to what extent a hospital with a bed capacity of 3500 can be of service to the public. As health care workers also expressed, developed countries are currently trying to reduce hospital capacity and to improve the quality of doctor-patient relationship. Therefore, they only allow hospitals with a bed capacity of maximum 600 beds. A big hospital does not equal to good quality service and I am in the opinion that these big hospitals will bring about certain problems. Instead of building two big hospitals, it would be more beneficial for the people of Ankara if we build technologically advanced hospitals with a bed capacity of 500-600 in various locations. Otherwise, I think that doctors might even run late to operating rooms in case of an emergency which could be dangerous for patients. Moreover, traffic regulations have recently been initiated around the hospital, yet still it is extremely difficult to put an end to the busy traffic in that area, considering the intense circulation of patients and relatives. We may proudly think that this project is not a burden on Turkey. However, it should not be forgotten that this project obliges Turkey to pay debts for 30 years to the firm that was in charge of building the hospital and this will in return pose a great challenge for Turkey's economy over the following years.

Whether it is local vaccines or equipment, Turkey puts in immense efforts to reflect its nationalization policy adopted in the defense industry on the health sector, trying at the same time to further develop this policy. If we were to come up with such a term, what would be the steps of a local evolution in the health sector?

Since I am not in the pharmaceutical industry, I can comment on this matter as an objective third party. Global competitiveness in the pharmaceutical industry is very high and patents of drugs are held by certain firms. In order for us to enter this kind of market, we need to be able to manufacture drugs with the same quality that will have the same effect. This is, of course, something that the experts can do, not us. Therefore, our intentions lie in the localization of the pharmaceutical industry.

What steps can be taken on the insufficient support for localization policy?

Admittedly, there is so much money circulating in this business. There is a great potential income which needs to be protected from some commissioners who have the aim to plunder it. They can get very high amounts of commission when they import drugs from abroad and sell them in Turkey, instead of selling the drugs manufactured in Turkey. For that reason, people in charge have to be very strict from the beginning and not give rise to unwanted situations such as this one.



85% of the demand in the domestic market is met by import in Turkey that ranks first globally among 20 countries in the medical equipment market. Medical equipment, which comes to the forefront as a sector that has the capacity to lower import rates in the manufacturing industry, has a significant potential. In this regard, the objective is to meet 20% of the demand through local production as of 2018, as part of the new transition plan. Do you think that this number can be achieved by the end of this year and turn the import-export balance of the health sector in our favor in the long term?

This is a matter that requires great efforts; ergo, intention alone is not enough. We need a vast number of qualified employees. If there is a scarcity of qualified employees, authorities' demand to produce without any help cannot be satisfied since claiming to engage in local manufacturing and then compromising on quality would affect patients negatively. Thus, we need qualified people who are successful in this area. This brings us to the need for a quality education. It goes without saying that this is the most important issue in today's Turkey. Doctors become fully qualified after completing their master's degree. If you do not provide a good quality education, then you cannot get a qualified doctor. This applies to all areas. For instance, the biggest problem of an industrialist nowadays is finding a craftsman who is an adept at his profession. This is because vocational schools have been neglected. Still, an entrepreneur who is trying to get into manufacturing in the health sector has to be able to find a good craftsman. As such emerges the need of well-trained employees who studied at vocational schools or completed their bachelor's degree.

Turkish universities cannot enter world rankings. With that being said, what do you think about having qualified universities that provide quality education rather than just having a large number of universities?

Education has been a major problem in Turkey for a long time now. Just think of an education mindset that lacks a settled exam system and changes with every new minister. People get confused and unfortunately, we are not able to evaluate the qualities of our people. Moreover, the fact that there are universities in every province is extremely wrong in an academic sense. Does this contribute to the economy? Yes, but economy is a whole different issue than academic education. We need more scientists in Turkey; however, we do not have a serious education system favorable to raise scientists. What is even more upsetting is that qualified people in Turkey are migrating abroad. Turkey is unfortunately losing its qualified people to other countries. If we could have provided them with better opportunities, they would have, of course, stayed in their own country. We have an example such as Prof. Dr. Aziz Sancar. If Aziz Sancar had stayed in Turkey, he would have retired as just a regular scientist since the opportunities offered abroad could not have been offered in Turkey. He went abroad and was provided with broad opportunities, thereby managing to embrace such a huge success. Consequently, Turkey's plans for the year 2023 will just remain dreams unless some serious radical reforms are put into practice.



