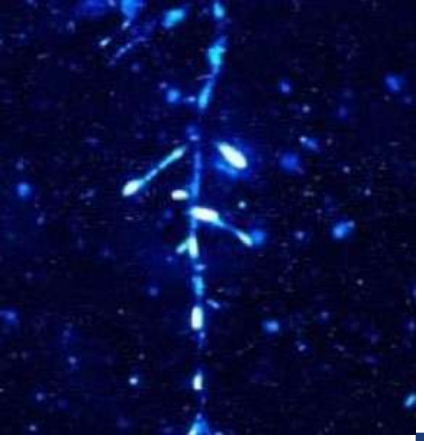
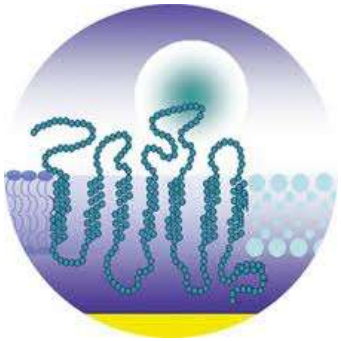
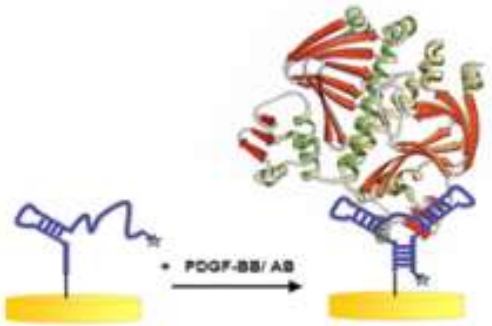


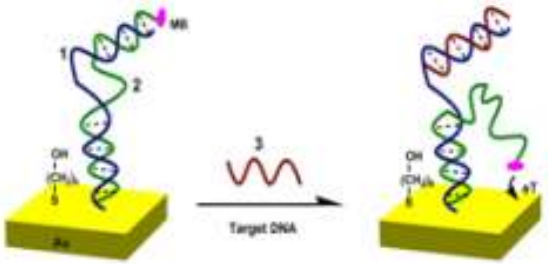


İnfeksiyon tanısında yeni yaklaşımlar

Biyosensörler

Barış OTLU
İnönü Üniversitesi Tıp Fakültesi,
Tıbbi Mikrobiyoloji Anabilim Dalı, Malatya.





İSTANBUL SERİRİYATI
No. 1 — 1947 den
Ayrı baskı

I. Türk Mikrobiyoloji Kongresi
Ekim 1943 Yılında
Ankara'da Hulusi Alataş'ın
Sağlık Vekili ve Recep Peker'in Başvekil
olduğu zaman toplanmıştır.

İkinci Türk Mikrobiyoloji Kongresi

Kader Basımevi
1947

II. Türk Mikrobiyoloji Kongresi

Orla Jensen'e cevaben yazdığımız bir teşekkür mektubuyla birlikte, II nci Türk Mikrobiyoloji kongresi programını göndererek kendilerini kongremizden haberdar edip davet ettik, aldığımız cevapta, Ankarada toplanan II nci Türk Mikrobiyoloji kongresi konularını çok enteresan bulduklarını ve davetimize teşekkürle zamanın seyahat zorluklarını belirttiler.

Değerli üyelerimizden bu milletlerarası IV. üncü Mikrobiyoloji kongresine ilmi etüdlerile iştirak edecekler şimdiden cemiyetimize müracaat etmişlerdir, belki daha da iştirak edecek değerli meslekdaşlarımız vardır.

Yayınladığımız programında beşeri ve veteriner Mikrobiyoloji, su, toprak, süt, nebat ve gıda Bakteriyolojisi ve gıda mayaları, tüberküloz, Difteri, Boğmaca, Brucella, influenza ve sair virüslü hastalıklar gibi mühim konuları ihtiva eden bu milletlerarası kongreye meslekdaşlarımızın yakın ilgi göstermelerini ve 1937 Ocak ayına kadar cemiyetimize müracaatlarını memleket ilim ve irfanı namına temenni ederim.

II. nci Türk Mikrobiyoloji kongresi konuları (Salmonella grubu, Şarbon ve Brucella grubu) gibi üç mühim ve büyük meselelerdir.

Çeşitli barsak infeksiyonlarını ve husule getirdikleri toksik belirtilerini, sebeblerini ve korunma çarelerini Salmonella grubunda tafsilâtıyla salâhiyetli ağızlardan dinliyeceğiz.

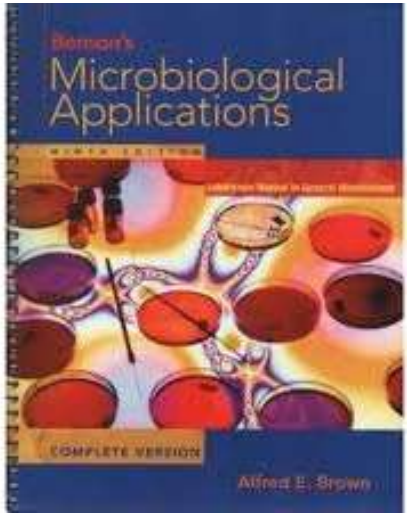
Günün en mühim bulaşıcı hastalığı haline

II. Mikrobiyoloji Kongresini Onursal Başkan Sağlık Bakanı Dr. Behçet Uz açarken

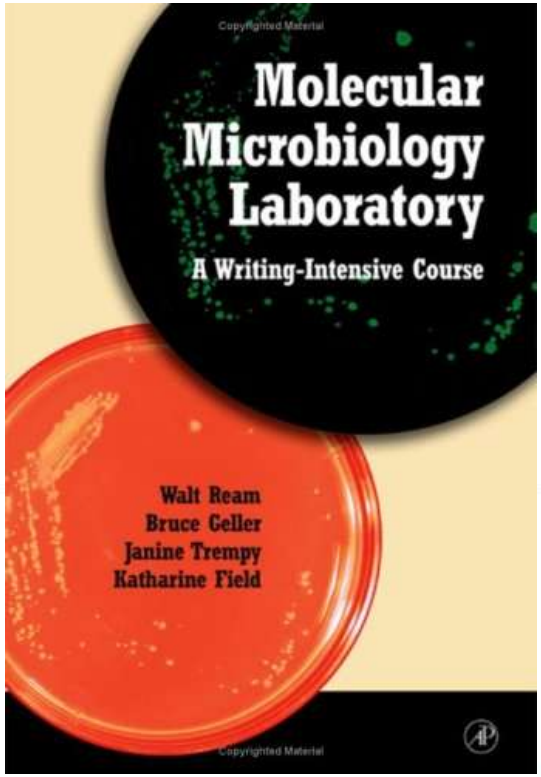
gelen ve bilgisizlikleri ve para hırsı yüzünden bulaşık derileri elde etmek suretile bir çok vatandaş mal ve canına musallat olan Şarbon-Antraks hastalığı hakkında kongremizde geniş bir yer verilmiştir. Esas itibarıyla bir hayvan hastalığı olan ve hayvanlardan insanlara geçen hastalıklardan bulunan şarbon, geçen 1945 yılında yakalanan insanlarda % 10 kadar ölümü mucib olmuştur.

Bu hastalık bu yıl memleketin bazı bölgelerinde fazlaca görülmektedir. Sağlık Bakanlığının 1946 Eylül ayı istatistiğinde bir aylık insan şarbonunun (415) kadar olduğunu öğreni-

Bakterilerin tanımlanması



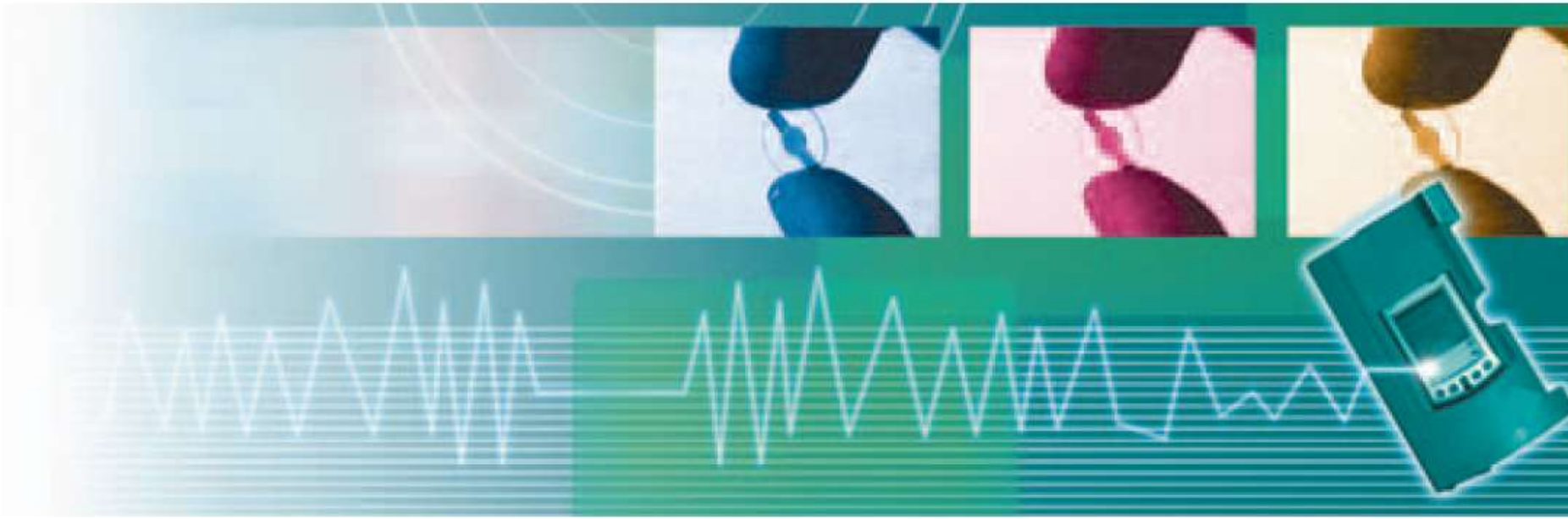
Bakterilerin tanımlanması



Bakterilerin tanımlanması

Anil Deisingh discusses the use of biosensors for the detection of bacteria

Biosensors for microbial detection



Miners Inspecting Caged Canary

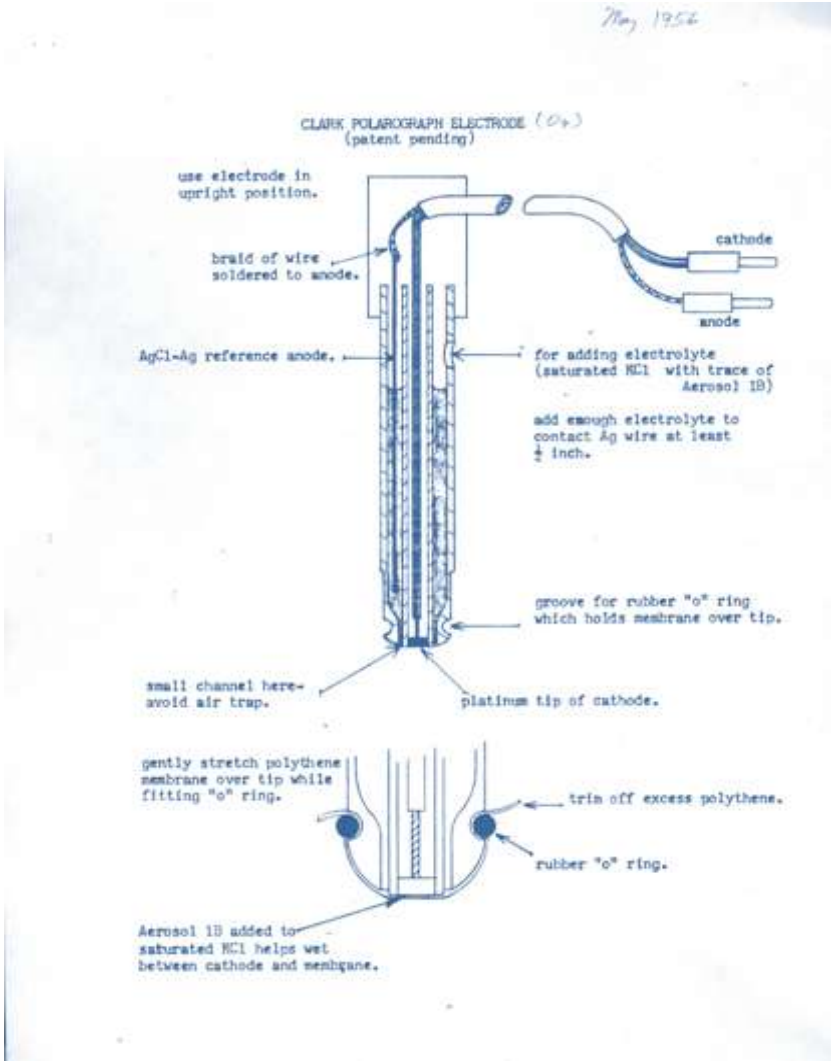
Prof. Leland C Clark Jnr
1918–2005

Glikoz oksidaz enziminin

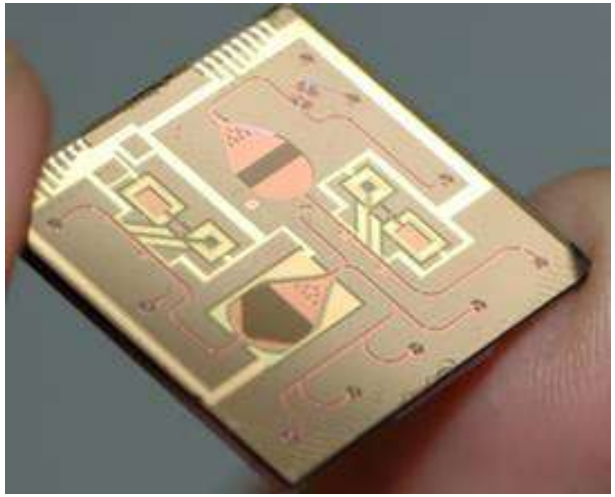
oksijen elektrotları üzerine sabitlendiği ve

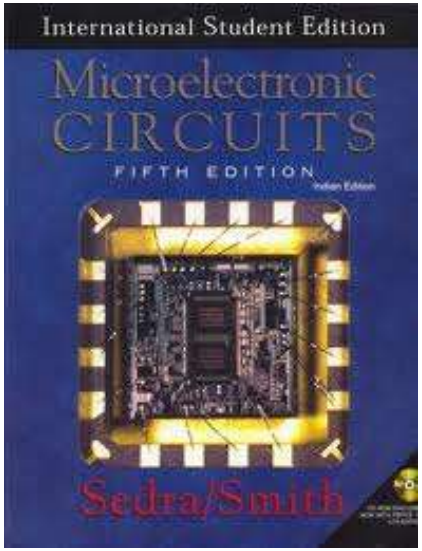
kandaki glikozu ölçmeye yarayan

ilk biyosensör 1960'lı yıllarda tanıtılmıştır.



