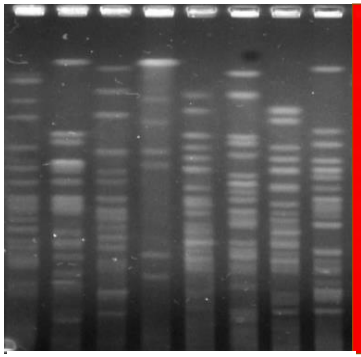


Hastane İnfeksiyonları ve Mikrobiyoloji Laboratuvarı

Barış Otlu
İnönü Üniversitesi Tıp Fakültesi
Tıbbi Mikrobiyoloji Anabilim Dalı

Hastane İnfeksiyonları Tarihi

3. Yüzyıl Roma Şiiri, Bir hastanın Dr. Simmakus'a seslenişi

"Hasta oluyordum ve sen hemen geldin

Yanında yüz öğrenciyle, ah Simmakus

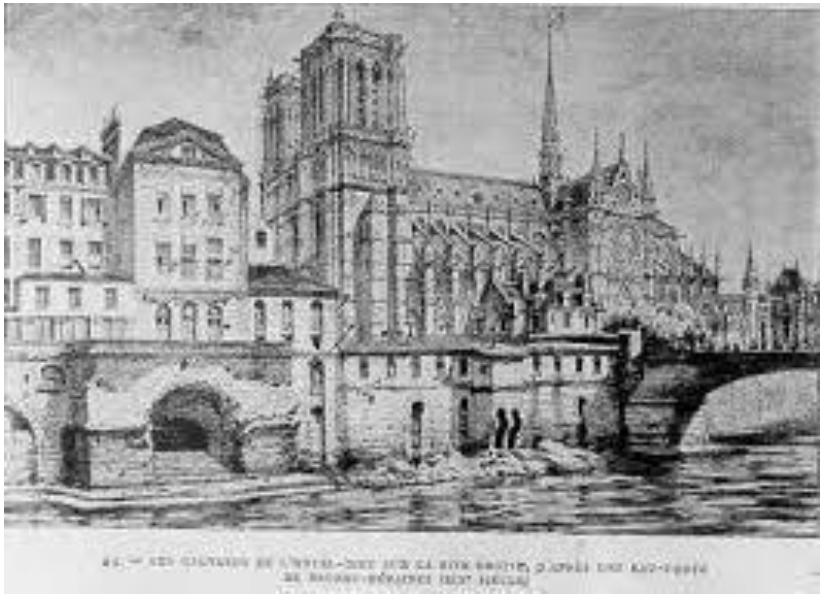
Yüz soğuk el bana dokundu

Hiç ateşim yoktu, ah Simmakus, şimdi var"

Kurtuluş Töreci, Hastane İnfeksiyonlarının tarihçesi
Hastane İnfeksiyonları Kirabı, 2003

Hastane İnfeksiyonları Tarihi

- Hastane, hastane infeksiyonları ve mikrobiyolojik tanı kavramlarının birlikte geliştiği düşünülebilir.

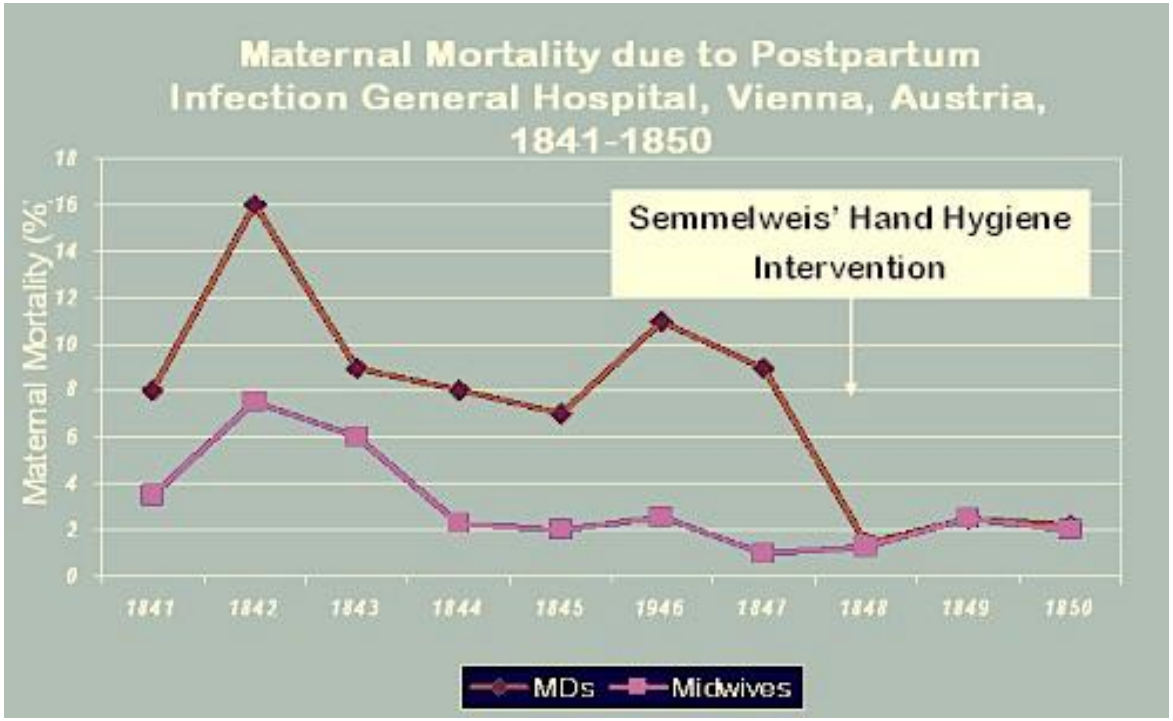


18.yy' da Hotel Dieu;
ampütasyonlardan ölüm oranı %60
salgın sırasında lohusalık hummasından ölüm oranı 19/20

Hastane İnfeksiyonları Tarihi

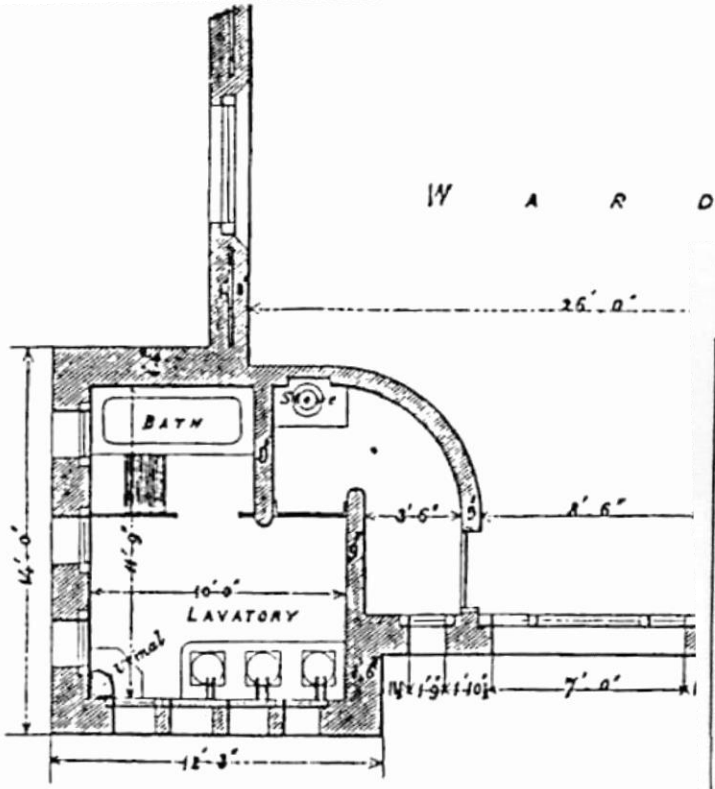
- 1840 Hastane İnfeksiyonlarının tespiti ve önlenmesi ile ilgili ilk bilimsel yaklaşım.

Ignaz Semmelweis



Hastane İnfeksiyonları Tarihi

from *Notes on Hospitals* published in 1863



Plan of Lavatory, Baths, and Water-closet

from

HOSPITAL GENERAL STATISTICAL FORM.

This Sheet will serve for the Classification of Cases in Hospitals under the following headings:—"Remaining, 1st January"—"Admitted"—"Cured (or Relieved)"—"Dead"—"Discharged incurable, for Irregularities, or at their own Request"—"Remaining, 31st December"—"Duration of Cases in Days."

Write the Name of Hospital, the Sex, the required Heading, and Date, with the Pen.

Ages — Months: 0, 3, 6 — 1, 2, 3, 4, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95 and upwards. Total.