We have so many scientists who are respected all over the world. What would you like to say to the light of our future, the youth in an environment such as this where everything is advancing so fast?

You should attach great importance to obtaining your bachelor's degree and strive at being qualified people, not at just passing classes. As the knowledge you gain there is directly related to your professions, being successful in university means having a bright future. Once you have success, I suggest that you be bold and enterprising. In this sense, you can consider yourselves lucky to be a part of TOBB ETÜ, because it provides a vast amount of support for its alumni, since it has very close relations with private sectors. Whether you work in the private sector or start your own business, there is no limit to education and science, which is why I suggest that you try to do a master's degree. You already can speak a foreign language, but that is not enough. You also need to advance your language skills. Medical technology is a very promising area in Turkey's future.

Our scientists tend to get their paychecks and not strive for more. Don't they get some of the blame?

People here prefer to just give lectures and consider writing articles as an inconvenience after they obtain their associate professorship degree. In developed countries such as the US, performances of academicians are inspected regularly. A university does not hold the responsibility to keep a faculty member who has not written a sufficient number of articles or carried out a sufficient number of scientific studies. In Turkey, however, the title 'professor' is enough to make a living for the rest of the person's life. Recently, initiatives were launched in order to facilitate reaching the title "associate professor". This is completely wrong since it is not possible to become a scientist without speaking a foreign language, especially English which is now basically the international language. By making concessions on level of English just to have more "associate professors", we are wholly impairing the quality. This demonstrates that what we are doing is completely the opposite of the necessary reform initiatives. This is no way to improve and advance.

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ROBOTIC SURGERY



Prof. Dr. Remzi Sağlam
Cerrahpaşa Medical Academy
Gülhane Military Medical Academy
London Institute
Medicana International Ankara Hospital (still)

We have read in your research that the prostate surgery performed by HOLEP method is the definitive solution for hemorrhage and prostate. Apart from this data about this method, we would like to touch upon a few issues we are curious about. What are the advantages of surgery for patients who have undergone HOLEP method during and after surgery compared to other prostate surgeries? Is there any possibility of recurrence of postoperative prostate disease by this method?

A very good question. The basis of the HOLEP method is the complete removal of later-growing tissue around the urinary tract. In fact, all methods objectives are the same. However, in the methods called TURN and Greenlight, this tissue cannot be removed completely, and the tissue remains. Therefore, patients who have been operated have been complaining again in the following years and they can come to us and re-operate. The biggest advantage of HOLEP is that there is no tissue left. If we compare the prostate to orange in HOLEP surgery, the prostate has a crust and an interior. The target of the operation is to leave the crust in place and remove the remaining part. Hence, HOLEP surgery is primarily to enter between the crust and the inside of the laser to surround it and push it into the urinary bladder. Therefore, patients under the HOLEP operation are very comfortable to urinate and the disease repetition is almost non-existent.

Well, patients think every surgery has its own risks and challenges. In your opinion, are there any risks in the operations you perform with HOLEP method and other robotic devices? What are the challenges for you?

Both HOLEP surgery and robotic flexible ureteroscopy work in extremely safe conditions. There is no risk situation. Patients were also very satisfied with the results. An indication of a good operation is that the patients we operate will start sending us and other patients and I am very happy with the doing job. Likewise, robotic flexible ureteroscopy in the event we are talking about the doctor is sitting tirelessly at the table is trying to treat the stone patiently, in this case, success is much better.

Can there be any damage to the vessels when using the ureteroscopy device?

One of the most comfortable and reliable devices used. However, we may confront a problem such as the narrow channel. In such a case, the patient with the required medication 15 days before the procedure is brought to the appropriate width. So far this has not been the case. But if there is a wrong intervention, there is a high probability of damage to the tissue. I would like to point out that, as well as multi-use devices, single-use ureteroscopy devices are now widely used and developed. For example, while there was only a 4-hour ureteroscope device, the Chinese developed it for 8 hours.