"kimyasal bir bileşiğe karşı verilen biyolojik yanıtı optik, termal ya da elektriksel sinyallere dönüştüren cihazlar"

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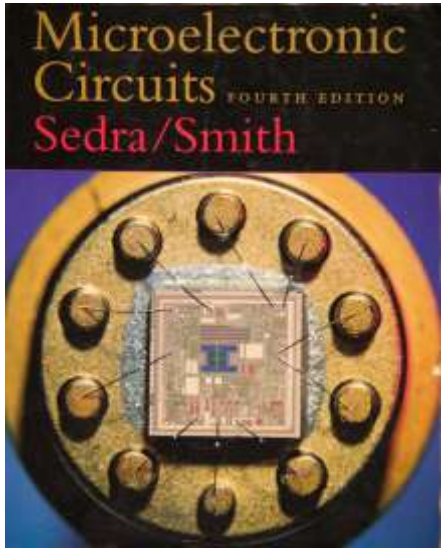
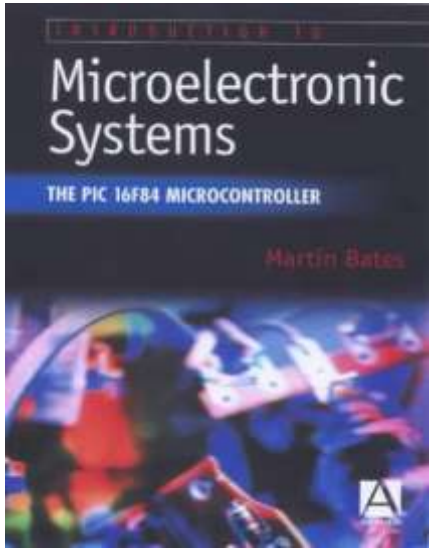
Microelectronic
CIRCUITS
FIFTH EDITION
Sedra/Smith


Microelectronic
Circuits FOURTH EDITION
Sedra/Smith


Microelectronic
Systems
THE PIC 16F84 MICROCONTROLLER
Martin Bates

Biosensors: Microelectronics marries biology

For decades, scientists have sought to couple biomolecules with electronic detection devices for sensing applications. These biosensors have been slow to penetrate commercial markets, however, because they are not as fast as more-established sensing methods, are often bulky, and are expensive to manufacture. The development of increasingly innovative biosensors, including multichannel DNA-probe arrays and the possibility of integrating living cells on chips, is making the technology more attractive to researchers, physicians, and industry. As a result, biosensors are at the forefront of a multidisciplinary science that marries the biological world and the electronic world.

Figure 2. Fiber-optic, fully automated biosensor performs four immunoassays simultaneously in 5 to 10 minutes and shows the results on an LCD screen in words.

nostics, environmental monitoring, and food processing," says S. J. Alcock, head of biosensor development at Cranfield Biotechnology Center in Cranfield, England. Transducers used in biosensors can also take many forms, depending on the parameters being measured. The most widely used biosensors measure electrochemical effects, but other types can be used to measure thermometric, piezoelectric, acoustic, magnetic, or optical responses.

be seeking, says Frances Ligler of the Naval Research Laboratory (NRL).

Growth of applications

The first biosensors, comprised of enzymes immobilized on oxygen electrodes, were reported in the 1960s. Their subsequent development led to the commercialization of devices for the measurement of glucose, pioneered by Yellow Springs Instruments (Yellow Springs, OH), which also markets its enzyme-based biosensors for medical, biotech
sports-physic
cose monitor
the most suc
to date, tha
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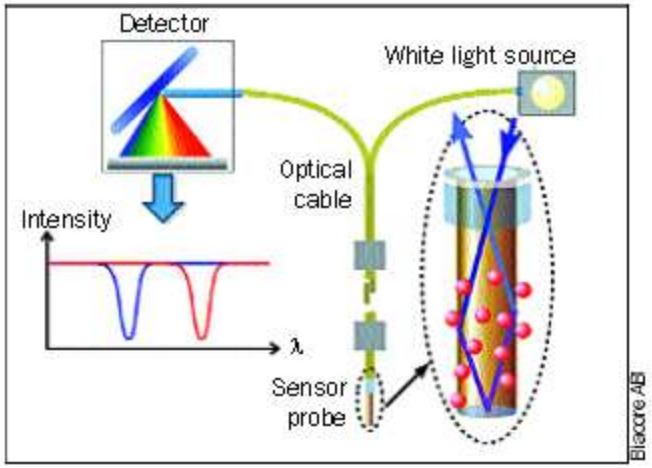

Mikroelektronik alanındaki gelişmeler ve biyolojik moleküllerin olağanüstü duyarlılıktaki yanıt verme kapasitelerinin keşfedilmesi, biyosensör teknolojisinin hızla gelişmesine neden olmuştur

"kimyasal bir bileşiğe karşı verilen biyolojik yanıtı optik, termal ya da elektriksel sinyallere dönüştüren cihazlar"

Food Microbiology 27 (2010) 710–730

Contents lists available at ScienceDirect

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journal homepage: www.elsevier.com/locate/fm

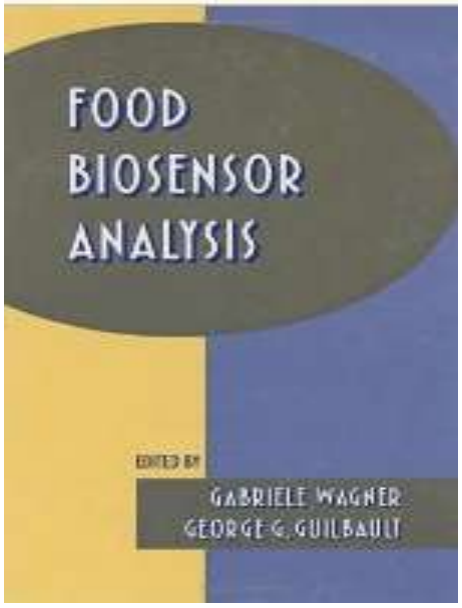
Review

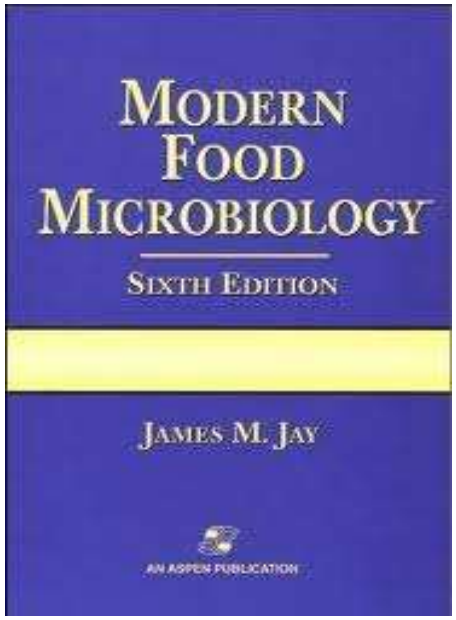
Alternative microbial methods: An overview and selection criteria

Vicky Jasson [a], Liesbeth Jacxsens [a], Pieternel Luning [b], Andreja Rajkovic [a], Mieke Uyttendaele [a,*]

[a] Laboratory of Food Microbiology and Food Preservation, Department of Food Safety and Food Quality, Faculty of Bioscience Engineering, Ghent University, Coupure links 653, B-9000 Ghent, Belgium

[b] Product Design and Quality Management Group, Department of Agro technology & Food Science, Wageningen University, Bomenweg 2, 6703 HD Wageningen, The Netherlands



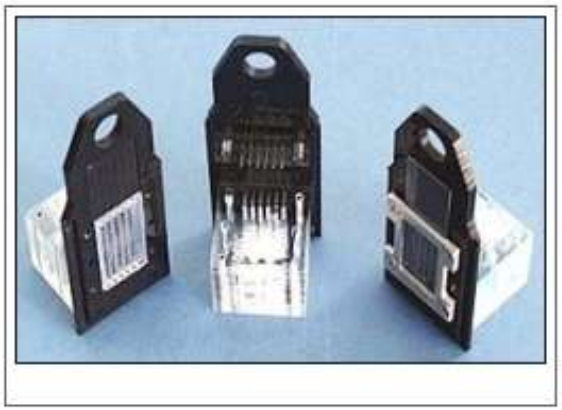


Çok az örnek gerektirmesi,

kısa sürede sonuç vermesi ve taşınabilir olmaları gibi avantajlarından dolayı özellikle gıda kaynaklı patojenlerin tespitine yönelik biyosensörler hızla geliştirilmektedir.

Array Biosensor for Simultaneously Detecting Staphylococcal and Botulinum Toxins in Food

Filed in archive Diagnostics, Methodologies and Instrumentation , Food and Agriculture on September 22, 2005



Staphylococcal enterotoxin B (SEB) and botulinum toxin (BotA) are common causes poisoning in humans and p high risk as potential biolo warfare agents. In a study published in the Septembe of Applied and Environmen Microbiology, researchers the Naval Research Labora array biosensor to detect f presence of SEB and BotA canned tomatoes, sweet c green beans, mushrooms and tuna which were spiked with both toxins at room temperature for two hours. The biosensor was capable of rapid simultaneously identifying both toxins in complex food matrices. Accorc the researchers,

> *"The ability to carry out multianalyte detection in complex samples is a clear advantage for screening food, water, or air samples for hazards either naturally occurring or deliberately introduced."*

Sensors Provide Early Warning of Biological Threats

November 9, 2009 by admin Leave a Comment

Filed under Featured

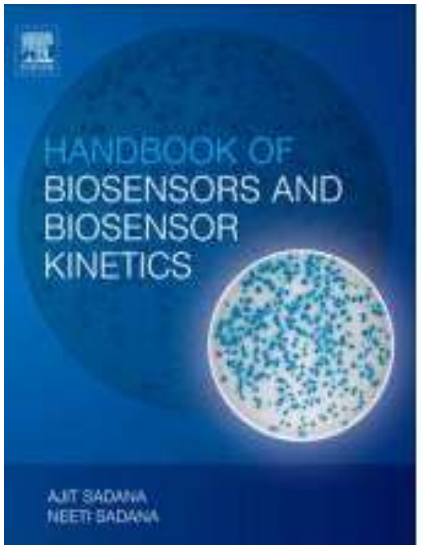
In order to help detect biological traces on Mars, scientists at Ames Research Center began work on an ultrasensitive biosensor in 2002. Early Warning initially developed a working version of the NASA biosensor calibrated to detect the bacteria strain E. coli O157:H7, known to cause acute gastrointestinal illness. It also detects indicator E. coli, commonly used in water testing. The analyzer uses a biomolecule concentrator to reduce a 10-liter water sample to 1 milliliter in about 45 minutes. The concentrated sample is then processed and fed to the biosensor. The entire process takes about 2 hours, a drastic improvement over typical laboratory-based water sampling, which can take several days to a week.

The Centers for Disease Control and Prevention (CDC) estimates there are between 4 and 11 million cases of acute gastrointestinal illnesses in the United States each year—caused by pathogens in public drinking water. The bacteria Escherichia coli (E. coli) and Salmonella have within the past few years contaminated spinach and tomato supplies, leading to nationwide health scares. Elsewhere, waterborne diseases are devastating populations in developing countries like Zimbabwe, where a cholera epidemic erupted in 2008 and claimed over 4,000 lives.

Early Warning's analyzer feeds a concentrated water sample to its biosensor, providing rapid pathogen detection

Scientists have found an unexpected source of inspiration in the effort to prevent similar disasters: the search for life on Mars. The possibility of life on the Red Planet has been a subject of popular and scientific fascination since the 19th century. While Martian meteorites have turned up controversial hints of organic activity, and NASA's exploratory efforts have delivered important discoveries related to potential life—the presence of water ice, and plumes of methane in Mars's atmosphere—direct evidence of organisms on our closest planetary relative has yet to be found.