CLASS I.—ORDER I. (ZYMOTIC DISEASES.)
1. Small Pox
Measles
Whooping Cough
Croup
Scarlatina
Quinsy
Diphtheria
Cynanche, Catarrh, Influenza
Ophthalmia (purulent)
Erysipelas
Metria (puerperal Fever)
Pyæmia
Hospital gangrene
Carbuncle, Boil
Dysentery
Diarrhœa
Cholera
Typhoid Fever (typhia)
Typhus
Relapsing Fever (typhinia)
Ague
Remittent Fever
Rheumatism
OTHERS

ORDER II.
Gonorrhœa
Primary Syphilis
Secondary Syphilis
Tertiary Syphilis
OTHERS

ORDER III.
Scurvy
Purpura
Alcohol { a. Delirium tremens / b. Intemperance }
OTHERS

ORDER IV.
Thrush
Porrigo
Scabies
Worms
OTHERS

CLASS II.—ORDER I. (CONSTITUTIONAL DISEASES.)
Gout
Dropsy
Cancer
Cachexy (scorbutic)
Mortification
OTHERS

ORDER II.
Scrofula
Tuberculous Meningitis

Most of the diseases in the following marginal list are of less frequent occurrence in hospitals; and all, with some exceptions, are classed as "Others" in their respective orders in the left-hand column. They will be distinguished in abstracting the diseases by writing the ages of the persons attacked, cured, or dead, &c., against the particular disease in the margin below. Thus, a person aged 16 would, if admitted for "mumps," be indicated in the body of this sheet by a tick against "Others" of Class I. Order I.; and his age (16) would be written against "mumps" in the margin. And so of other diseases. The diseases not found printed in the margin must be written in their proper compartments. A summary of the facts in the margin should be given in an appendix to the general Tables.

CLASS I.
ORDER I.
variola
varicella
miliaria
morbilli
erythema
dysentery with abscess of liver (placed to dysentery)
yellow fever

ORDER II.
leprosy (Greek elephantiasis)
glanders
hydrophobia
malignant pustule
bronchocele
cretinism
ergotism

ORDER III.
rickets

ORDER IV.

Hastane İnfeksiyonları Tarihi-Yoğun Bakımlar

- 1952

Intensive care medicine is 60 years old: the history and future of the intensive care unit

Authors: Fiona E Kelly,[A] Kevin Fong,[B] Nicholas Hirsch[C] and Jerry P Nolan[D]

Intensive care is celebrating its 60th anniversary this year. The concept arose from the devastating Copenhagen polio epidemic of 1952, which resulted in hundreds of victims experiencing respiratory and bulbar failure. Over 300 patients required artificial ventilation for several weeks. This was provided by 1,000 medical and dental students who were employed to hand ventilate the lungs of these patients via tracheostomies. By 1953, Bjorn Ibsen, the anaesthetist who had suggested that positive pressure ventilation should be the treatment of choice during the epidemic, had set up the first intensive care unit (ICU) in Europe, gathering together physicians and physiologists to manage sick patients – many would consider him to be the 'father' of intensive care. Here, we discuss the events surrounding the 1952 polio epidemic, the subsequent development of ICUs throughout the UK, the changes that have occurred in intensive care over the past 10 years and what the future holds for the specialty.

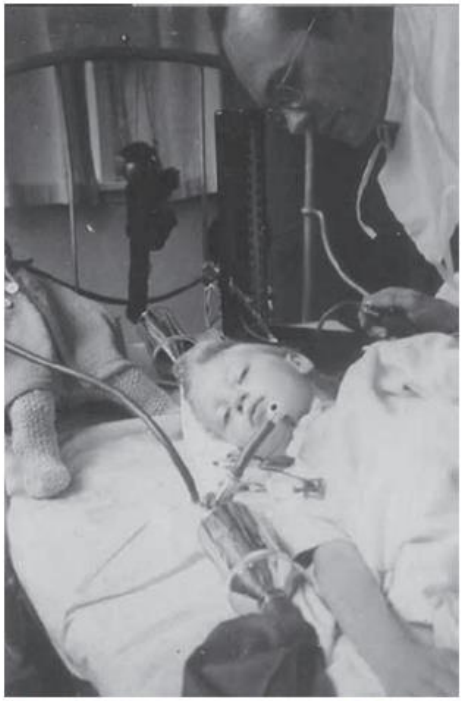


Fig 3. An 8-year-old girl being hand ventilated via a tracheostomy.

Fig 1. Coventry alligator iron lung.

Hastane İnfeksiyonları Tarihi-Yoğun Bakımlar

Causative organism	No. of infections	Site of infection: Sputum	Tracheostomy	Wound swab	Urine
Coliforms	39	18	6	5	10
Ps. aeruginosa	21	11	7	2	1
Proteus spp.	9	5	1	1	2
H. influenzae	6	5	1	0	0
Strep. pneumoniae	3	3	0	0	0
Staph. aureus	21	10	4	7	0
Strep. faecalis	4	0	1	3	0
Strep. pyogenes	3	0	0	3	0
Candida spp.	14	3	11	0	0
Clostridium welchii	1	0	0	1	0
Totals	121	55	31	22	13

Plan of the Intensive Therapy Unit at the Royal Hospital, Sheffield.

Yoğun Bakım ve Salgınlar

Journal of Hospital Infection (2009) 73, 355–363

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REVIEW

Acinetobacter: an old friend, but a new enemy

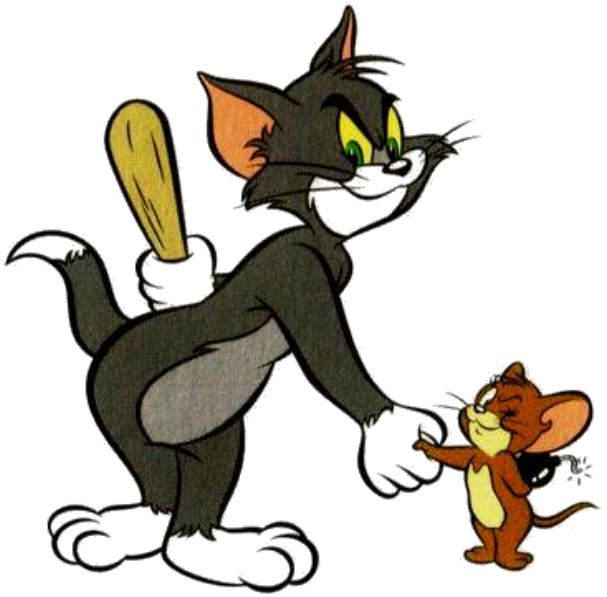
K.J. Towner*

Department of Clinical Microbiology, Nottingham University Hospitals NHS Trust, Queen's Medical Centre, Nottingham NG7 2UH, UK

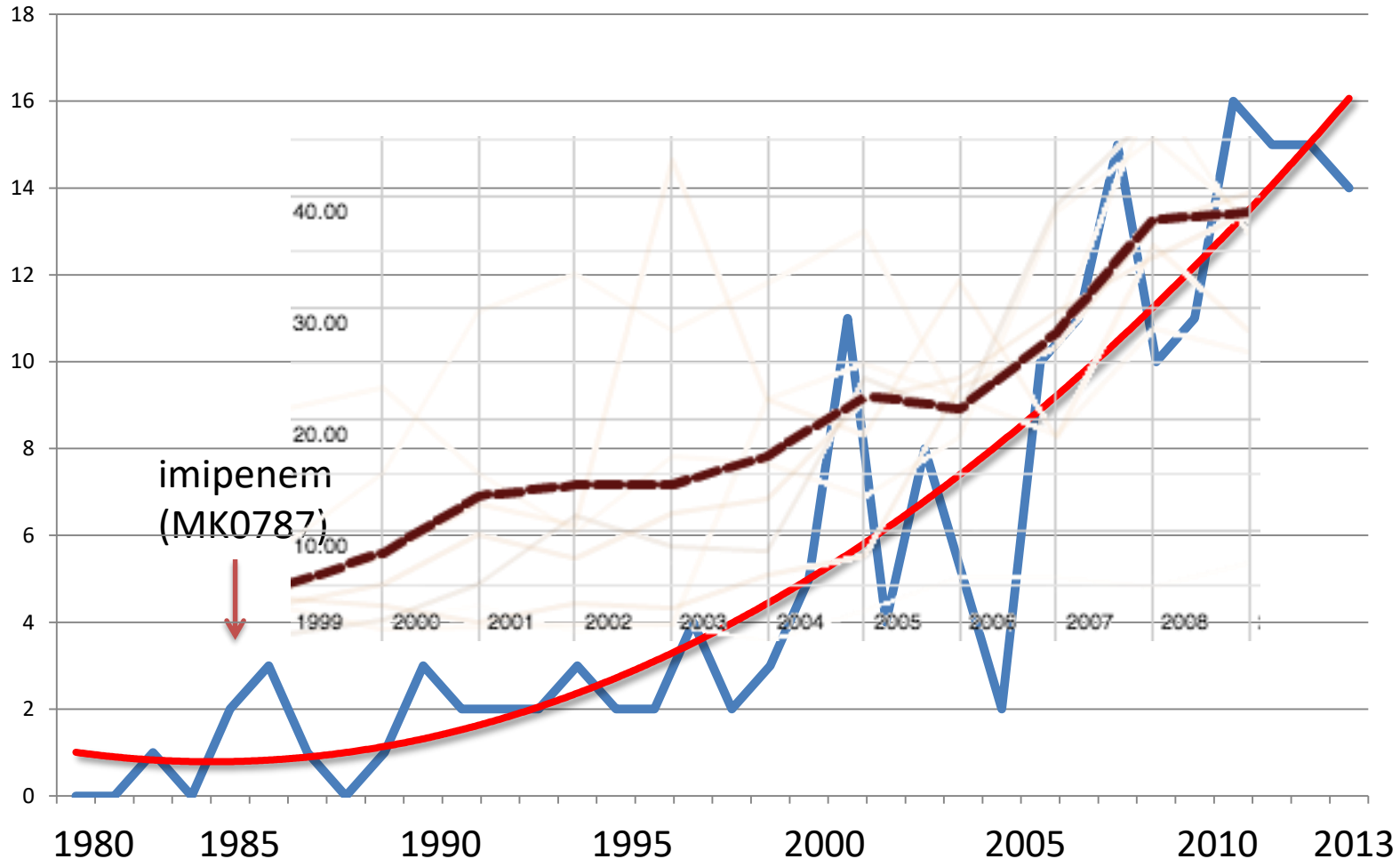
Available online 22 August 2009

KEYWORDS
Acinetobacter;
Epidemiology;
Infection control measures;
Nosocomial infection;
Therapeutic options