Robotic surgery widespread use today in Turkey. However, we are discussing how much budget we have allocated to R & D in this regard. In your opinion, how should we proceed with the development of robotic surgery and transition to domestic production in our country? What are our responsibilities?

Yes, we should not think only Ibn-i Sina and Da-Vinci robots. There are humanoid robots and robots used in the industry. If you've designed a robot to be used in the industry and you've told the institutions that will support you that it will be useful, they can allocate a budget to you. In recent years, project supports have intensified. After the preparation of the files sent to TUBITAK, KOSGEB, etc. This and similar institutions also provide support to a certain extent in the way the project works, its purpose and needs. The support rate may vary, but most of the time these institutions support to projects. But of course, problems can arise against people in this regard. We're constantly on television in Turkey, some people are not accepted but when they have gone to America, they will be very successful with their projects. This is a challenge. Instead of crying he was not accepted in Turkey, to prepare projects would appreciate everyone's style will appeal to everyone, of course, is better. For example, the Germans know very well about electromagnetic and electrohydraulic. For the most part, they were preferred; however, domestic production is now becoming more preferred, I think we are starting to compete.

AND UROLOGY IN TURKEY

We wonder how you get help and help you create your team while you work. How can biomedical engineers be effective during these studies and surgeries? In which areas can they play an active role in your work?

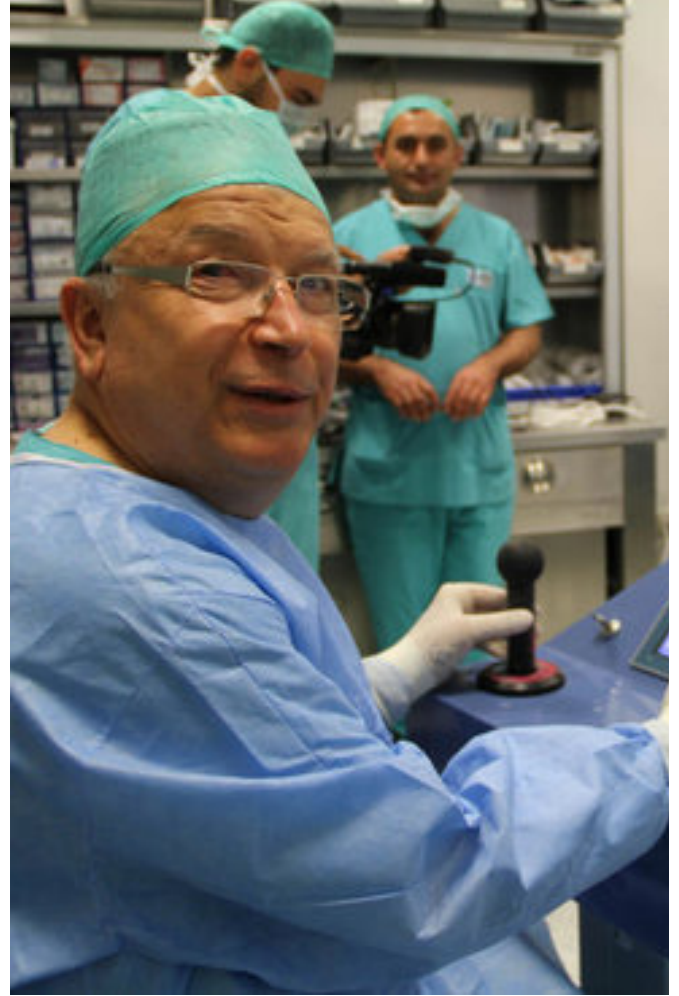
There is a culture of sharing; and one step forward: one in the wrong way, the other in the beginning. Keep in mind that collaboration and honesty are very important concepts that are always to advance the work that is created. Our work has a project preparation phase. The preparation of this project is done by our electrical engineers, but the person who manages this project can tell the biomedical engineer to prepare this part. All these things have quality control. CE certificate ISO Certificate FDA Certificate and quality control need to be carried out at the factory and biomedical engineers can play a very important role in this quality control part. After graduation, biomedical engineers will have a master's and a doctorate degree in a certain field and will look for work according to their experience and interests like doctors leave the branches after graduation, Companies will also seek quality biomedical engineers.