In order to help detect biological traces on Mars, scientists at Ames Research Center began work on an ultrasensitive biosensor in 2002. The chief components of the sensor are carbon nanotubes, which are the major focus of research at the Center for Nanotechnology at Ames—the U.S. Government's largest nanotechnology research group and one of the largest in the world. Tubes of graphite about 1/50,000th the diameter of a human hair, carbon nanotubes can be grown up to several millimeters in length and display remarkable properties. They possess extreme tensile strength (the equivalent of a cable 1 millimeter in diameter supporting nearly 14,000 pounds) and are excellent conductors of heat and electricity.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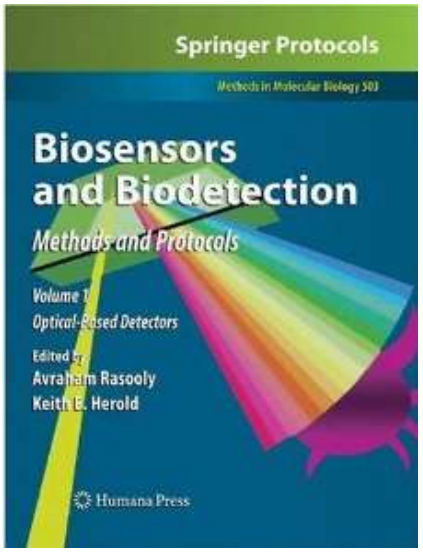
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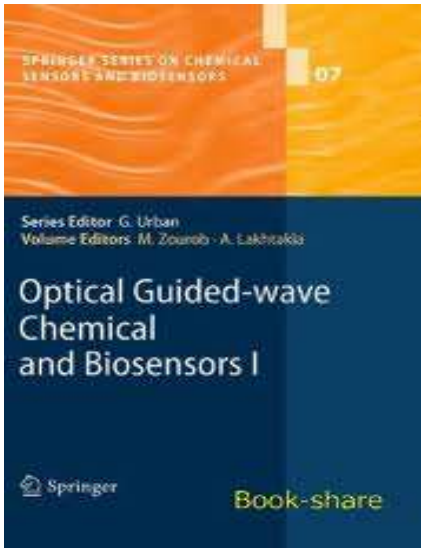
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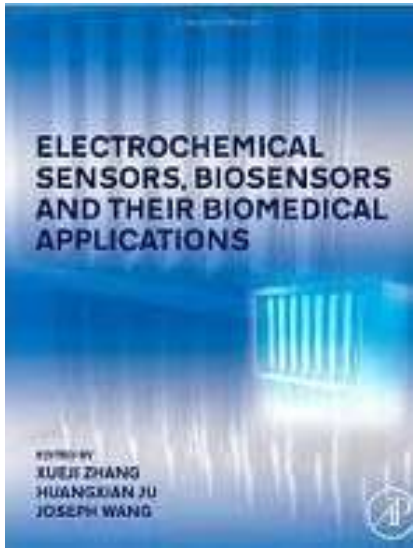
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AND THEIR BIOMEDICAL
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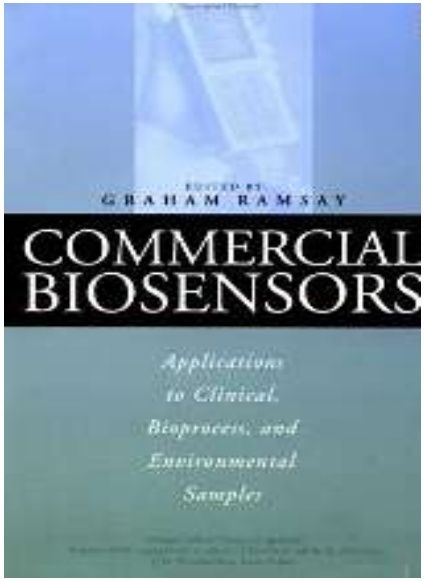
HUANGXIAN JU
JOSEPH WANG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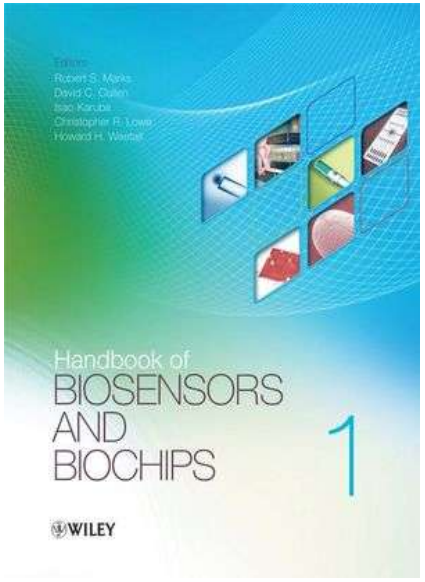
Bioprocess, and
Environmental
Samples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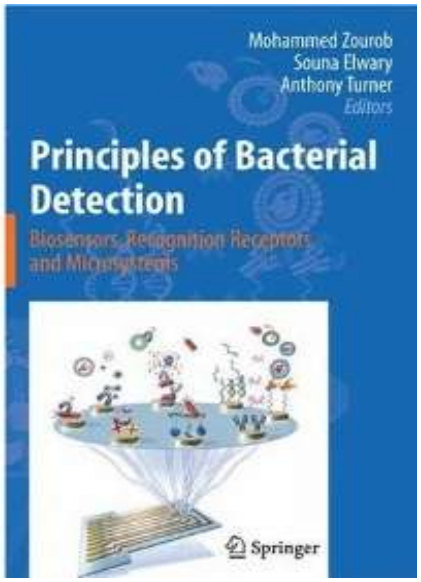
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Souna Elwary
Anthony Turner
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Biosensors, Recognition Receptors
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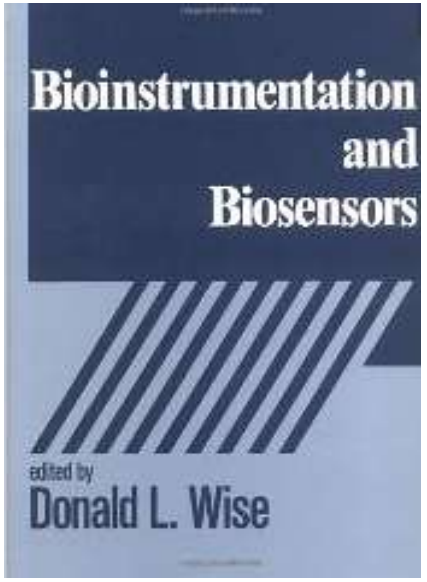
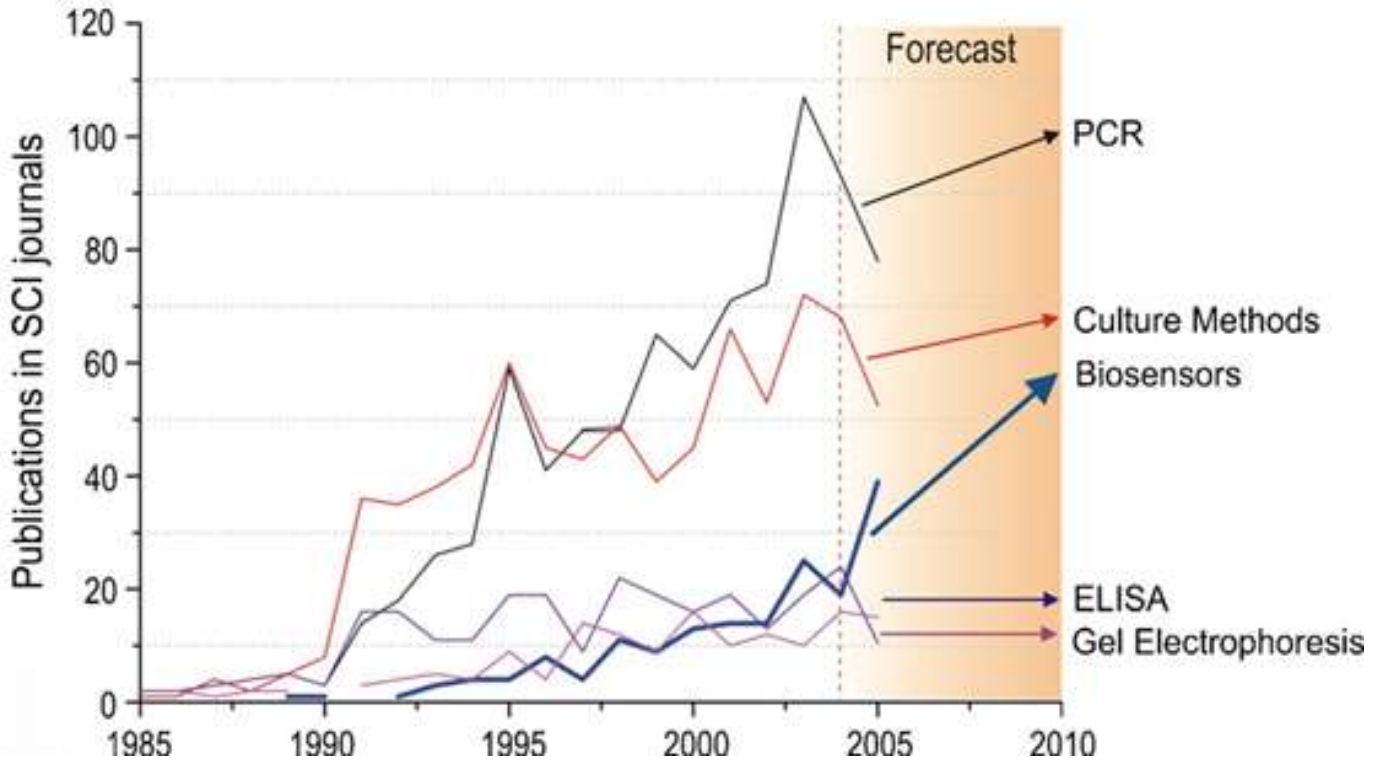
Springer


Bioinstrumentation
and
Biosensors
edited by
Donald L. Wise

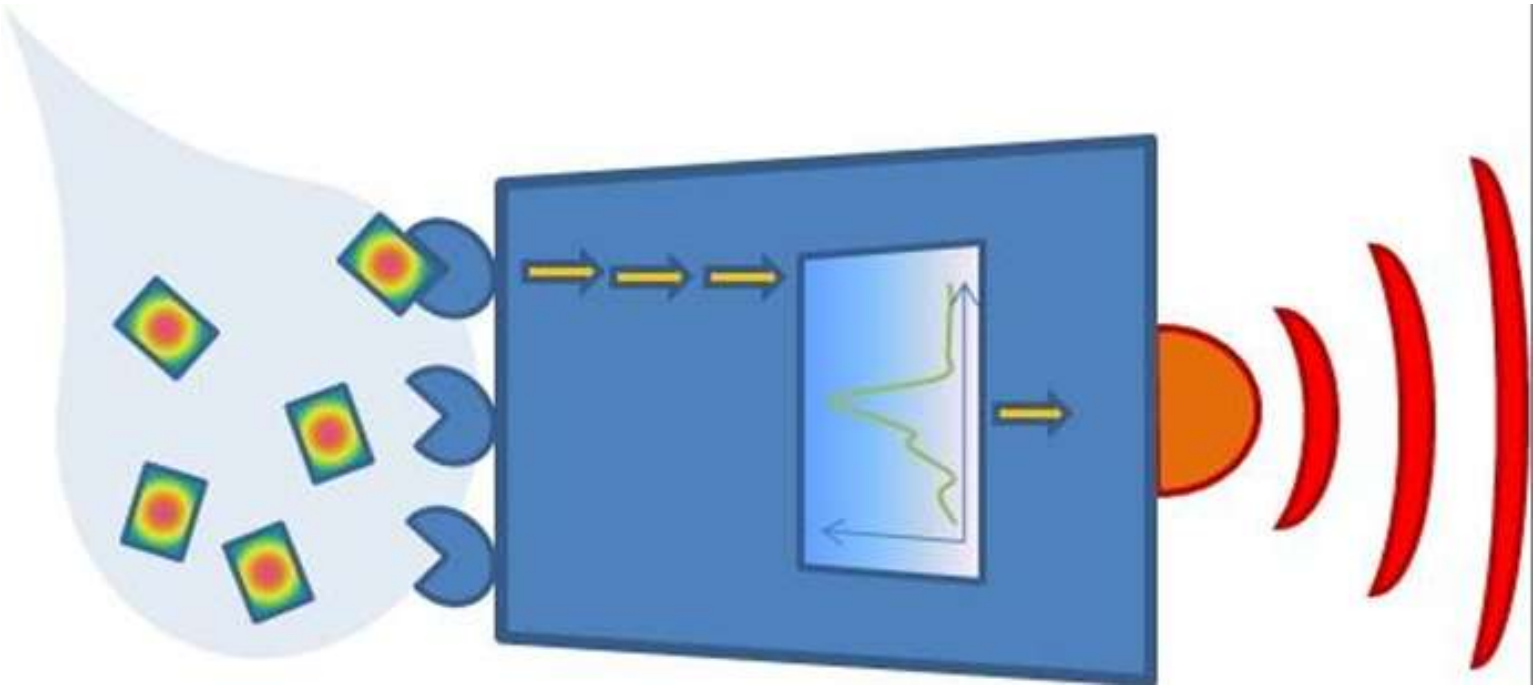
Biyosensörler

Biyosensörler patojenlerin tespitinde en hızlı gelişen teknoloji

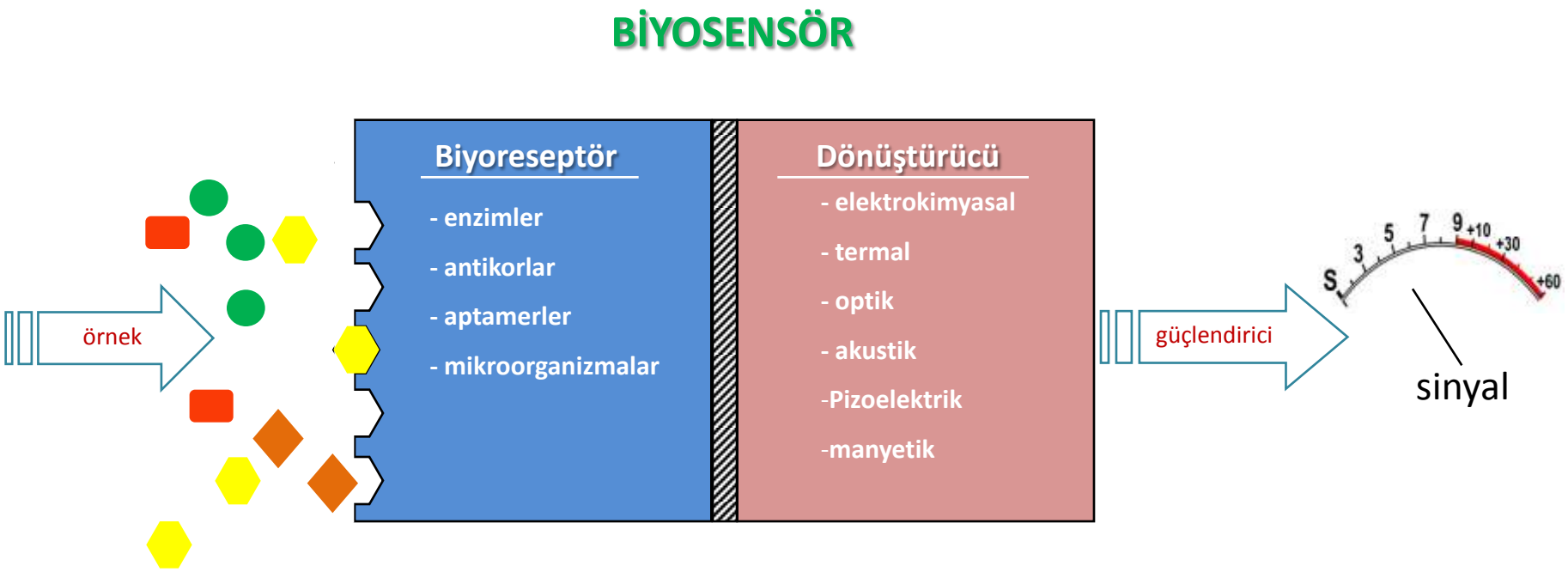


Biosensors and Bioelectronics 22 (2007) 1205–1217

Biyosensörlerin Temel Bileşenleri



Biyosensörlerin Temel Bileşenleri



Bu dönüştürücülerden bazıları;

biyolojik etkileşimi gerçek zamanlı olarak gösterebilirken bazıları ikincil elementlerin varlığına (fosfataz veya işaretli antikorlar) ihtiyaç duyarlar.