outbreaks can occur in such units, involving the infection or colonisation of numerous patients by specific epidemic strains of *A. baumannii*. Recently, a particular problem has concerned cross-infection of injured military patients repatriated from combat regions of the world (e.g. Iraq and Afghanistan). Carbapenems have previously been the treatment of choice for infected patients, but increasing reports worldwide now describe *A. baumannii* isolates resistant to all conventional antimicrobial regimens. Data to support therapeutic use of the limited number of new antimicrobial agents (e.g. tigecycline) with in-vitro activity against these pathogens are still very limited. Detailed advice concerning prevention and control of outbreaks caused by multidrug-resistant strains of acinetobacter is available from the UK Health Protection Agency. In addition to antibiotic prescribing policies and audit, these measures focus on reinforcing standard infection control procedures and precautions, with particular attention to thorough cleaning of patient areas to take account of the long-term survival of acinetobacter after drying and inadequate disinfection. Despite these measures, the problem continues to escalate, with many hospitals worldwide now reporting outbreaks caused by multidrug-resistant strains of acinetobacter.



PubMed'de son 35 yılda 200 den fazla *Acinetobacter spp.* salgını yayın haline gelmiş !!!



CDDEP THE CENTER FOR Disease Dynamics, Economics & Policy

Hastane İnfeksiyonları ve Mikrobiyoloji Laboratuvarı

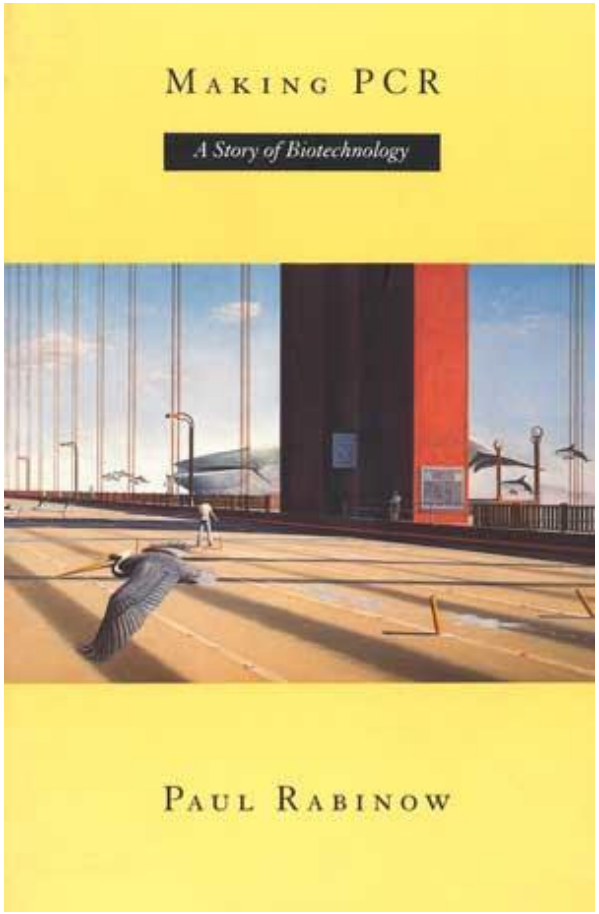
- İnfeksiyona neden olan etkenin belirlenmesi
  - Etkenin hızla tespiti
  - Antimikrobiyal duyarlılığın belirlenmesi
  - Antibiyotik direnç genlerinin tespit edilmesi
  - Virülans genlerinin belirlenmesi
- İzolatlar arasındaki klonal ilişkinin ve bulaş kaynağının araştırılması
  - Hastane salgınlarının araştırılması
  - Salgının kaynağının belirlenmesi
  - Dirençli bakterilerin izlenmesi
  - Re-aktivasyonun yeni bulaştan ayırt edilmesi

Enfeksiyon etkenin tespiti

- Etkenin hızla tespiti

Enfeksiyon etkenin tespiti

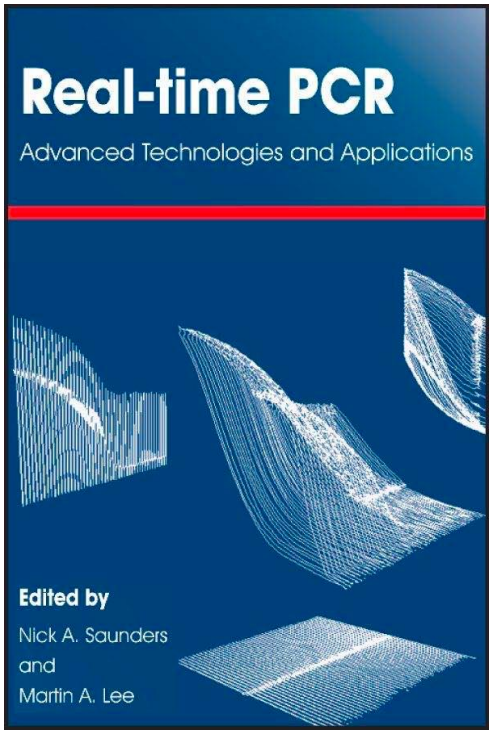
- Moleküler yöntemlerle etkenin tespiti



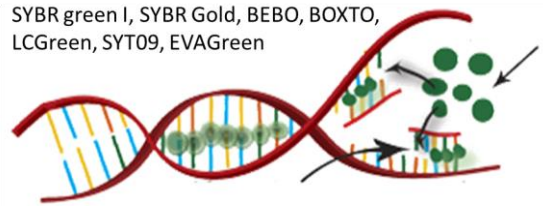
- *PCR*
- *Multiplex PCR*
- *Nested PCR*
- *Seminetested PCR*
- *Broad Range PCR*
- *Hot Start PCR*
- *Touchdown PCR*
- *Reverse Transcription PCR*
- *Real-time PCR*

Enfeksiyon etkenin tespiti

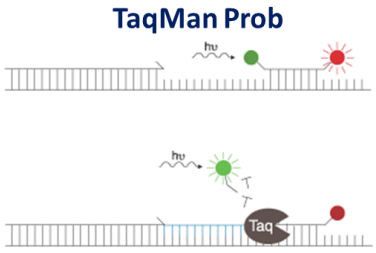
- Moleküler yöntemlerle etkenin tespiti

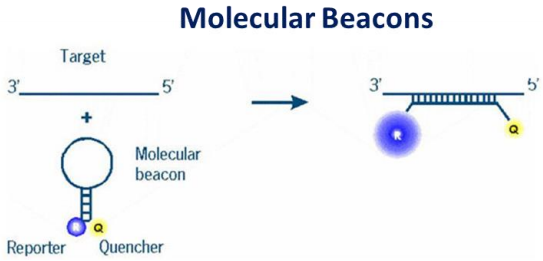


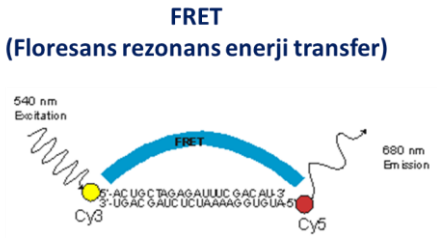
- Özgül olmayan saptama; florojenik boyalarla

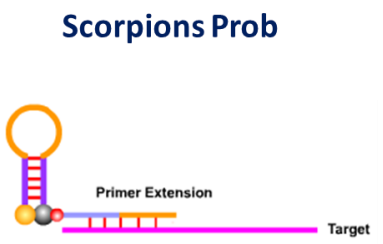


- Özgül saptama; sekans spesifik florojenik oligonükleotid problarla









Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti
  - Real-time PCR cihazları laboratuvarlarda yerini aldılar.

Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti

Healthcare Associated Infections

- Xpert MRSA
- Xpert SA Nasal Complete
- Xpert MRSA/SA SSTI
- Xpert MRSA/SA BC
- Xpert C. difficile
- Xpert C. difficile/Epi
- Xpert vanA
- Xpert Norovirus
- Xpert Carba-R

Critical Infectious Diseases

- Xpert MTB/RIF
- Xpert Flu
- Xpert Flu/RSV XC
- Xpert EV

Sexual Health

- Xpert CT/NG
- Xpert GBS
- Xpert GBS LB

Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti

Healthcare Associated Infections

- Xpert MRSA
- Xpert SA Nasal Complete
- Xpert MRSA/SA SSTI
- Xpert MRSA/SA BC
- Xpert C. difficile
- Xpert C. difficile/Epi
- Xpert vanA
- Xpert Norovirus
- Xpert Carba-R

Critical Infectious Diseases

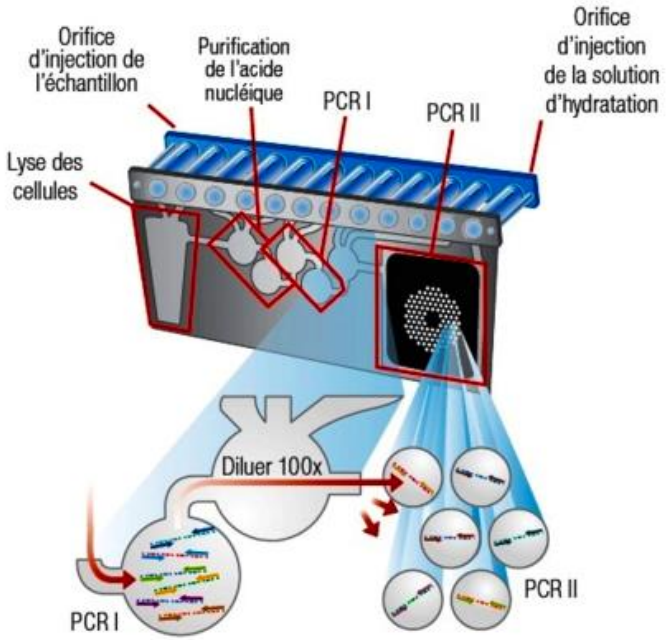
- Xpert MTB/RIF
- Xpert Flu
- Xpert Flu/RSV XC
- Xpert EV

Sexual Health

- Xpert CT/NG
- Xpert GBS
- Xpert GBS LB

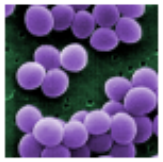
Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti
  - Yüksek multipleks kapasiteye sahip cihazlar (Biofire, Filmarray)



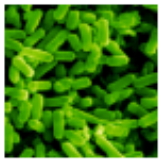
Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti
  - Yüksek multipleks kapasiteye sahip cihazlar. Biofire, Filmarray



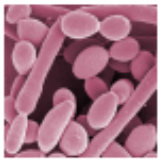
Gram-Positive Bacteria

Enterococcus
Listeria monocytogenes
Staphylococcus
Staphylococcus aureus
Streptococcus
Streptococcus agalactiae
Streptococcus pneumoniae
Streptococcus pyogenes



Gram-Negative Bacteria

Acinetobacter baumannii
Haemophilus influenzae
Neisseria meningitidis
Pseudomonas aeruginosa
Enterobacteriaceae
Enterobacter cloacae complex
Escherichia coli
Klebsiella oxytoca
Klebsiella pneumoniae
Proteus
Serratia marcescens



Yeast

Candida albicans
Candida glabrata
Candida krusei
Candida parapsilosis
Candida tropicalis

Antibiotic Resistance Genes

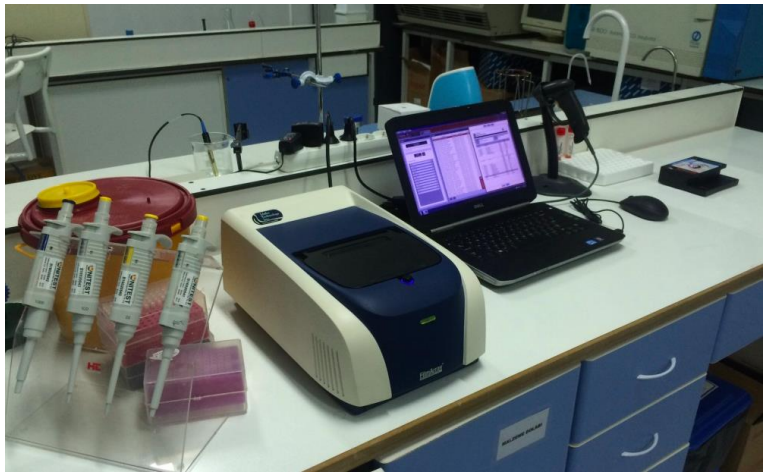
mecA – methicillin resistant
vanA/B – vancomycin resistant
KPC – carbapenem resistant

Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti

Rapid Detection of Bloodstream Pathogens in Liver Transplantation Patients With FilmArray Multiplex Polymerase Chain Reaction Assays: Comparison With Conventional Methods

B. Otlu[a,*], Y. Bayindir[b], F. Ozdemir[c], V. Ince[c], S. Cuglan[a], M. Hopoglu[b], Y. Yakupogullari[a], C. Kizilkaya[d], C. Kuzucu[a], B. Isık[a], and S. Yilmaz[c]



Gram negative bacteria	Gram positive bacteria	Yeast	Antimicrobial resistance genes
Acinetobacter baumannii *Haemophilus influenzae* *Neisseria meningitidis* *Pseudomonas aeruginosa* *Enterobacter cloacae* complex *Escherichia coli* *Klebsiella oxytoca* *Klebsiella pneumoniae* *Proteus spp.* *Serratia marcescens*	*Enterococcus spp.* *Listeria monocytogenes* *Staphylococcus spp.* *Staphylococcus aureus* *Streptococcus spp.* *Streptococcus agalactiae* *Streptococcus pneumoniae* *Streptococcus pyogenes*	*Candida albicans* *Candida glabrata* *Candida krusei* *Candida parapsilosis* *Candida tropicalis*	*mecA* - methicillin resistance gene *vanA/B* - vancomycin resistance gene KPC - carbapenem resistance gene

Enfeksiyon etkenin tespiti

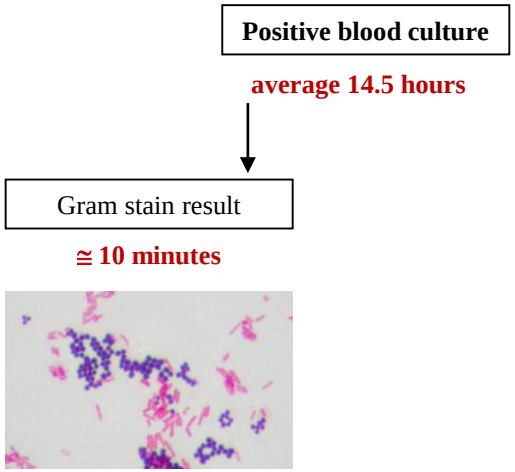
- Moleküler yöntemlerle etkenin tespiti
  - Ortalama kan kültür pozitiflik süresi: 14.5 saat

Positive blood culture

average 14.5 hours

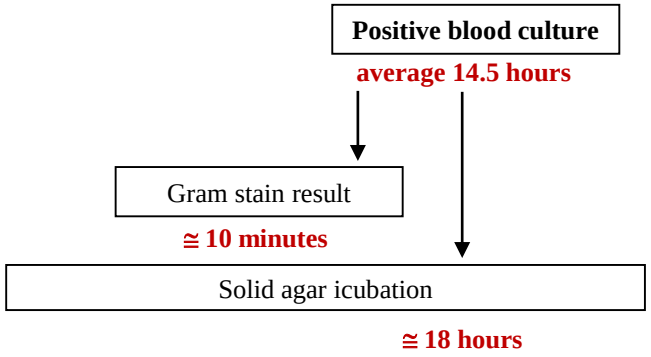
Enfeksiyon etkenin tespiti

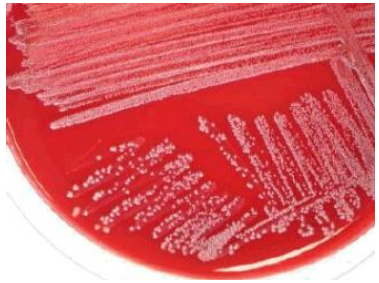
- Moleküler yöntemlerle etkenin tespiti
  - Gram boyama



Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti
  - Kültür sonucu



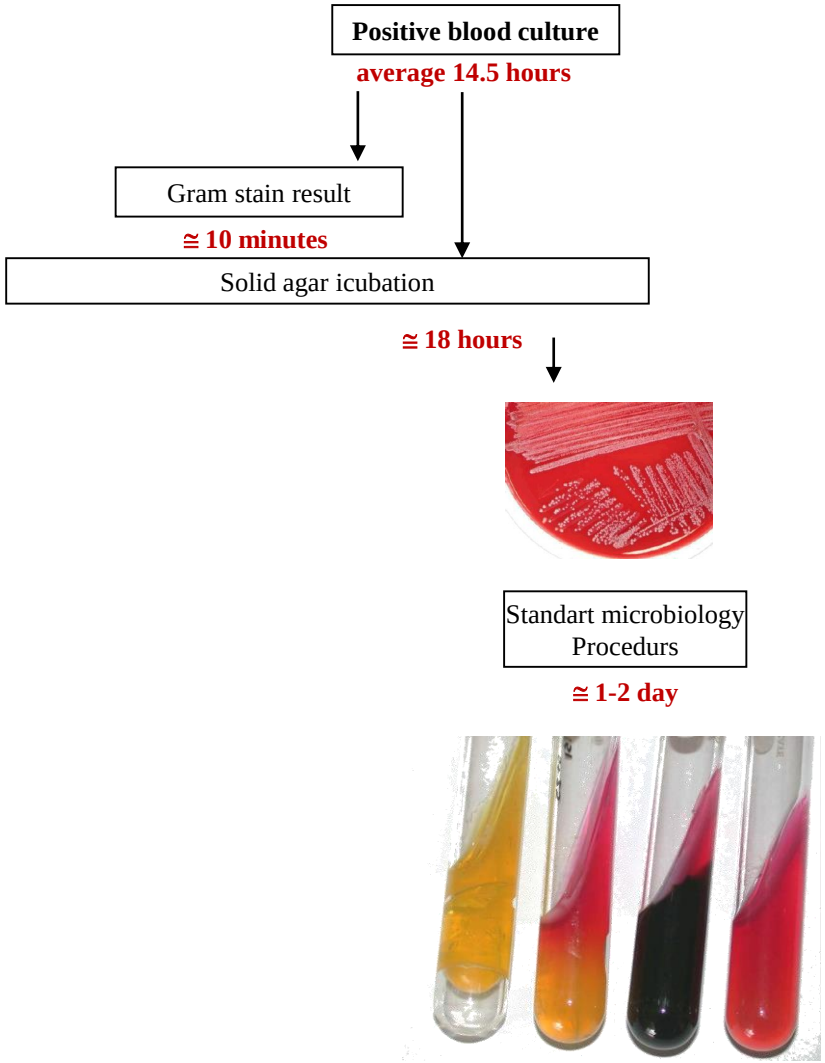


Saf kültür

Subkültür?

Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti
  - Kültür sonucu ve tanımlama



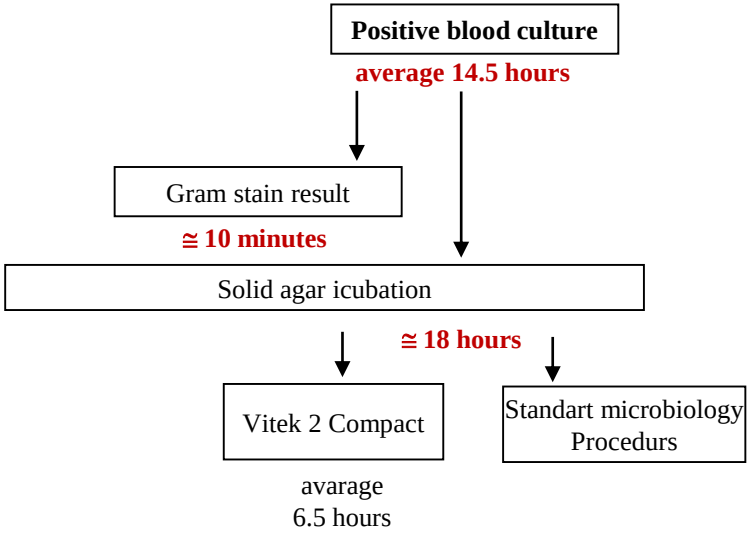
Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti
  - Kültür sonucu

Sample No	Time to blood positvity (hours)	Gram stain from positive bottle	Identification after solid agar incubation (18 hours) Standart microbiology methods / Time to result (day)
1	11.5	Gr - bacilli	*Enterobacter spp.* / 4
2	8.2	Gr - bacilli	*E. coli* / 1
3	10.2	Gr - bacilli	*K. pneumoniae* /1
4	25.2	Gr - bacilli	*K. pneumoniae* / 1
5	8.1	Gr - bacilli	*K. pneumoniae* / 1
6	7.2	Gr + cocci	*Acinetobacter spp.* / 4
7	10.1	Gr + cocci	*Acinetobacter spp.* /1
8	100.8	Gr - bacilli	*K. pneumoniae* / 1
9	10.4	Gr - bacilli	*E. coli* / 1
10	12.1	Gr + cocci	*Enterococcus spp.* / 1
11	18.6	Gr + cocci	*Enterococcus spp.* / 2
12	14.1	Gr + cocci	*Micrococcus spp.* / 2
13	15.5	Gr - bacilli	*Morganella spp.* / 2
14	11.4	Gr + cocci	Contamination with skin flora
15	38.6	Gr + cocci	Contamination with skin flora
16	12.1	Gr - bacilli	*Enterobacter spp.* / 2
17	9.7	Gr + cocci	*Acinetobacter spp.* / 1
18	10.6	Gr - bacilli	*E. coli,* / 1
19	71.1	Yeast	*Canida spp.* / 1
20	9.4	Gr - bacilli	*E. coli* / 1
21	12.4	Gr - bacilli	*Morganella spp.* /1
22	8.2	Gr - bacilli	*K. pneumonia,* / 1
23	11.1	Gr - bacilli	*E. coli,* ESBL (+) / 1
24	14.4	Gr - bacilli	*E. coli,* ESBL (+) / 1
25	10.1	Gr + cocci	*Acinetobacter spp.* / 1
26	17.4	Gr - bacilli	*P. aeruginosa* / 1
27	52.1	Gr - bacilli	*K. pneumoniae* / 1
28	49.4	Gr - bacilli	*K. pneumoniae* / 1
29	8.8	Gr - bacilli	*E. coli,* ESBL (+), carbepenemase (+) / 2
30	12.2	Gr - bacilli	*E. coli,* ESBL (+), carbepenemase (+) /1
31	10.4	Gr + cocci	*Acinetobacter spp.* / 1

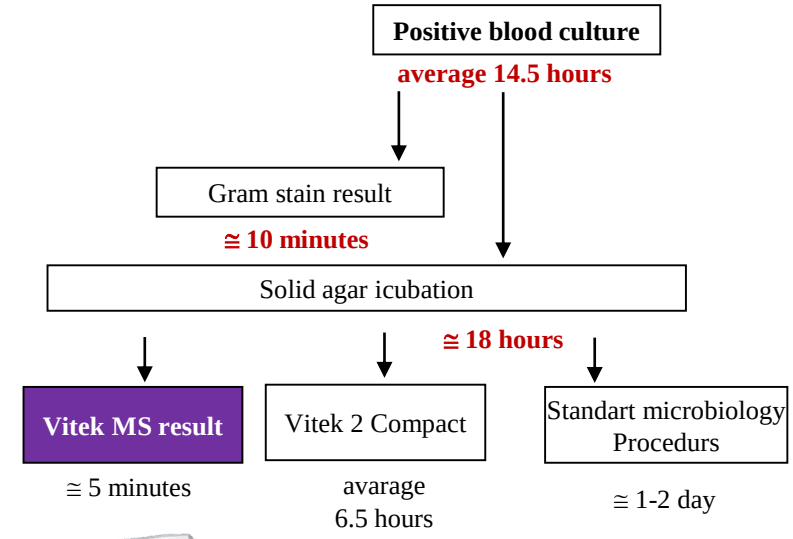
Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti
  - Kültür sonucu



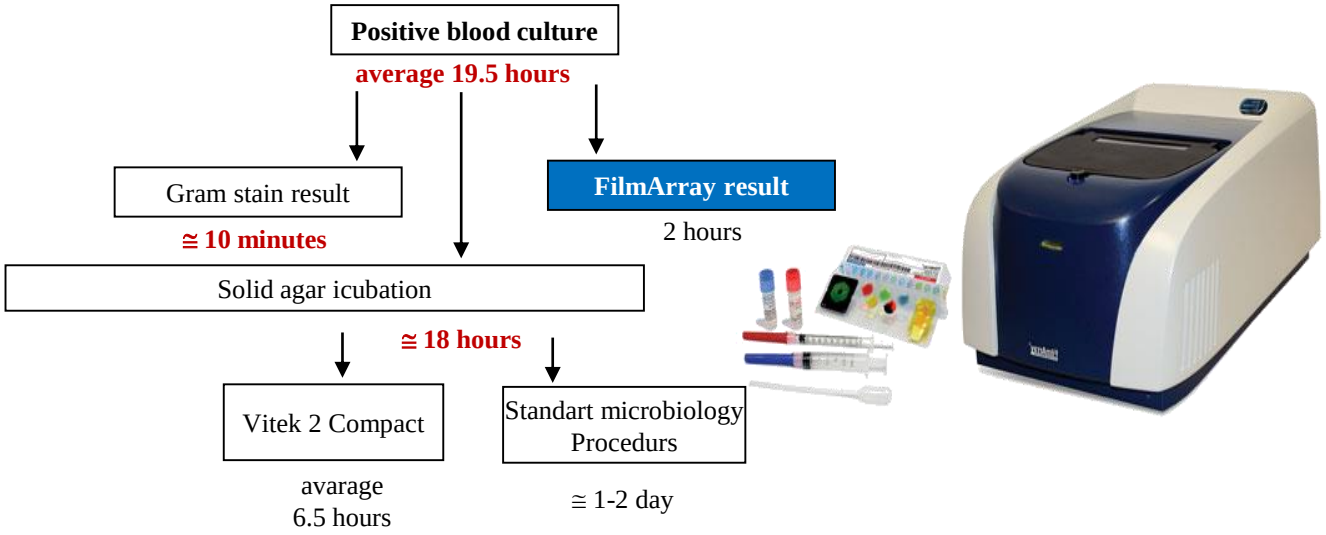
Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti
  - Kültür sonucu



Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti
  - Kültür sonucu



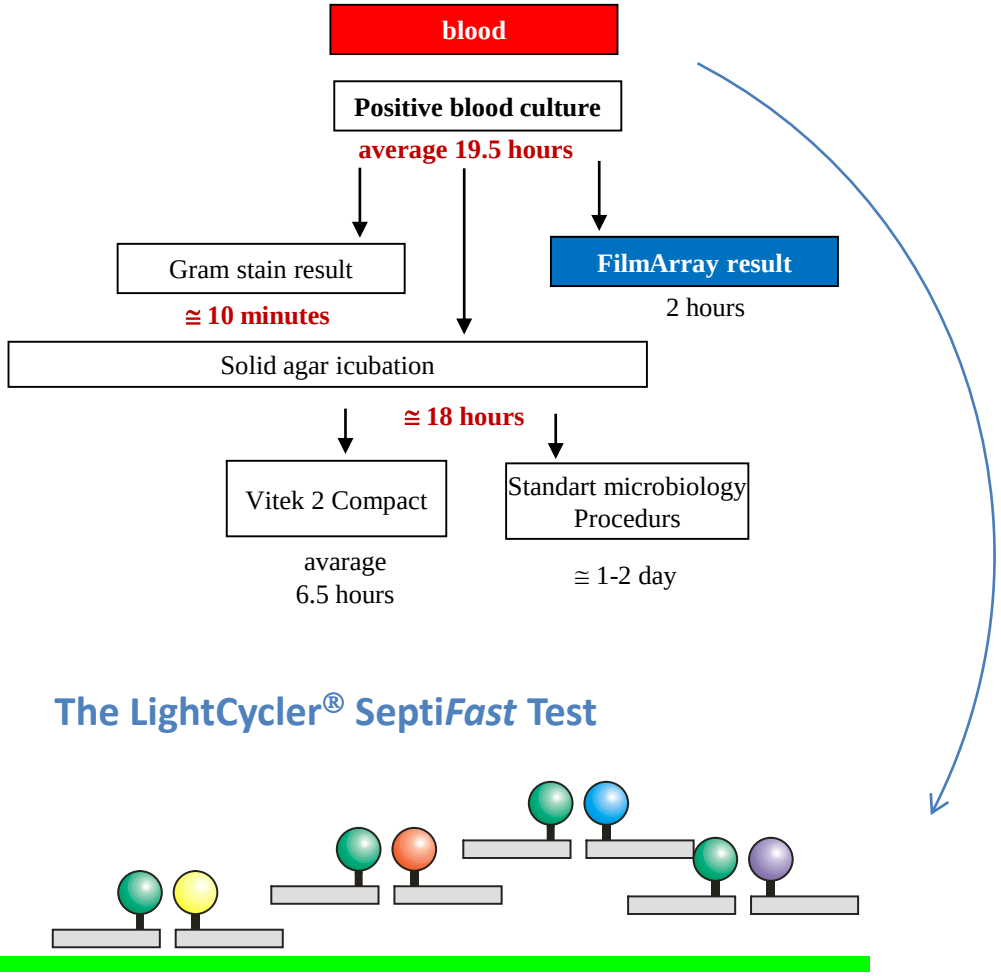
Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti

Sample No	Time to blood positvity (hours)	Gram stain from positive bottle	FilmArray Identification	Identification after solid agar incubation (18 hours)		
				Standart microbiology methods / Time to result (day)	Vitek 2 Compact / Time to result (hours)	Vitek MS
1	11.5	Gr - bacilli	*E. cloace complex*	*Enterobacter spp.* / 4	*E. cloace complex* / 5	*E. cloace*
2	8.2	Gr - bacilli	*E. coli, KPC (-)*	*E. coli* / 1	ND[b]	ND[b]
3	10.2	Gr - bacilli	*K. pneumoniae , P. aeruginosa*	*K. pneumoniae* /1	*K. pneumoniae* / 4.15	*K. pneumoniae*
4	25.2	Gr - bacilli	*K. pneumoniae*	*K. pneumoniae* / 1	*K. pneumoniae* / 5	*K. pneumoniae*
5	8.1	Gr - bacilli	*K. pneumoniae, Streptococcus spp*	*K. pneumoniae* / 1	*K. pneumoniae* /4.45	*K. pneumoniae*
6	7.2	Gr + cocci	*A. baumannii*	*Acinetobacter spp.* / 4	*A. baumannii complex* /6	*A. baumannii complex*
7	10.1	Gr + cocci	*A. baumannii*	*Acinetobacter spp .* /1	*A. baumannii complex* /6	*A. baumannii complex*
8	100.8	Gr - bacilli	*K. pneumoniae*	*K. pneumoniae* / 1	*K. pneumoniae* / 6	*K. pneumoniae*
9	10.4	Gr - bacilli	*E. coli, KPC (-)*	*E. coli* / 1	ND [b]	ND [b]
10	12.1	Gr + cocci	*Enterococcus spp., Van A/B (-)*	*Enterococcus spp.* / 1	*E. faecium* / 6	*E. faecium*
11	18.6	Gr + cocci	*Enterococcus spp., Van A/B (-)*	*Enterococcus spp.* / 2	*E. faecium* / 6	*E. faecium*
12	14.1	Gr + cocci	*Not detected*	*Micrococcus spp.*/ 2	*E. cloacae* / 5	*E. cloacae*
13	15.5	Gr - bacilli	*Staphylococcus spp., MecA (-)*	*Morganella spp.*/ 2	*Morganella morgani* / 5.45	*Morganella morgani*
14	11.4	Gr + cocci	*Enterococcus spp., Van A/B (-)* *Staphylococcus spp., MecA (-)*	Contamination with skin flora	ND[e]	ND [e]
15	38.6	Gr + cocci	*A. baumannii* *Enterococcus spp., Van A/B (-)*	Contamination with skin flora	ND [e]	ND [e]
16	12.1	Gr - bacilli	*E. cloacae complex, KPC (-)*	*Enterobacter spp.*, carbepenemase (+) / 2	*E. cloacae complex* / 5.15	*E. cloacae*
17	9.7	Gr + cocci	*A. baumannii*	*Acinetobacter spp.*/ 1	*A. baumannii complex* / 6	*A. baumannii complex*
18	10.6	Gr - bacilli	*E. coli, KPC (-)*	*E. coli*, ESBL (+)/1	ND [b]	ND [b]
19	71.1	Yeast	*C. tropicalis*	*Canida spp.* / 1	*C. tropicalis* / 18.15	*C. kefyr*[d]
20	9.4	Gr - bacilli	*E. coli, KPC (-)*	*E. coli* / 1	ND [b]	ND [b]
21	12.4	Gr - bacilli	*Not detected*	*Morganella spp. /1*	*Morganella morgani* / 5.45	*Morganella morgani*
22	8.2	Gr - bacilli	*K. pneumonia* KPC(-), Enterococcus *Van A/B*(-)	*K. pneumonia*, carbepenemase (+) / 1	*K. pneumonia*	*K. pneumonia*
23	11.1	Gr - bacilli	*E. coli, KPC (-)*	*E. coli*, ESBL (+), carbepenemase (+) / 1	ND [b]	ND [b]
24	14.4	Gr - bacilli	*E. coli, KPC (-)*	*E. coli*, ESBL (+), carbepenemase (+) / 1	ND [b]	ND [b]
25	10.1	Gr + cocci	*A. baumannii*	*Acinetobacter spp.*/ 1	*A. baumannii complex* / 8	*A. baumannii complex*
26	17.4	Gr - bacilli	*P. aeruginosa*	*P. aeruginosa* / 1	*P. aeruginosa* / 4.45	*P. aeruginosa*
27	52.1	Gr - bacilli	*K. pneumoniae , KPC (-)*	*K. pneumoniae* / 1	*K. pneumoniae* / 4.45	*K. pneumoniae*
28	49.4	Gr - bacilli	*K. pneumoniae KPC (-)*	*K. pneumoniae* / 1	*K. pneumoniae* / 4	*K. pneumoniae*
29	8.8	Gr - bacilli	*E. coli, KPC (-)*	*E. coli*, ESBL (+), carbepenemase (+) / 2	ND [b]	ND [b]
30	12.2	Gr - bacilli	*E. coli, KPC (-)*	*E. coli*, ESBL (+), carbepenemase (+) /1	ND [b]	ND [b]
31	10.4	Gr + cocci	*A. baumannii*	*Acinetobacter spp.*/ 1	*A. baumannii complex* / 6.5	*A. baumannii complex*

Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti



Enfeksiyon etkenin tespiti

- Moleküler yöntemlerle etkenin tespiti

Curiosity Diagnostics

Help when you need it most

PCR|ONE For Investors About Us

(I)
COLLECT SAMPLE

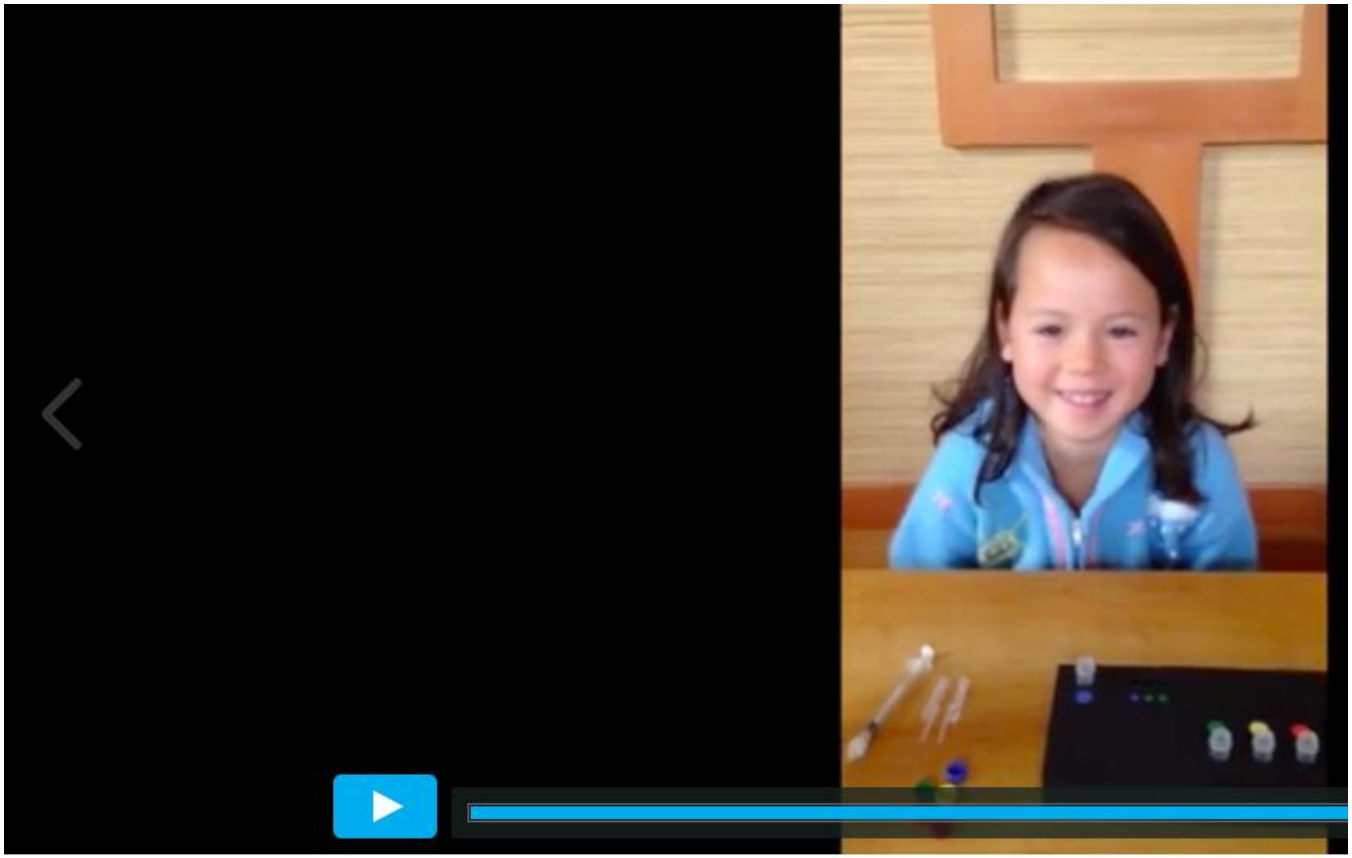
SEPSIS GOLDEN HOUR

Saving patients with systemic infections requires rapid administration of drugs. PCR|ONE system allows drugs to be specifically targeted for optimal treatment.

Enfeksiyon etkenin tespiti

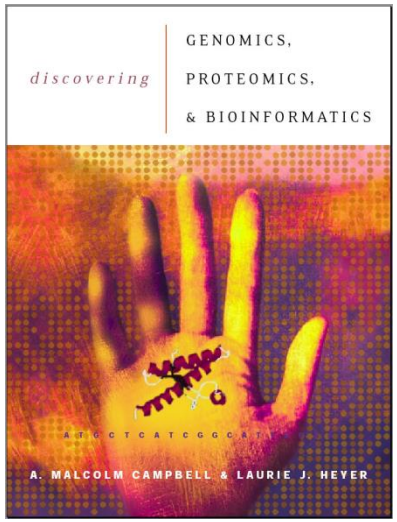
We are Biomeme:
A smartphone-based DNA detection platform.
No lab necessary.

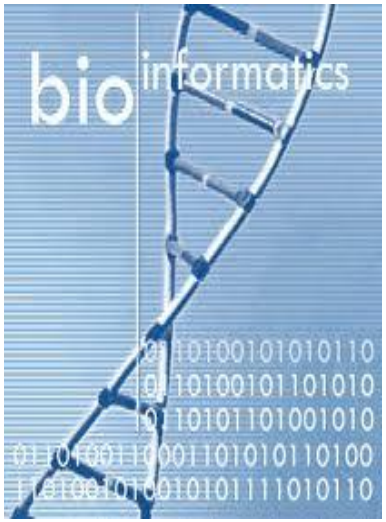
Enfeksiyon etkenin tespiti

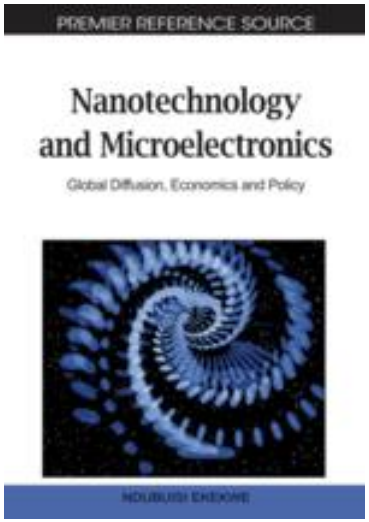


Biomeme Sample Prep for Children

- Genomik, biyoinformatik ve mikroelektronik alanında yaşanan hızlı gelişmelerin en göze çarpan sonuçları,
  - Biyosensörlerdir ve
  - DNA mikroçip teknolojileri







Biyosensörler

Biyosensörler

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BIO-X

Solutions for Hospital-Acquired Infections

BIO-X® offers a structured approach to partnering with innovators from academia, clinics and biotech SME's to develop proof of concept, proof of mechanisms or proof of hypothesis for new life science products and services. The BIO-X program offers selected project teams tailor-made process support and financing, up to 1 million SEK per year for up to two years. We are currently looking for
healthcare for projects seeking to
diagnostics and other solutions to
infections.

The recent **BIO-X Call for proposals** for n
fighting hospital acquired infections gene
in academic research, clinics as well as

- **Rapid and sensitive diagnostic bench-top system for detection of hospital-acquired infections**
  A fully automated microfluidic benchtop system for rapid, sensitive and decentralized detection of hospital-acquired infections, based on magnetic bioassays.
- **Antibacterial polymers for prevention of surgical site and wound infections**
  Antibacterial and biocompatible polymers for prevention of surgical site infections and wound infections.
- **Sampling device for simultaneous transportation and enrichment of multidrug-resistant bacteria samples**
  A sampling device for simultaneous transportation and broth enrichment of multidrug-resistant bacteria to increase sensitivity and shorten the screening process.
- **Cranioplasty implant for large skull defects limiting hospital-acquired infections**
  A bio-ceramic implant for use in cranioplasty of large skull defects limiting bacterial infections related to replacement of the skull bone.

- **Biosensors for early diagnostics of hospital-acquired infections**
  An optical biosensor platform technology for early diagnosis of infectious agents on a multitude of surfaces, *eg* on medical devices, in patients' wounds, etc.

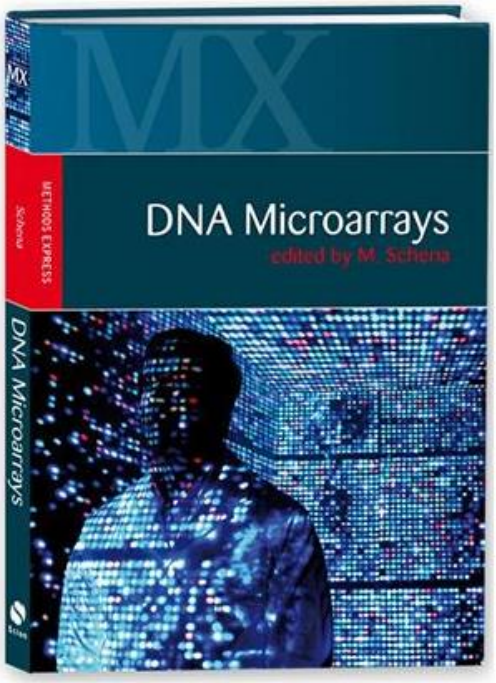
Antimicrobial surface technology for covalently coating medical grade materials for reducing hospital acquired infections; in this instance, single use silicon based devices used in ventilatory support.