What is the role of biomedical engineering in patent procurement?

In line with the needs and requirements of the company in research and production, electrical electronics, industry and biomedical engineers can be included in the studies. The more you support the mass of biomedical engineers, the more you will be able to progress. "I support the idea that high value-added products must produce our own devices!" Our target is in this direction.

When we look at the professional organizations and organizations we see many rooms and associations. What kind of changes in your career led to your presence in these organizations? Would you recommend to us about our presence in these organizations?

Of course, I would recommend. Most of the associations I am a member of our medical associations (TURKISH UROLOGY ASSOCIATION) There is an existing biomedical engineering association for you. These associations hold various meetings. And as a member, you become aware of the meetings and have a specific position. Another advantage is that you can easily access the publications of international associations. Also, be aware that you can contribute to these publications when you reach a sufficient level. Associations are constantly coming to you on announcements about meetings and concluded scientific studies. You also have a community of journal in the future you will see the benefits of this too much.



You answered our questions with sincerity. We have gained valuable information about our field and entrepreneurship. Thank you very much for your time.

I'm so glad it's useful. I thank you.

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SELECTED ESSAYS

Re-Engineered Organisms

Starman on a journey to Mars, Space Oddity in the background... Not to mention Elevate will be in the sky... Science is progressing... Almost everyone has heard of artificial intelligence. Well, is there anyone who has heard what CRISPR is or is there anyone who has knowledge about "re-engineered organisms"?

We will lose our jobs because of artificial intelligence!

Amazon, Siemens, General Electric and many other companies have announced that they will lay off hundreds, even thousands of employees. Is artificial intelligence the reason for this?

Do not think that artificial intelligence is behind everything. It is not true that artificial intelligence will destroy manpower. Sebastian Thurn, one of the founders of the Google X Lab, where Google conducts secret works for high-level projects, stated that there is no need to worry about artificial intelligence destroying manpower and that "super human workers" can emerge with the help of artificial intelligence. Do you still think that manpower will be destroyed?

What we should really think about is CRISPR (Clustered Regularly Interspaced Palindromic Repeats). In other words, the most ground-breaking gene editing technology in biology since PCR (Polymerase Chain Reaction).

According to Juan Enriquez, who is the founding director of Harvard Business School Life Science Project and also a futurist, thanks to the biotechnological methods allowing for making certain changes on the DNA, it will be possible in the future to redesign our brains, bodies and even organisms.

What is it? It is "re-engineered organisms". Do you still think that manpower will be destroyed?

Imagine that you are able to play with your memories or live in an environment that is not suitable for you... They talk about recoding ourselves. Of course, after all these changes, will we still be ourselves? That is another issue...

We should certainly ask this to Michio Kaku; but yes, even though CRISPR opens the door for a new era, I think that "re-engineered organisms" are still not far away from science fiction...

Yasin ŞAHİN
Chief Editor and Lead Writer

Start of the Possibilities in Science Fictions Movies: Brainternet

A team of researchers from Wits University in Johannesburg, South Africa has made a major breakthrough in the field of **Biomedical Engineering**. They have announced that they have managed to connect the human brain to the Internet. This development, which is a first in the history of the world, will play an important role in brain-computer interfaces as well as in the future of artificial intelligence. **Biomedical Engineering**

Connection of the Brain to the World Wide Web (WWW)

This development called as the "**Brainternet**" project, turns the brain into an **Internet of Things (IoT)** (This term has entered into our lives with **Internet and represents the devices connected to the Internet and the web they create**) node on the **World Wide Web (WWW)**. Therefore, the brainwaves are transmitted to

the Internet. The global Internet, in which at first only our computers were included, has started in time to involve our phones, smart watches, televisions, coffee machines, cars and even our clothes.

In other words, it has created a virtual world whose population is many times more than the humans. Now, mankind has decided to include itself in this world.