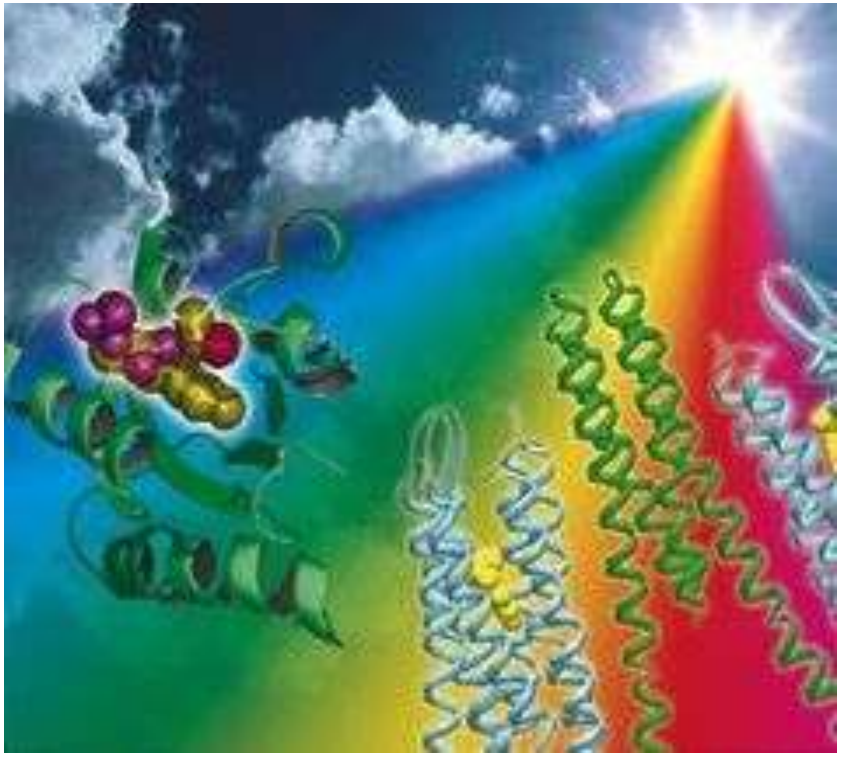
Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Analiz edilecek madde ile seçici olarak etkileşime giren oldukça duyarlı biyolojik moleküllerdir.

En önemli özellikleri;

tespit edilmesi istenen hedef moleküle karşı yüksek afinite ve özgüllük göstermeleridir.



Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

- enzimler
- antikorlar
- aptamerler
- mikroorganizmalar

Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

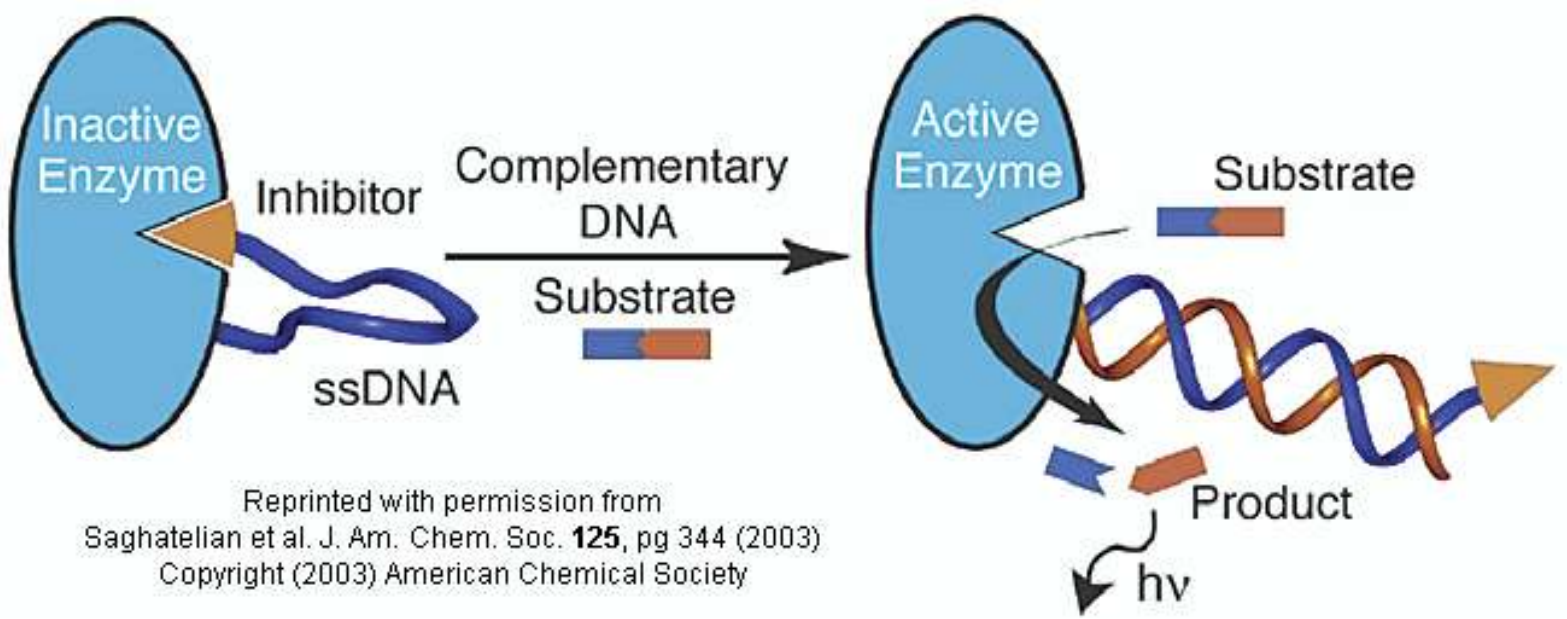
Enzim biyoreseptörler

Enzimler kimyasal tepkimelere katıldıklarında birçok ölçülebilir reaksiyon ürünü meydana getirdiklerinden, (proton, elektron, ışık ve ısı gibi) biyoreseptör olarak kullanılan popüler biyomoleküllerdir.

Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Enzim biyoreseptörler

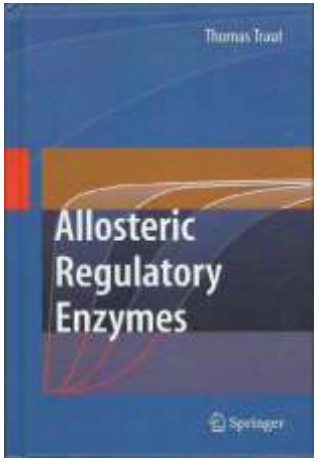


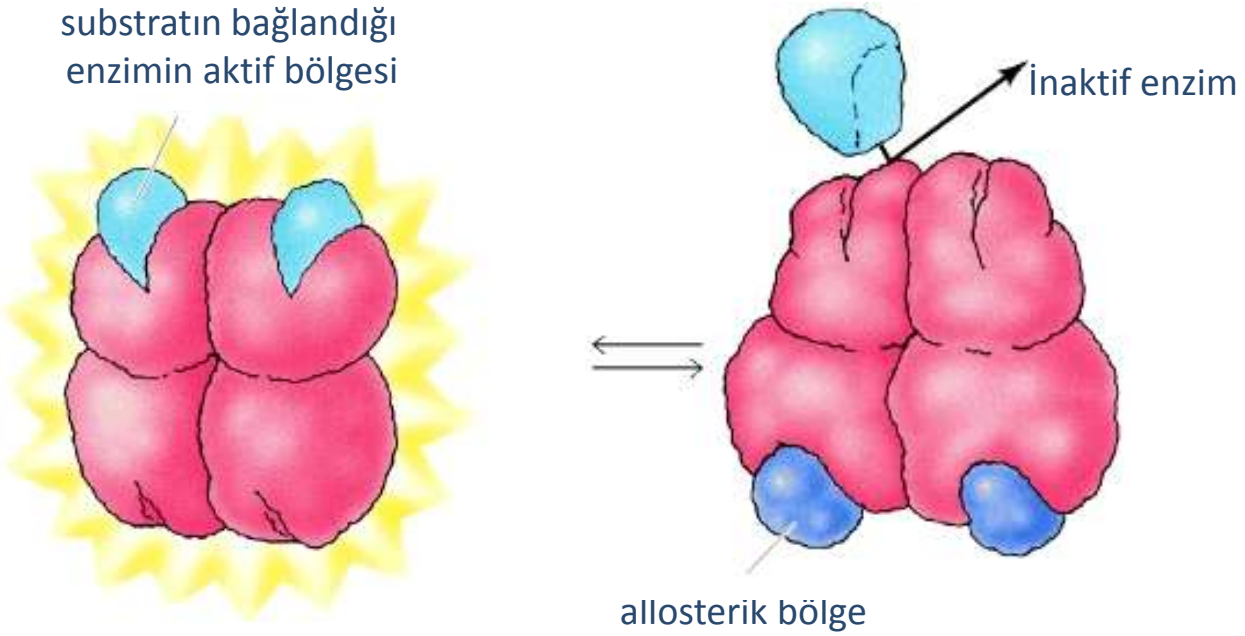
Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Enzim biyoreseptörler

Özellikle birden fazla alt üniteye sahip olan allosterik enzimler, doğaları gereği biyosensör molekül olarak yüksek potansiyele sahiptirler.





Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Enzim biyoreseptörler

THE JOURNAL OF BIOLOGICAL CHEMISTRY
Vol. 276, No. 43, Issue of October 26, pp. 40087–40095, 2001
Printed in U.S.A.

Engineering Regulable *Escherichia coli* β-Galactosidases as Biosensors for Anti-HIV Antibody Detection in Human Sera*

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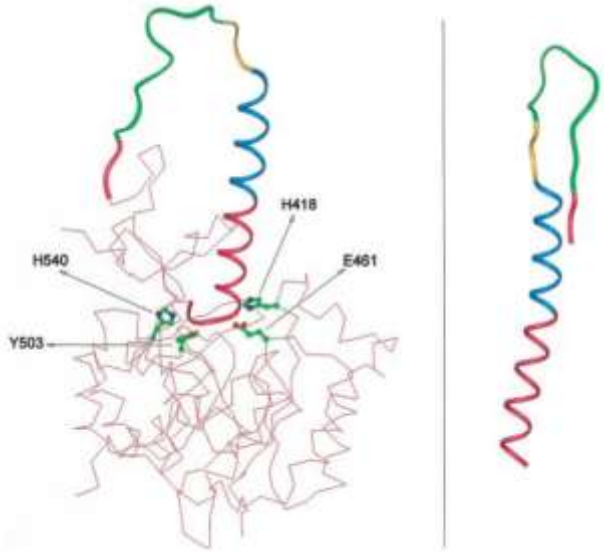
Neus Ferrer-Miralles,[a,b] Jordi X. Feliu,[a,c] Stéphane Vandevuer,[d] Annette Müller,[e]



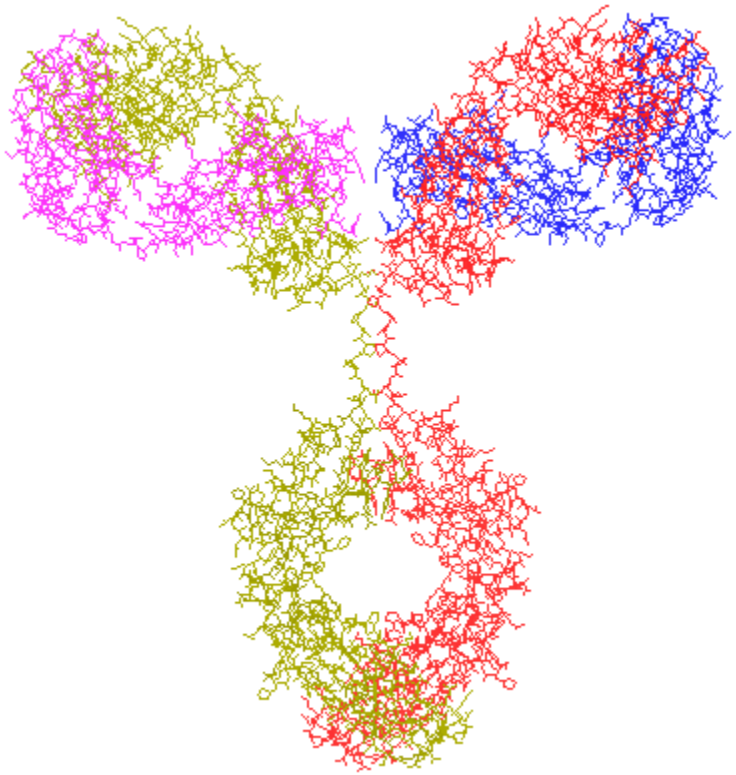
Serumda HIV antikorlarını tespit etmek için, zarf glikoproteinlerine ait epitopları (gp41 ait P1 ve P2 epitopu), *E. coli* β-galaktozidaz enzimin aktif bölgesinin yanına ekleyerek hibrid bir enzim tasarlamışlardır.

Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Antikor biyoreseptörler

Antikorlar 1950'li yıllardan itibaren tanıda kullanılmaya başlanmış, yüksek duyarlılığı ve özgüllüğü kanıtlanmış biyoreseptör moleküllerdir.

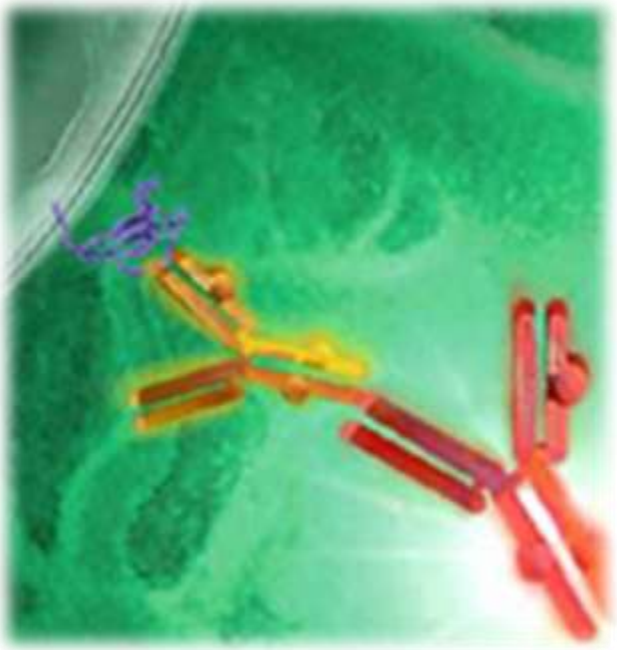


Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Antikorlar biyoreseptörler

Antikorlar tüm bir mikroorganizmayı tanıyabilecekleri gibi onlara ait toksinleri, pilileri, sporları, enzimleri hatta peptid parçalarını tanıyabilirler.

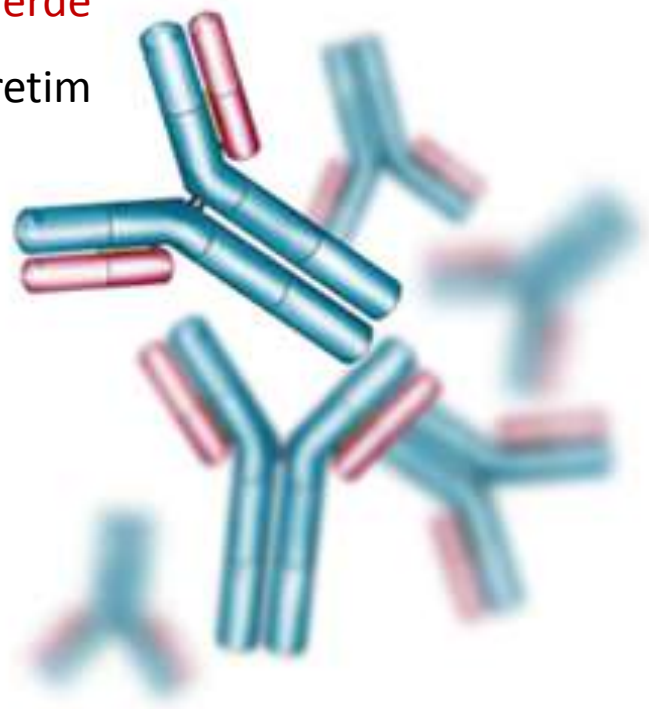


Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Antikor biyoreseptörler

Kullanım amaçlarına bağlı olarak, antikorların çeşitli şekillerde modifiye edilebilmeleri önemli avantajlarındadır. Üretim şekillerine göre; poliklonal veya monoklonal olabilirler.



Biyosensörlerin Temel Bileşenleri

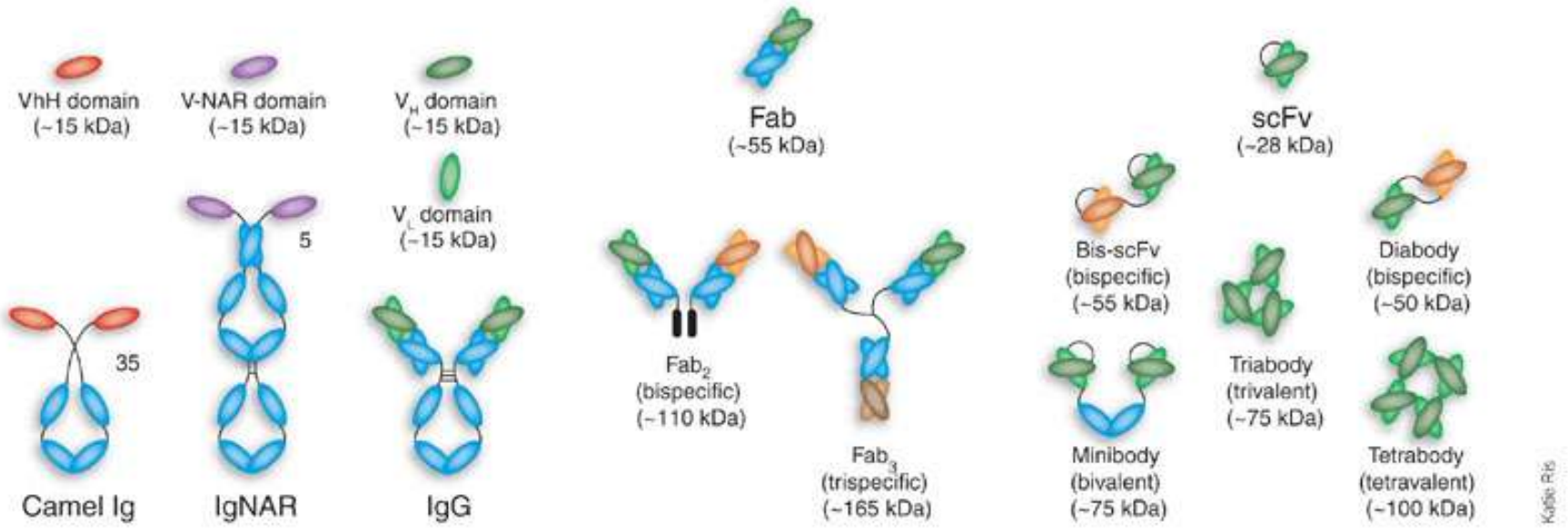
Biyoreseptör moleküller

Antikor biyoreseptörler

- Rekombinant antikorlar;

  antikorların antijen bağlanma bölgelerindeki domainleri (Fab parçası) genetik olarak manipüle değiştirilmiş yapılardır.

- Rekombinant antikorları üretmek daha hızlı ve ucuzdur.



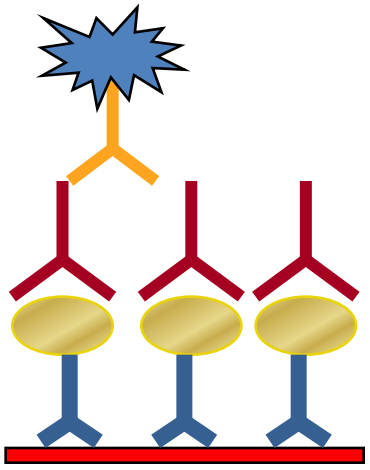
http://www3.imperial.ac.uk/people/m.deonarain

Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Antikor biyoreseptörler

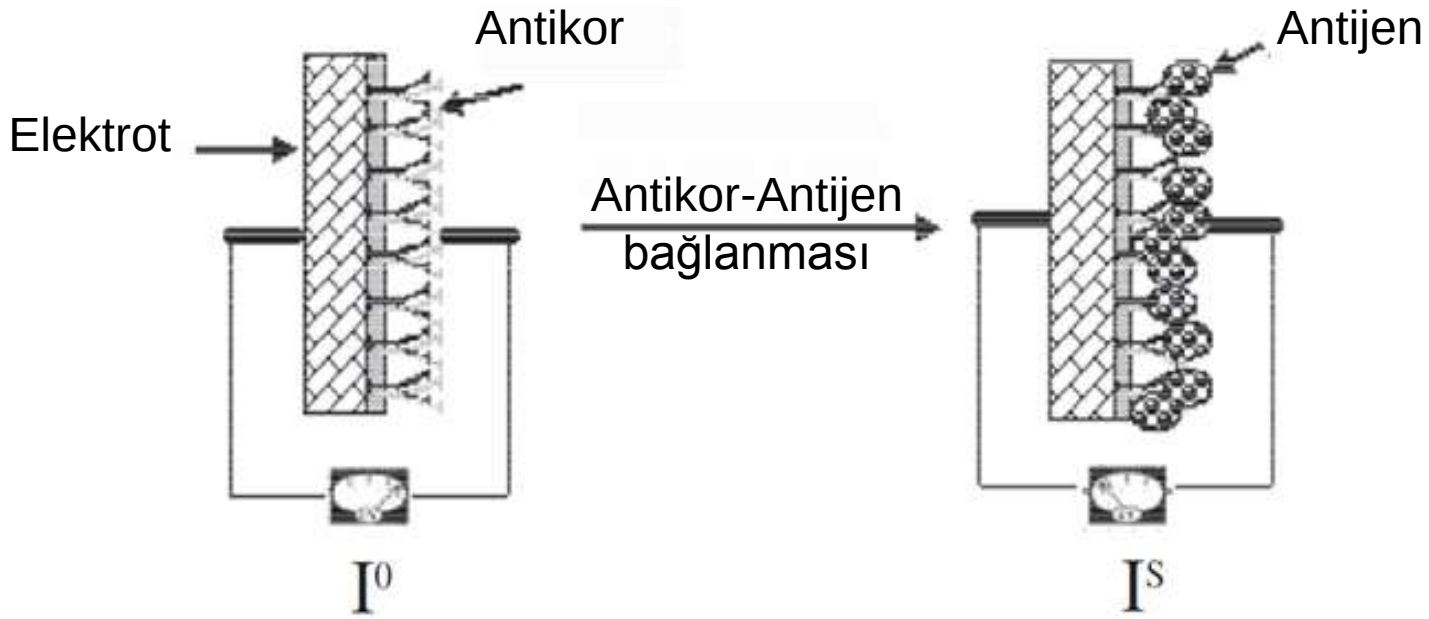
Birçok immünolojik yöntemde işaretli antikorlar kullanılmaktadır. Enzimler, biyotin, floroforlar ve radyoaktif izotoplar; antikorları işaretlemede sıklıkla kullanılan moleküllerdir.



Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Antikor biyoreseptörler

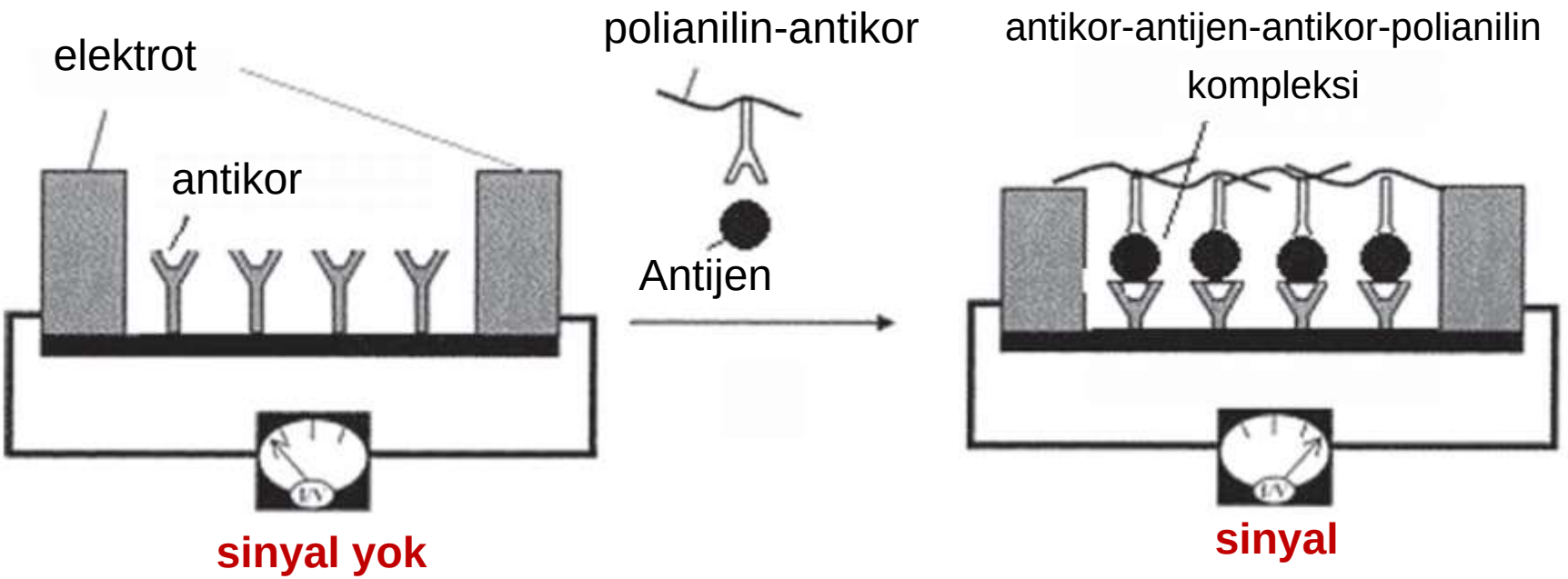


Muhammad-Tahir et al. (2007)

Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

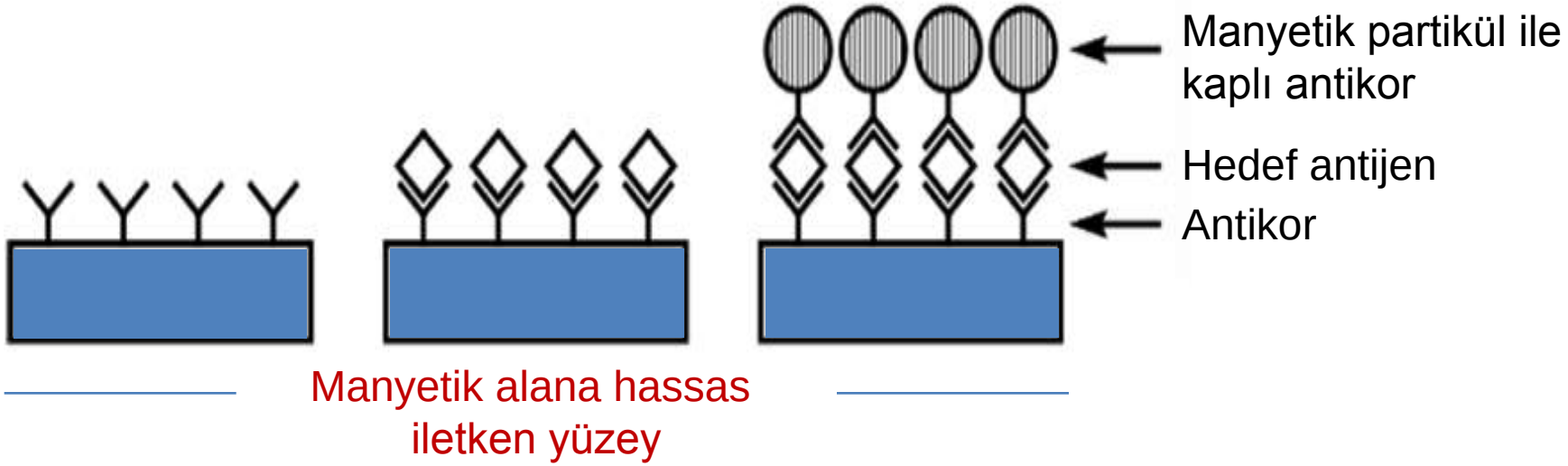
Antikor biyoreseptörler



Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Antikor biyoreseptörler



Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Antikor biyoreseptörler

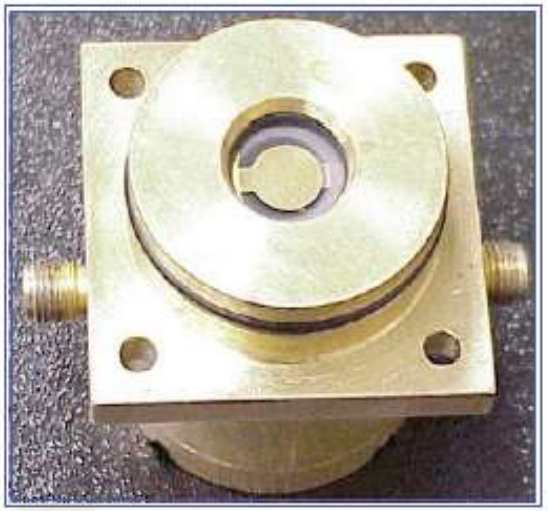
Bir çok rekombinant antikor; HIV, Hepatit B, Hepatit C, Ebola, Rabies, EBV, Rubeola, Measles, *Salmonella Typhimurium*, botulinum toksinlerinin tespitinde kullanılmaktadır.