The project works by taking brainwave EEG signals gathered by an Emotiv EEG device connected to the user's head. The signals are then transmitted to a low cost Raspberry Pi computer, which live streams the data to an application programming interface and displays the data on an open website where anyone can view the activity.

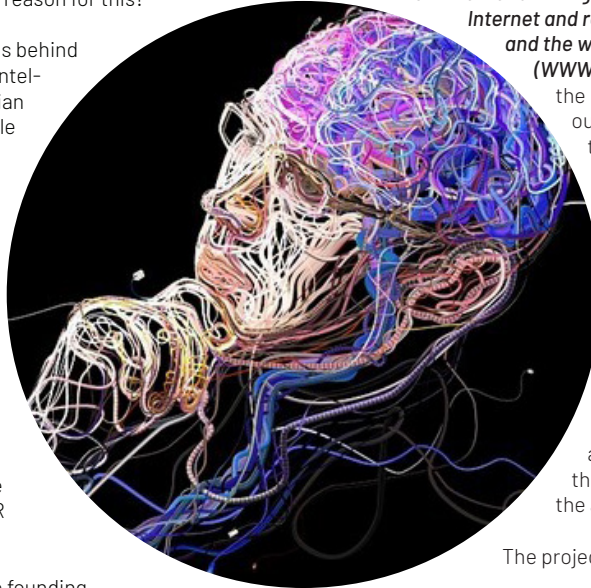
The project's supervisor **Adam Pantanowitz** says:

"Brainternet is a new frontier in brain-computer interface systems. There is a lack of easily understood data about how a human brain works and processes. Brainternet seeks to simplify a person's understanding of their own brain and the brains of others. It does this through continuous monitoring of brain activity as well as enabling some interactivity."

The functionality that has been built into this site of the brain is very narrow, limited to stimulus such as arm movement. It provides a stimulus to the user by using the interaction between the user and their brain and thereby aims to see the response. **Brainternet** can be further improved to classify recordings through a smart phone app that will provide data for a machine-learning algorithm.

Pantanowitz says this is just the beginning of the possibilities of the project. He also states that the team is still working to allow for a more interactive experience between the user and their brain and that in future, there could be information transferred in both directions - inputs and outputs to the brain

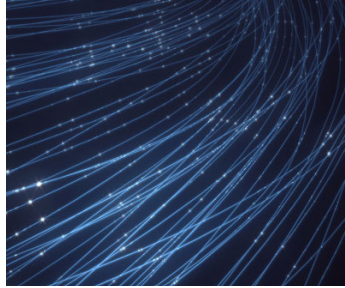
Duygu Yurtseven



INNOVATIVE

Ultra-Thin Optical Fibers Offer New Way to 3D Print Microstructures

For the first time, researchers have shown that an optical fiber as thin as a human hair can be used to create microscopic structures with laser-based 3D printing. The innovative approach might one day be used with an endoscope to fabricate tiny biocompatible structures directly into tissue inside the body and could enable new ways to repair tissue damage.



Smart Clothing" Developed for Making the Lives of Dementia Patients Easier

Smart pajamas developed by Xenomo can control automatically the movements of dementia patients through the sensors placed on them. With this technology, it is aimed to solve the problem of keeping dementia patients in closed rooms or under continuous surveillance.

Personalized Pharmaceutical Manufacturing Will Be Possible Thanks to Edible QR Code

As a result of their joint work, researchers from the University of Copenhagen and Åbo Akademi University in Finland developed edible QR codes that can be printed on tablets. These tables with printed QR codes will carry such information as the name of the patient, use of the drug, its date of expiry and batch number.



This Simple Blood Test Can Predict Cancer Years in Advance

A new type of non-invasive cancer test has just delivered promising results in an early-stage feasibility study, paving the way for a future when we'll be able to get highly accurate cancer screening with a simple blood test. The technology, also referred to as a "liquid biopsy", involves scanning the blood for bits of DNA shed by tumors. These new results are getting us one step closer to a major upgrade in cancer diagnostics.