Antibody-based Piezoelectric NanoBioSensors

Commercial Applications

- Anthrax detection.
- HIV and hepatitis detection.

Immunosensors have been the most explored and the most advanced class of acoustic biosensors. The interest results from the fact that antibodies can be obtained against almost any substance, antibody immobilization techniques are numerous and well developed, and the pertinent acoustic sensing mechanism is simple and is mostly determined by mass accumulation.



Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Antikor biyoreseptörler

Benhar ve arkadaşları, tek zincirli antikorla kapladıkları karbon elektrotlu elektrokimyasal biyosensör ile *Listeria monocytogenes* ve MtKatG enzimi eksprese eden *M. tuberculosis'in* saptanabilirliğini göstermişlerdir.

Recombinant single chain antibodies in bioelectrochemical sensors

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Received 9 February 2001; received in revised form 4 May 2001; accepted 15 May 2001

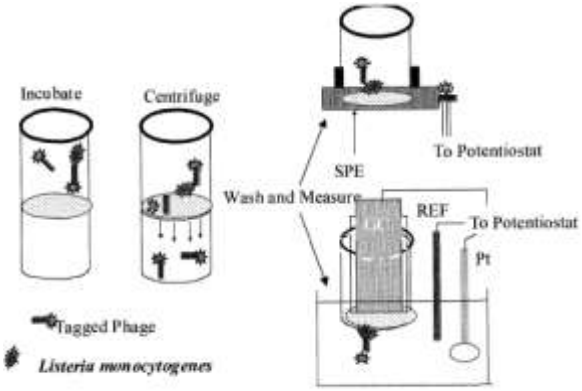


Fig. 4. The experimental set-up for *listeria* capture and detection.

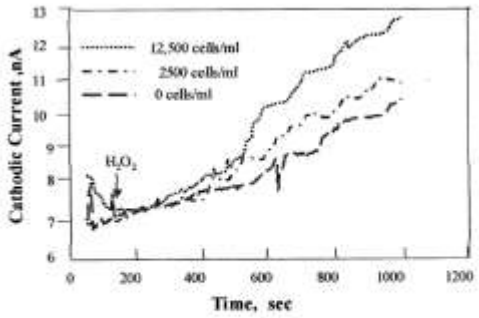


Fig. 5. Amperometric detection of *L. monocytogenes*. Response of filter caps with the bacteria, anti listeria (c4) M13 phage and HRP conjugated anti M13. 0.5 H_2O_2 was added to a solution containing 0.5 mM 5-ASA.

Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Aptamer biyoreseptörler

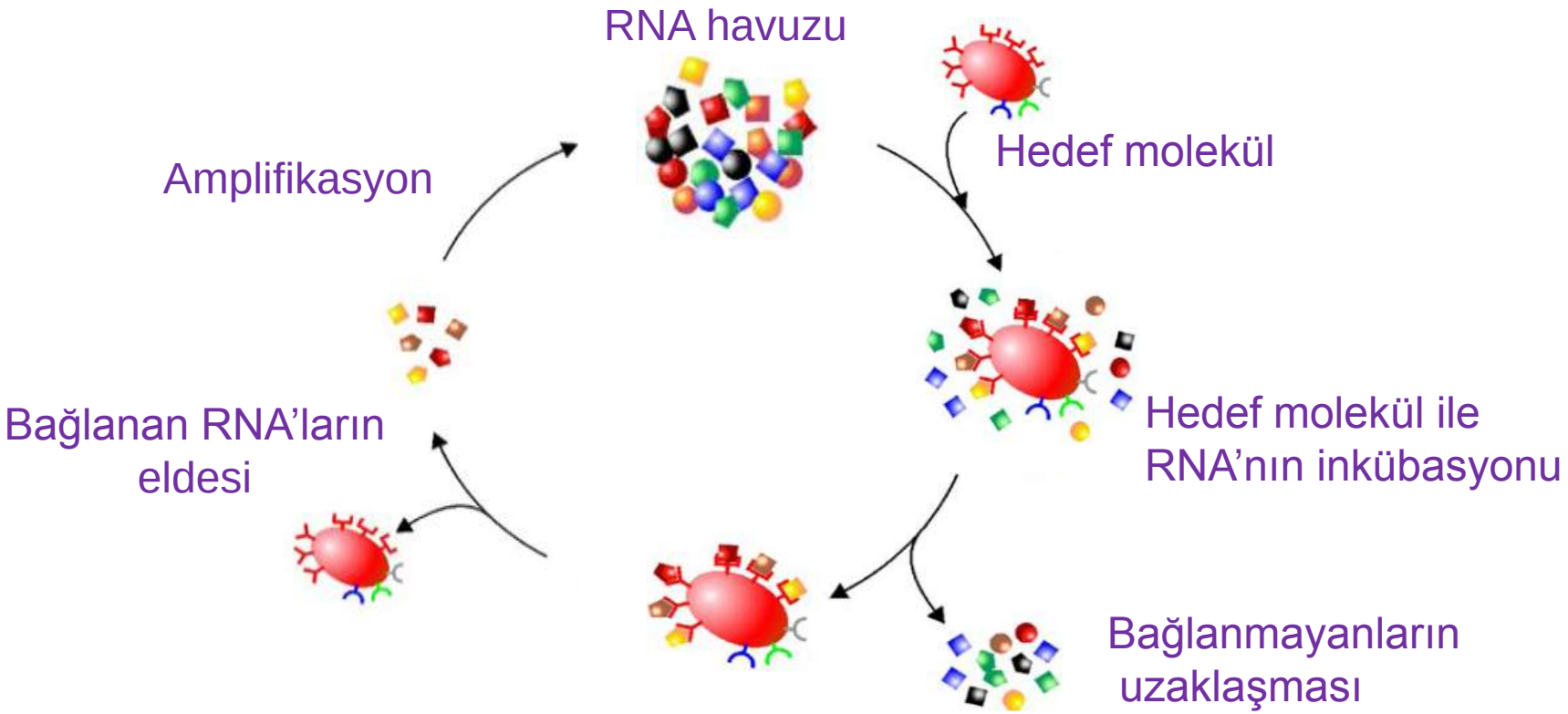
Aptamerler; peptidler, vitaminler, ilaçlar, mikroorganizmalar, bakteri sporları gibi çok çeşitli moleküllere yüksek affinite ve özgüllükte bağlanabilen oligonükleotidlerdir (DNA yada RNA).

Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Aptamer biyoreseptörler

Aptamerler, 1990'lı yılında SELEX (systematic evolution of ligands by exponential enrichment) yöntemi olarak bilinen, *in vitro* seleksiyon ve amplifikasyon tekniği ile keşfedilmişlerdir



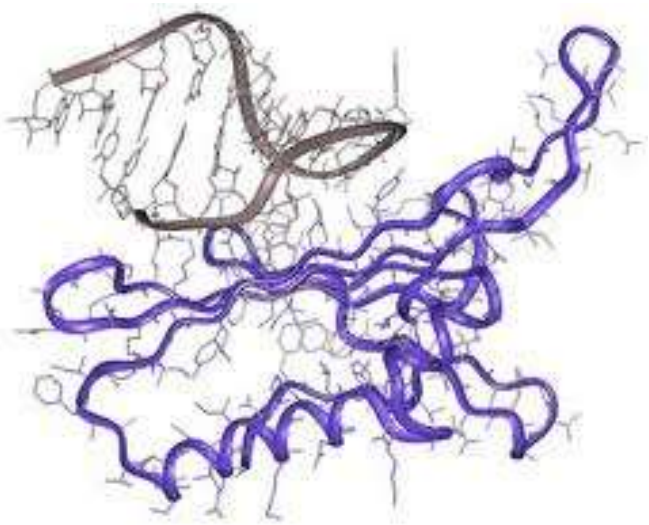
Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Aptamer biyoreseptörler

Aptamer temelli biyosensörler, antikor ve enzim temelli olanlarla karşılaştırıldıklarında bir çok avantaja sahiptirler;

- hedefe karşı seçildiklerinde yüksek özgüllükte ve afinitededirler,
- yüksek miktarda ve saflıkta sentezlenebilir,
- diğerlerinden farklı olarak, DNA aptamerleri çoğunlukla yüksek düzeyde stabildirler. Oda ısısında saklanabilirler.

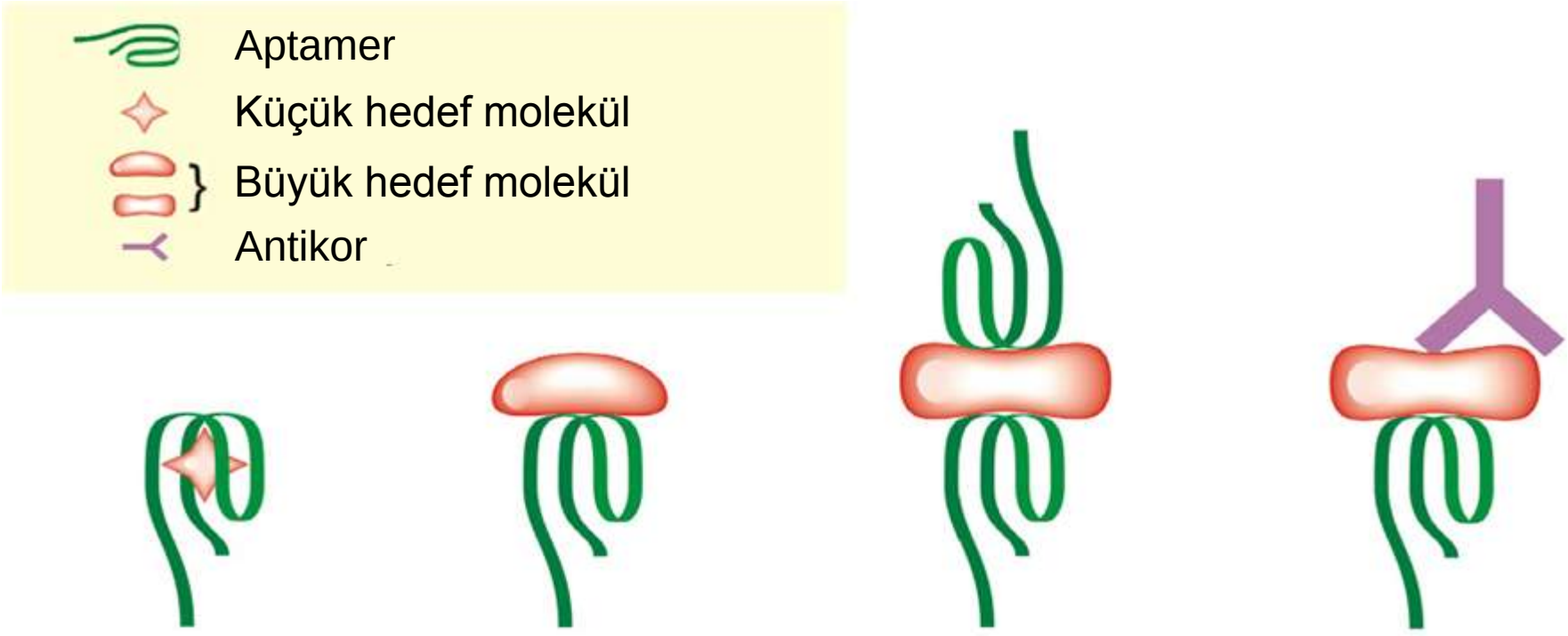


Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Aptamer biyoreseptörler

Yüksek özgüllükte ve afinitedeki aptamerler, *in vitro* ortamda herhangi bir hedefe karşı seçilebilirler. Bu da bir çok farklı aptamer tabanlı biyosensörlerin geliştirilmesini mümkün kılmaktadır.

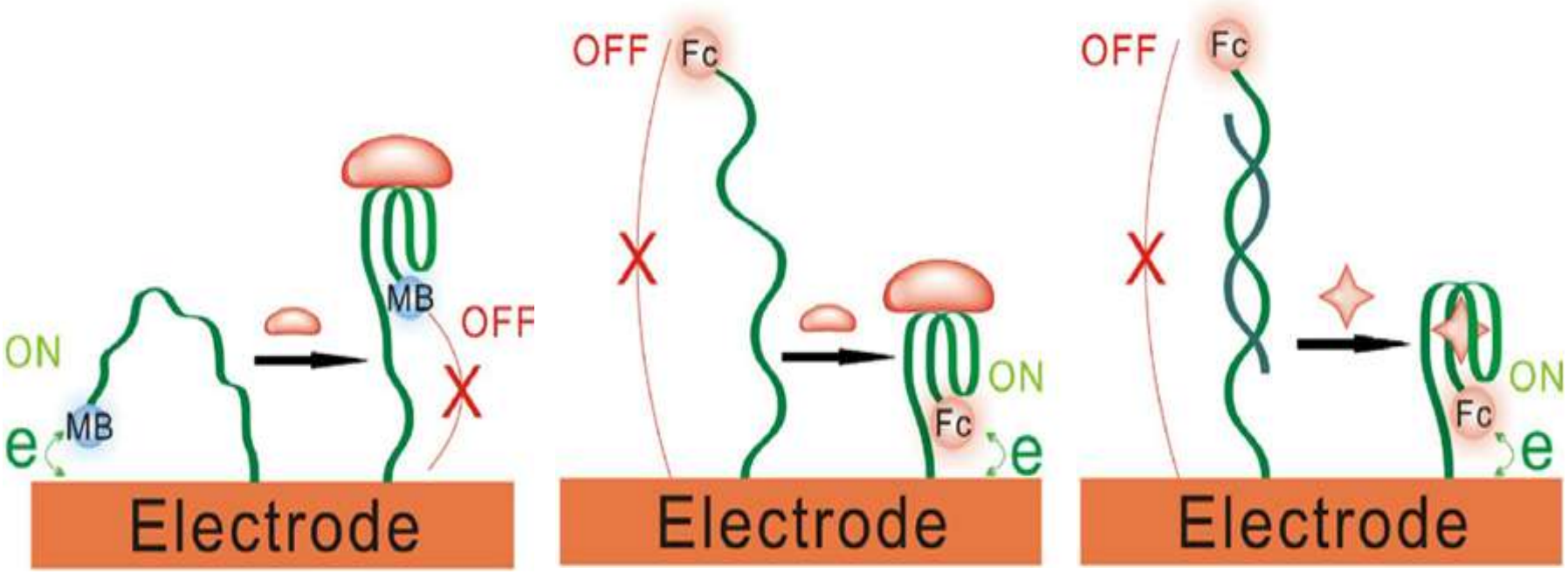


Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Aptamer biyoreseptörler

Aptamerler hedefe bağlandıklarında, belirgin konformasyonel değişikliklere uğrarlar.