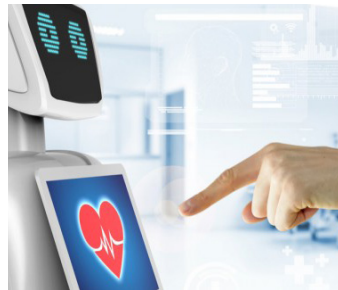


Experiment with Drugs to Treat the Wounded Soldiers in the Netherlands

A drug called "MDMA" is used in the treatment of soldiers wounded while serving in conflict zones in the Netherlands and experiencing post-traumatic stress disorder. It is stated that the main ingredient of a drug called ecstasy, MDMA, is largely successful in the treatment of post-traumatic stress disorder.

Virus Discovered a Hundred Years Ago Could Be the Solution to Antibiotic Resistance

Antibiotic resistance, which occurs when bacteria does not respond to certain antibiotics, constitutes a growing threat around the world. For this reason, 10 million deaths are predicted until 2050. It is not easy to develop a new drug to prevent the problem. While several large pharmaceutical companies have stopped producing new antibiotics, the drugs being developed come across various obstacles during the approval stage. When this is the case, some manufacturers have turned towards different solutions, one of them being "phage therapy", which has a long history. The treatment is applied using viruses called bacteriophages (phages in short), which kill bacteria. Bacteriophages, discovered in the early 1900s, has the potential for the treatment of patients with bacterial infection.



Artificial Intelligence Can Better Diagnose Heart Diseases and Lung Cancer than Doctors

It has been announced that two newly developed artificial intelligence systems are more successful in diagnosing lung cancer and heart diseases than doctors. If these artificial intelligences are popularized effectively, they can not only save countless lives but also bring billions of dollars of profit.

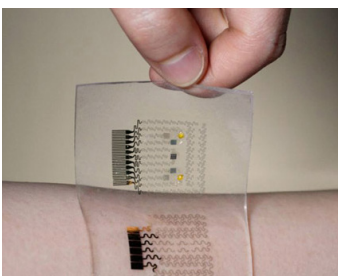


We Will Be Able to Predict the Next Cholera Outbreak Thanks to Satellites and Algorithms

It will be possible to foresee weeks in advance cholera outbreaks, leading to thousands of deaths every year, using satellite data and special algorithms. Cholera is a highly dangerous disease likely to spread over large areas and causing every year over 100.000 deaths worldwide. Therefore, the necessary monitoring of a potential cholera outbreak, constitutes a major public health issue.

The First Laboratory-grown Human Egg Can Help Achieve Fertility in the Future.

Researchers from the University of Edinburgh have announced that for the first time, they have taken immature egg cells from females and matured them in the lab until they reached the stage of fertilization. It is stated that in the future, this can constitute an alternative for the in vitro fertilization technique applied for having children. It is also recorded that this can preserve the fertility of females undergoing cancer treatment.



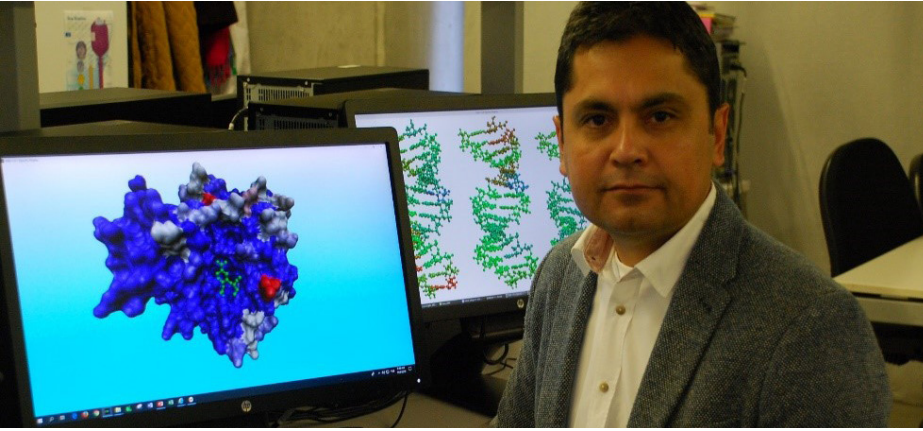
Scientists Design Bacteria to Reflect "Sonar" Signals for Ultrasound Imaging

The bacteria designed through ultrasound machine can generate images that reveal the locations of the microbes. Thanks to these images, doctors can exactly detect the area in the body they will work in and apply the necessary treatment. "We are engineering the bacterial cells so they can bounce sound waves back to us and let us know their location the way a ship or submarine scatters sonar when another ship is looking for it. We want to be able to ask the bacteria, 'Where are you and how are you doing?' The first step is to learn to visualize and locate the cells, and the next step is to communicate with them."

GlaxoSmithKlin Conducting Works That Will Start the "Blockchain" Era in Pharmaceutical Industry

GlaxoSmithKline (GSK), one of the world's biggest pharmaceutical companies, aims to develop a supply chain monitoring system as a result of its partnership with Microsoft and Blockchain company Viant.

MOVEMENTS



Finding a fast and inexpensive way to detect specific strains of bacteria and viruses is critical to food safety, water quality, environmental protection and human health. However, current methods for detecting illness-causing strains of bacteria such as *E. coli* require either time-intensive biological cell cultures or DNA amplification approaches that rely on expensive laboratory equipment.

Now, Dr. Oren of biomedical engineering at TOBB University of Economics and Technology and colleagues at the University of Washington, Seattle and the University of California, Davis have adapted a molecular electronic device called a single-molecule break junction to detect RNA from strains of *E. coli* known for causing illness.

The findings were published in the journal *Nature Nanotechnology*.

"The reliable, efficient and inexpensive detection and identification of specific strains of microorganisms such as *E. coli* is a grand challenge in biology and the health sciences," said researchers. "Our technique could pave the way for rapid, straightforward detection of pathogens, antimicrobial resistant bacterial strains and biomarkers for cancer."

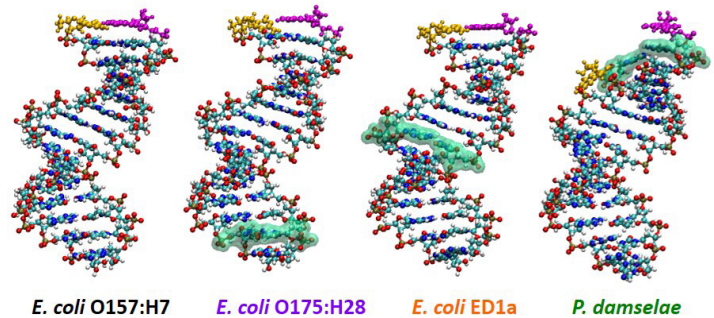
Research team focused on *E. coli* since it is a common pathogen that could easily be found in the food supply, but might not cause illness in a benign form. The worst strain of *E. coli*, called *E. coli* O157:H7, produces a toxic substance called Shiga toxin that causes bloody diarrhea, kidney failure and even death.

Single-molecule break junction devices consist of two metal electrodes with atomically sharp interfaces that are brought into contact in a liquid solution of interest, such as a solution containing RNA sequences from *E. coli*. As the electrodes are brought into contact and pulled apart, an electrical bias is applied and the current is measured. This process is repeated hundreds or thousands of times to determine the conductance of a single molecule.

"One of the questions we asked is how small of a change in the sequence is needed to cause a meaningful change in the electrical conductance?" said researchers. "The smallest thing we can change is a single-base, so we decided to see if a single-base change can be measured." By testing short sequences of RNA bound to DNA with chemical linkers, the team examined an *E. coli* sequence that would produce Shiga toxin.

Their findings showed that changes in the electrical resistance of RNA due to a single-base change could be measured, which would allow them to see not only if a sequence was *E. coli*, but the specific strain of *E. coli* that produces Shiga toxin.

"A system that could selectively identify short sequences of DNA or RNA opens up new avenues for developing an electronic sensor platform for a wide range of applications," he said. "Eventually, we want to get to the point where we can extract RNA samples from real organisms and measure their conductance on a sensing platform."



For details: Y. Li, J. M. Artés, B. Demir, S. Gokce, H. M. Mohammad, M. Alangari, M. P. Anantram, E. E. Oren & J. Hihath "Detection and identification of genetic material via single-molecule conductance" *Nature Nanotechnology*, (2018).