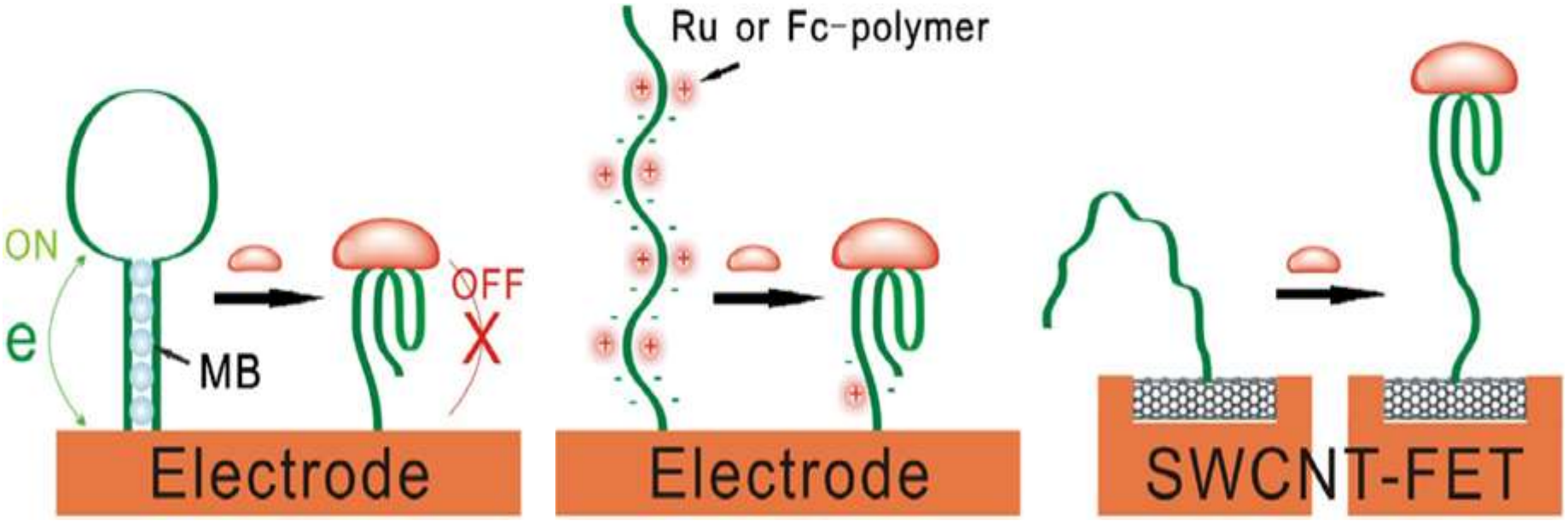


Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Aptamer biyoreseptörler

Aptamerler hedefe bağlandıklarında, belirgin konformasyonel değişikliklere uğrarlar.



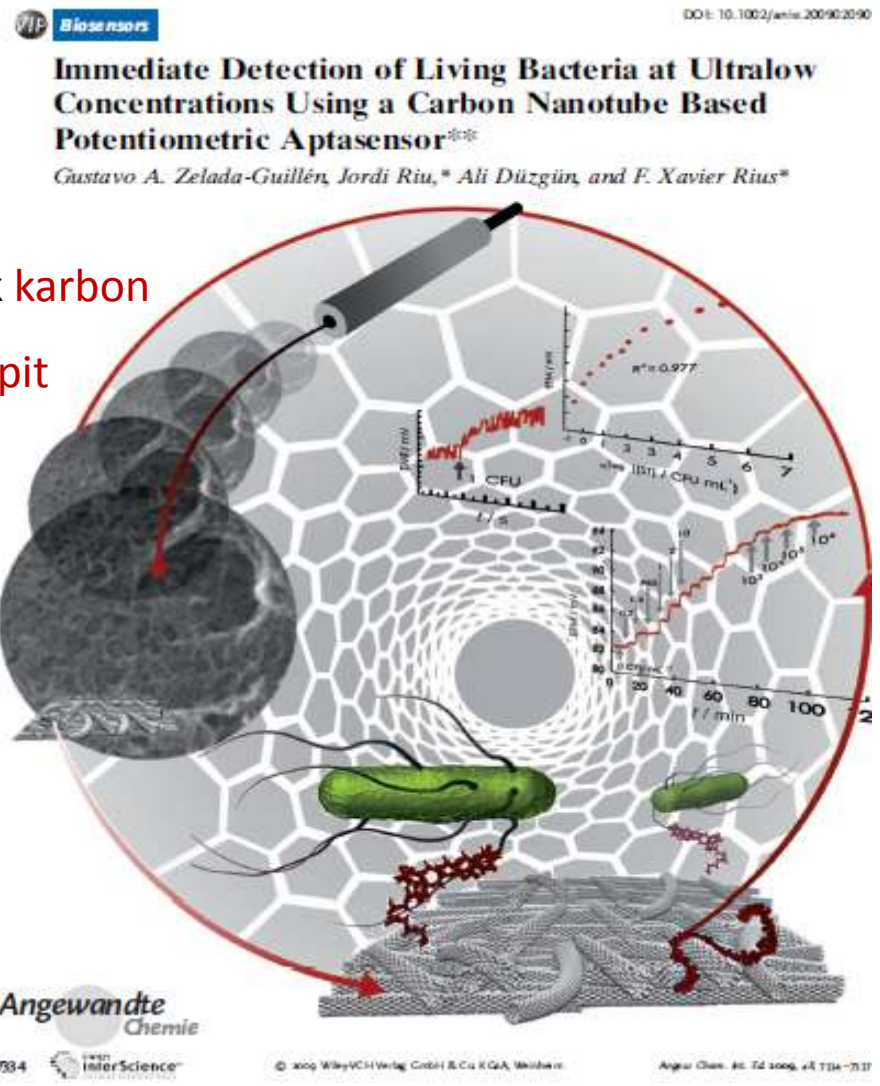
Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Aptamer biyoreseptörler

Zelada-Guillen ve arkadaşları;

biyoreseptör olarak aptamer ve iletken olarak karbon nanotüp kullandıkları, *Salmonella* Typhi'yi tespit edebilecek bir biyosensör geliştirmişlerdir.



Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Aptamer biyoreseptörler

Araştırmacılar geliştirdikleri biyosensör ile 5 ml'lik sıvı içerisindeki tek bir bakteriyi bile %100 duyarlılıkta ve özgülükte tespit edebilmişlerdir.

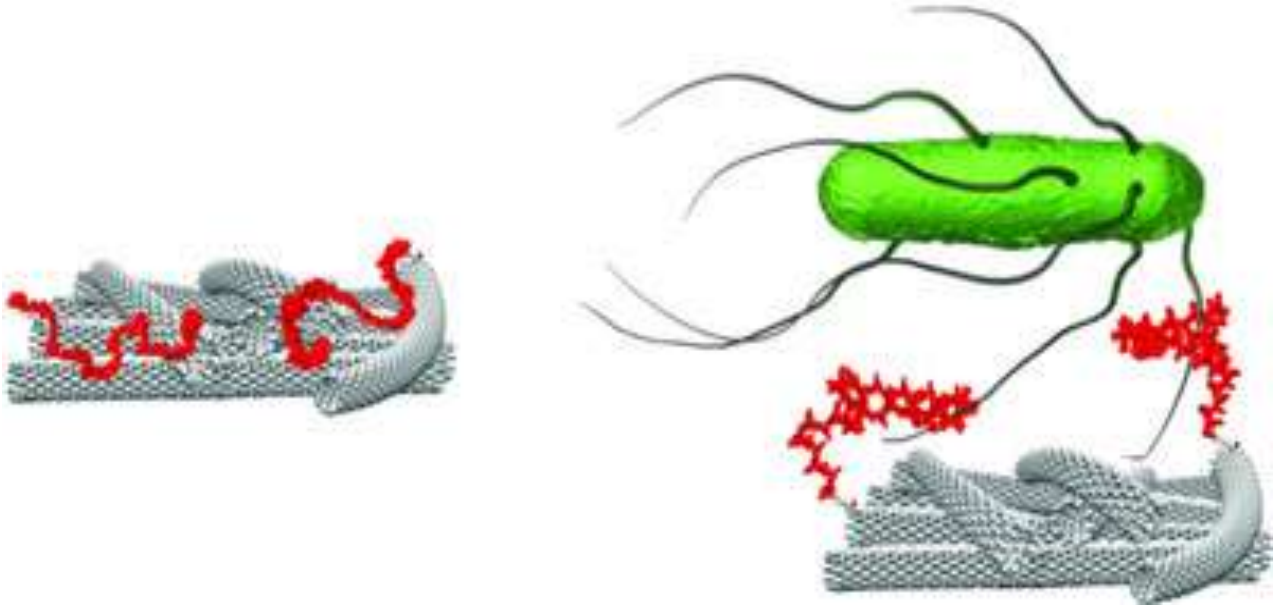


Figure 1. a) Possible conformations of the aptamers that are self-assembled on carbon nanotubes. b) Schematic representation of the interaction between the target bacteria and the hybrid aptamer–SWCNT system.

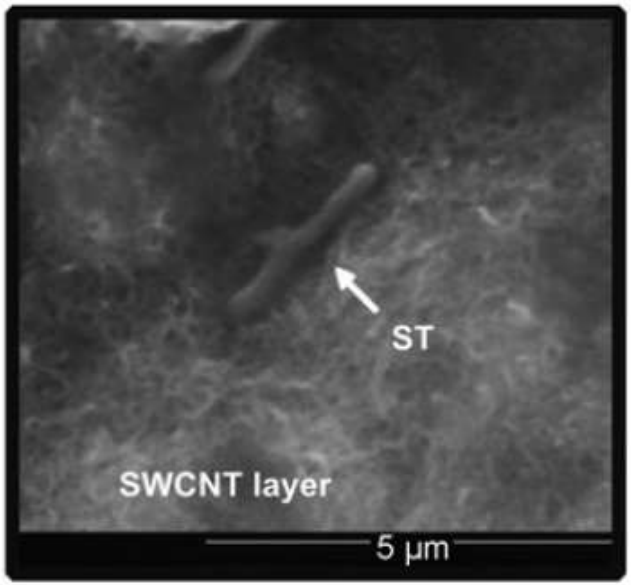
Biyosensörlerin Temel Bileşenleri

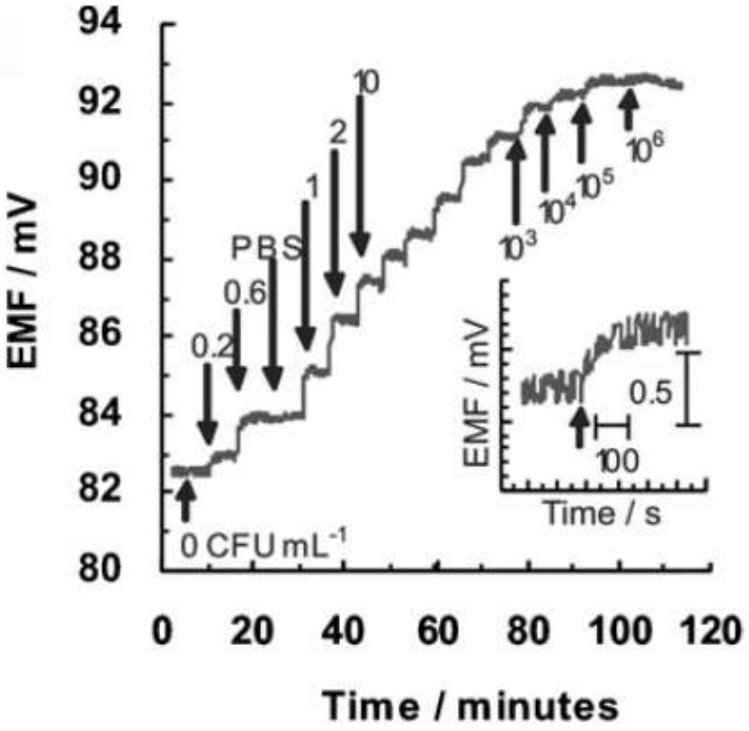
Biyoreseptör moleküller

Aptamer biyoreseptörler

Kantitatif ölçüm de yapabilme kapasitesine sahip bu biyosensör;

aptamer ve bakteri arasındaki bağlanmayı 60 saniyeden kısa sürede gösterebilmektedir.





Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Aptamer biyoreseptörler

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Chip-based detection of hepatitis C virus using RNA aptamers that specifically bind to HCV core antigen

Seram Lee [a,1], Young Sook Kim [b,1], Minjung Jo [a,1], Moonsoo Jin [c],

Abstract

The development of reagents with high affinity and specificity to the antigens of hepatitis C virus (HCV) is important for the early stage diagnosis of its infection. Aptamers are short, single-stranded oligonucleotides with the ability to specifically recognize target molecules with high affinity. Herein, we report the selection of RNA aptamers that bind to the core antigen of HCV. High affinity aptamers were isolated from a 10^{15} random library of 60 mer RNAs using the SELEX procedure. Importantly, the selected aptamers specifically bound to the core antigen, but not to another HCV antigen, NS5, in a protein chip-based assay. Using these aptamers, we developed an aptamer-based biosensor for HCV diagnosis and detected the core antigen from HCV infected patients' sera with good specificity. This novel aptamer-based antigen detection sensor could be applied to the early diagnosis of HCV infection.

Keywords: Hepatitis C virus; SELEX; Aptamers; Biosensor; Diagnosis

Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Aptamer biyoreseptörler

Chip-based detection of hepatitis C virus using RNA aptamers that specifically bind to HCV core antigen

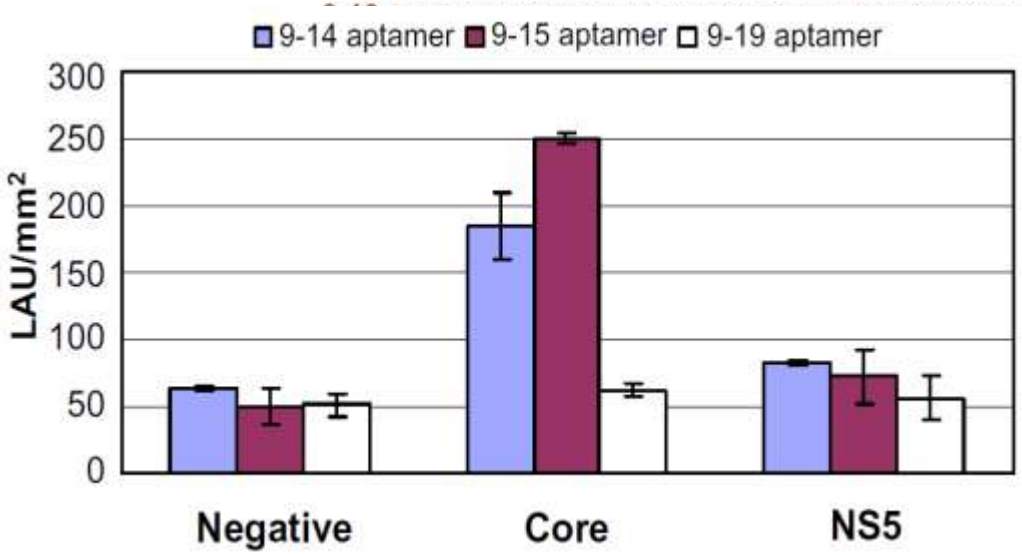
A

9-14 GGGCCGTTCGAACACGAGCATGTTGTCTACGTTGTAGAAGCTGTTATGGTAGGTACTTCCACGAGGTATCAACGGAGTTGGTGGACAGTACTCAGGTCATCCTAGG

9-15 GGGCCGTTCGAACCGAGCATGGATCGAGGATGGGAACACCCAGTAGGAGGATGGGCATGGCCGGACCCAAAATTAGCAGTGGGACAGTACTCAGGTCATCCTAGG

ACATTTGTACGTATCCCATTGGACAGTACTCAGGTCATCCTAGG

AATATAAATGACTAGGCGTGGGACAGTACTCAGGTCATCCTAGG



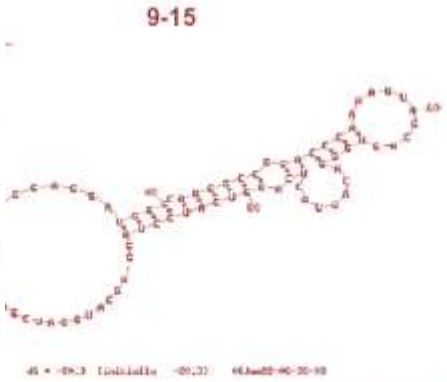


Fig. 2. (A) Sequences of selected aptamers and (B) secondary structure of aptamers 9-14 and 9-15 predicted by Mfold.

Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Aptamer biyoreseptörler

Aptamer biyosensörler ile bakterilerin tespiti virüslere göre daha yeni bir alandır.

Bacillus anthracis, Mycobacterium tuberculosis, Escherichia coli ve Bacillus thuringiensis gibi direkt olarak mikroorganizmaların tespitinde kullanılabilmektedirler.

Target	Application	Counter-selection step	Aptamer sequence(s)	Identification of specific target molecule(s)	Reference
Whole-cell targets					
B. anthracis Sterne strain spores	Detection	–	No sequence reported	Non-identified	Bruno and Kiel (1999)
	Detection	–	3 sequences	Non-identified	Kiel et al. (2004b)
	Detection	–	79 sequences from 13 classes	Non-identified	Zhen et al. (2002)
B. thuringiensis spores	Detection	–	1 sequence	Non-identified	Ikanovic et al. (2007)
E. coli DH5α	Detection	–	1 sequence	Non-identified	So et al. (2008)
M. tuberculosis	Anti-mycobacterial agents	*M. bovis* attenuated strain [Bacillus Calmette-Gue'rin (BCG)]	No sequence reported	Membrane protein	Chen et al. (2007)
T. brucei	Anti-parasitic drugs	–	22 sequences from 3 classes	Parasite flagellar protein	Homann and Goringer (1999)
T. cruzi	Invasion inhibitor agents	*T. cruzi* epimastigotes	23 sequences from 4 classes	Parasite receptors for the host cell matrix molecules laminin, fibronecitin, thrombospondin and heparin sulfate.	Ulrich et al. (2002)
Human Influenza A virus (H3N2) (A/Panama)	Influenza A virus genotyping and inhibitor agent	A/Aichi H3N2 virus strain	2 sequences	Haemagglutinin (HA1 peptide chain)	Gopinath et al. (2006)

Target Application Counter-selection step Aptamer sequence(s) Identification of specific target molecule(s) Reference

Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Aptamer biyoreseptörler

Aynı zamanda *Bacillus thuringiensis* sporlarının, kolera toksini, shiga toksin, stafilokokal enterotoksin B gibi mikroorganizma ürünlerinin aptamer biyosensörler ile gösteriliği yayınlar mevcuttur .

Target	Application	Counter-selection step	Aptamer sequence(s)	Reference
Microbial and viral protein/toxin targets				
Cholera whole toxin	Detection	–	No sequence reported	Bruno and Kiel (2002)
E. coli release factor 1 (RF-1)	Non-sense-suppression-based technology	–	17 sequences from 3 classes	Sando et al. (2007)
Mycobacterium avium subsp. *paratuberculosis* recombinant MAP0105c gene product	Detection	Maltose-bind protein (MBP)	No sequence reported	Bannantine et al. (2007)
S. enterica serovar Typhi IVP pili protein (pre-PilS protein)	Cell invasion inhibitor agent	–	9 sequences reported	Pan et al. (2005)
Shiga toxin	Detection	–	11 sequences	Kiel et al. (2004a)
Staphylococcal enterotoxin B (SEB)	Detection	–	No sequence reported	Bruno and Kiel (2002)
Hepatitis C virus (HCV) non-structural protein 3 (NS3) protease	Anti-HCV agents		3 sequences	Fukuda et al. (2000)
HCV NS3 helicase	Therapeutics and diagnostic	–	4 sequences	Hwang et al. (2004)
HCV NS5B RNA polymerase	Polymerase inhibition	–	7 sequences from 3 classes	Biroccio et al. (2002)
Human immunodeficiency virus 1 (HIV-1) reverse transcriptase (RT)	Reverse transcription inhibition	–	25 sequences	DeStefano et al. (2006)
HIV-1 protein trans-activator of transcription (Tat protein)	Transcription inhibition and detection	–	4 sequences	Yamamoto et al. (2000)
HIV-1 R5 SU glycoptrotein (gp120)	Antiviral	–	27 sequences	Khati et al. (2003)
Influenza A virus (H5N1) HA1 protein	Antiviral	–	2 sequences	Cheng et al. (2008)
SARS coronavirus (SCV) NTPase/Helicase	Anti-SCV agents	–	6 sequences from 3 classes	Jang et al. (2008)

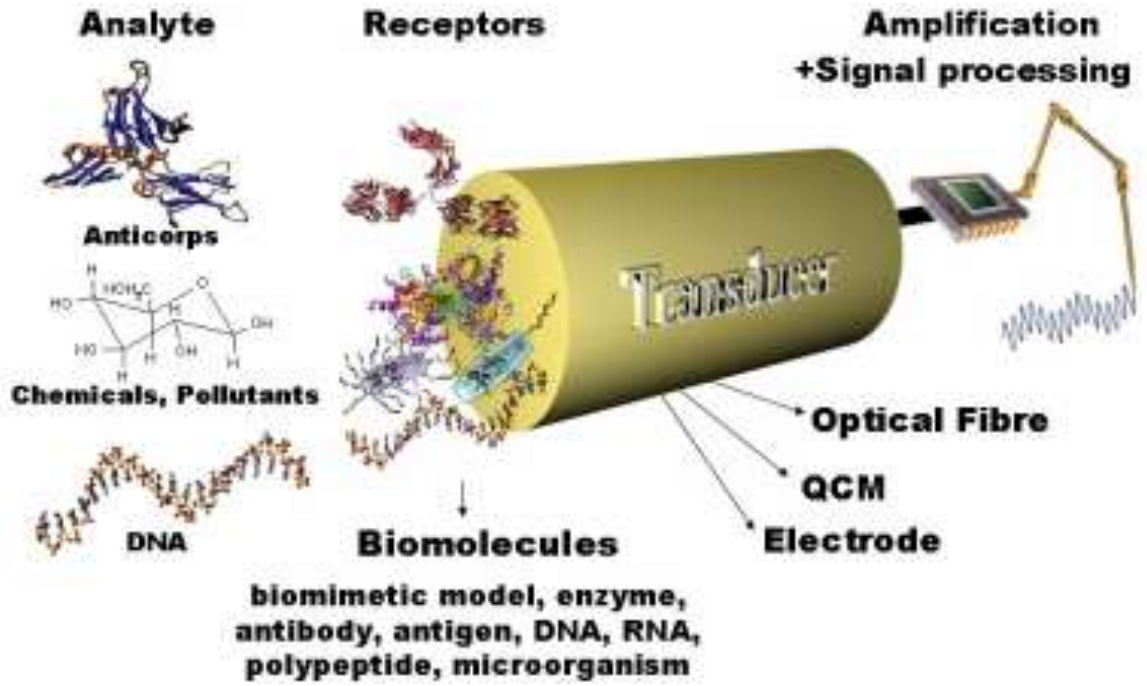
Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Mikroorganizma biyoreseptörler

Biyoreseptör olarak kullanılan birçok biyolojik molekülün orijini mikroorganizmalardır.

Mikroorganizmaların kendileri de biyoreseptör olarak kullanılabilirler .



Biyosensörlerin Temel Bileşenleri

Biyoreseptör moleküller

Mikroorganizma biyoreseptörler

- Çoğunlukla inorganik veya organik toksik kimyasal maddelerin tespitinde kullanılırlar ve diğer biyoreseptör moleküllere göre daha fazla çeşitlilikte kimyasal yapı saptayabilirler.
- Genetik modifikasyonlara uyumlu olmaları, farklı pH ve sıcaklıklarda işlev görebilmeleri mikroorganizmaları ideal biyosensörler yapmaktadır.

Table 2
Potentiometric microbial biosensors

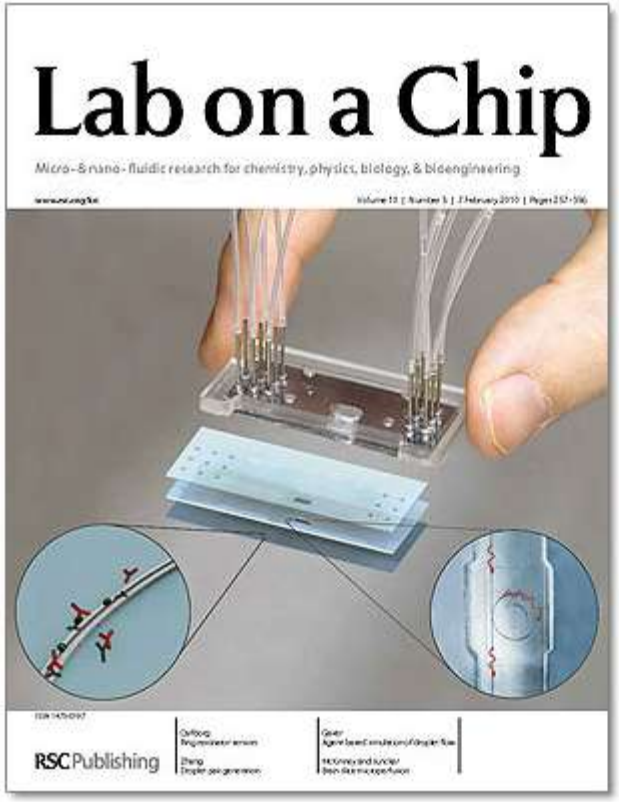
Target	Microorganism	Transducer type	Limit of detection
Organophosphates	*Flavobacteium* sp.	pH electrode	0.025–0.4 mM
Organophosphates	Recombinant *E coli*	pH electrode	2 μM
Organophosphates	Recombinant *E coli*	pH electrode	3 μM
Penicillin	Recombinant *E coli*	Flat pH electrode	5–30 mM
Penicillin	Recombinant *E coli*	pH electrode	1–16 mM
Tryptophan	*E coli* WP2	LAPS	0–12 μM
Urea	*Bacillus* sp.	NH_4^+ ion selective electrode	0.55–550 μM
Trichloroethylene	*P. aeruginosa* JI104	Chloride ion selective electrode	0.03–2 mg/l
Trichloroethylene	*P. aeruginosa* JI104	Chloride ion selective electrode	0.1–4 mg/l
Ethanol	*S. ellipsoideus*	Oxygen	0.02–50 mM
Sucrose	*S. cerevisiae*	Oxygen	3.2 μM

SABIO – nanophotonic biosensors for immunoassays

Ultrahigh sensitivity Slot-wAveguide BIOsensor on a highly integrated chip for simultaneous diagnosis of multiple diseases

2006–2009

In the EU FP6 project SABIO, KTH and the other partners have demonstrated t ring-resonator sensor array integrated fully packaged with a microfluidic netwo used slot waveguides to achieve a refractive index sensitivity of 246 nm/RIU – reported for a silicon nitride ring-resonator. The system noise level of 1.2 pm, a refractive index detection limit of 5x10-6. Refractive Index Units. This is at the the best experimentally demonstrated detection limit of planar ring-resonator s also demonstrated a surface mass detection limit of 0.9 pg/mm2.



NASA Develops Chemical Sensor for iPhone

November 13, 2009 by admin — Leave a Comment
Filed under Mobile, Wireless

Jing Li, a physical scientist at NASA's Ames Research Center, Moffett Field, Calif., along with other researchers working under the Cell-All program in the Department of Homeland Security's Science and Technology Directorate, developed a proof of concept of new technology that would bring compact, low-cost, low-power, high-speed nanosensor-based chemical sensing capabilities to cell phones.

The device Li developed is about the size of a postage stamp and is designed to be plugged in to an iPhone to collect, process and transmit sensor data. The new device is able to detect and identify low concentrations of airborne ammonia, chlorine gas and methane. The device senses chemicals in the air using a "sample jet" and a multiple-channel silicon-based sensing chip, which consists of 16 nanosensors, and sends detection data to another phone or a computer via telephone communication network or Wi-Fi.

www.nasa.gov

- Biyosensörler, örnek alımı ve sonuç verme arasındaki süreyi oldukça kısaltmaktadırlar.
- Nanolitre veya daha az örnek gerektirmeleri ve aynı zamanda yüksek düzeyde duyarlılık ve özgüllüğe sahip olmaları en önemli avantajlarıdır.
- Ölçüm sistemlerinin otomasyona uygun ve taşınabilir olması değişik alanlarda kullanımlarına imkan vermektedir.
- Buna karşın biyosensörlerin geleceğini maliyet-etkin olmaları belirleyecektir.

Dates announced for 2012!

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