- **Antifungal coating for medical devices**
  Antifungal coating technology to prevent in-growth of fungal hyphae and prevent biofilm formation on medical devices.
- **Ultrafast lab-on-a-chip system for microbial detection**
  An antibody-based ultrafast, sensitive, lab-on-a-chip system for microbial

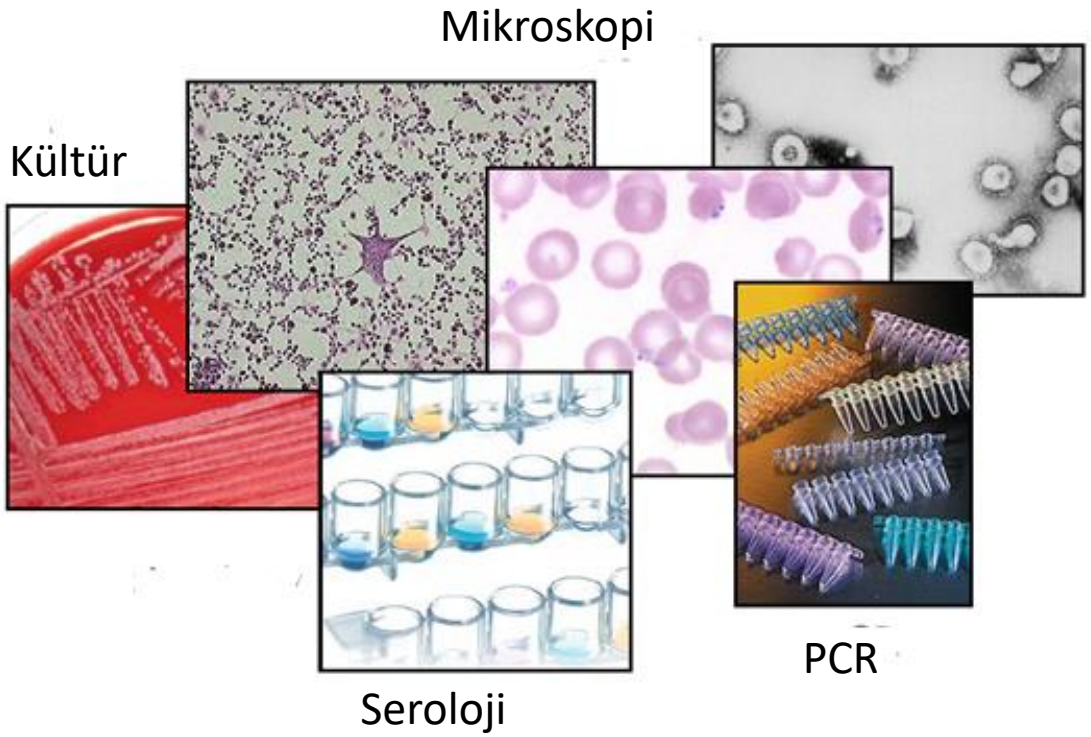
DNA Mikroçip Teknolojileri

- DNA mikroçip teknolojileri, çevresel ve

  klinik örneklerden mikroorganizmaların tanısı için giderek artan oranda kullanılmaktadır.



Geleneksel Mikrobiyolojik Tanı Yöntemleri

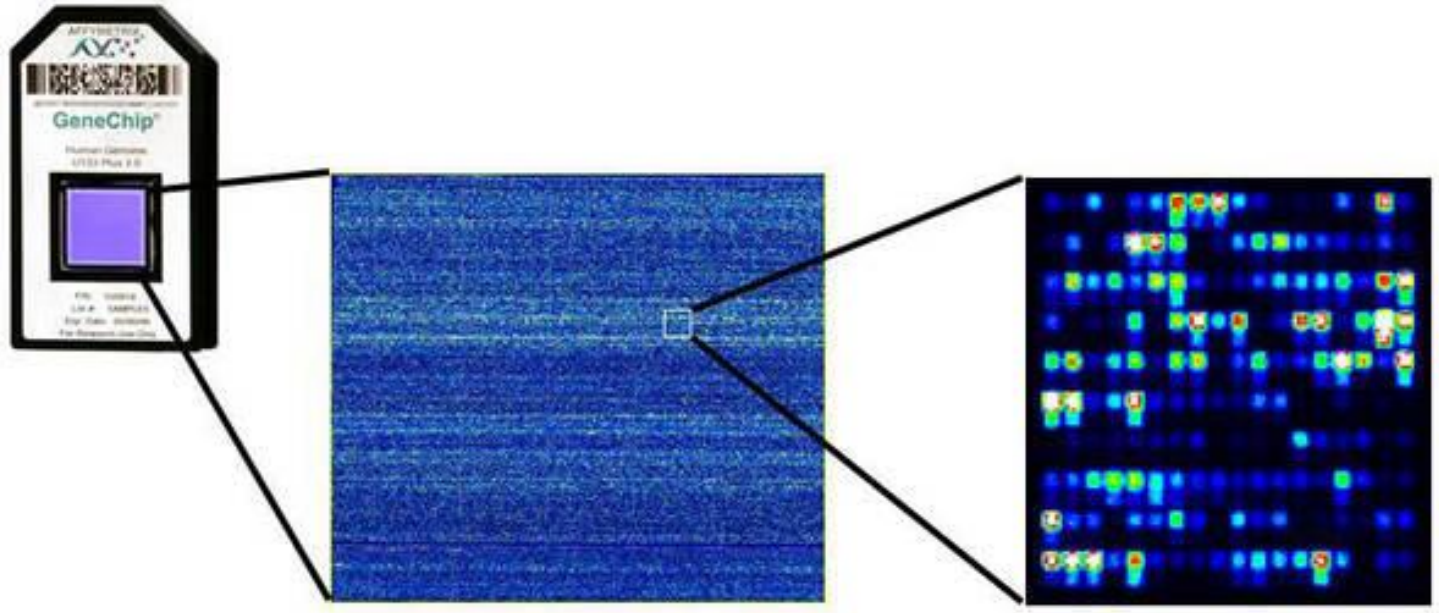


DNA Mikroçip Teknolojileri

- PCR ile elde edilen floresanla işaretli amplikonların

  çok sayıda farklı oligonükleotid prob içeren katı yüzeylerde, kendisine uyan probla

  hibridize olması temeline dayanmaktadır.



DNA Mikroçip Teknolojileri

- **Virochip** 1500 virüse ait 36.000 prob içermektedir.

Using a Pan-Viral Microarray Assay (Virochip) to Screen Clinical Samples for Viral Pathogens

Eunice C. Chen[1], Steve A. Miller[1], Joseph L. DeRisi[1,2], Charles Y. Chiu[1,2]

[1]Department of Laboratory Medicine, University of California, San Francisco

[2]Division of Infectious Diseases, University of California, San Francisco

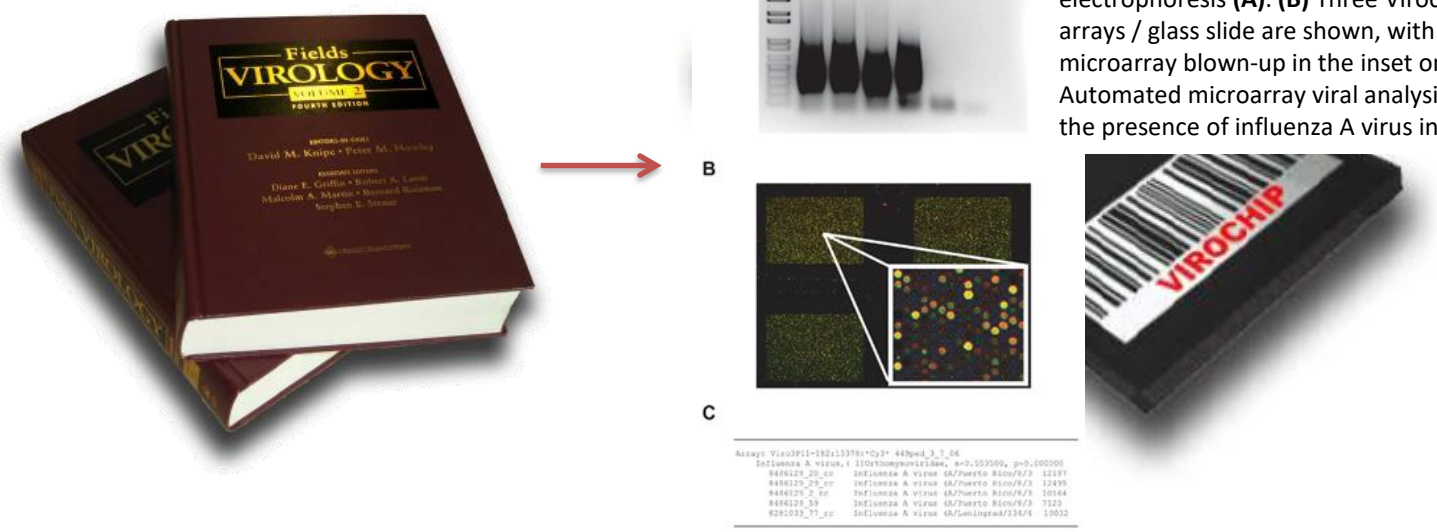


Figure 2. Steps in the Virochip assay. After amplification by random PCR, a smear of 200 - 1000 bp can be visualized by gel electrophoresis **(A)**. **(B)** Three Virochip microarrays out of the 8 arrays / glass slide are shown, with a small region of one microarray blown-up in the inset on the bottom right corner. **(C)** Automated microarray viral analysis using E-Predict revealing the presence of influenza A virus in the clinical sample.

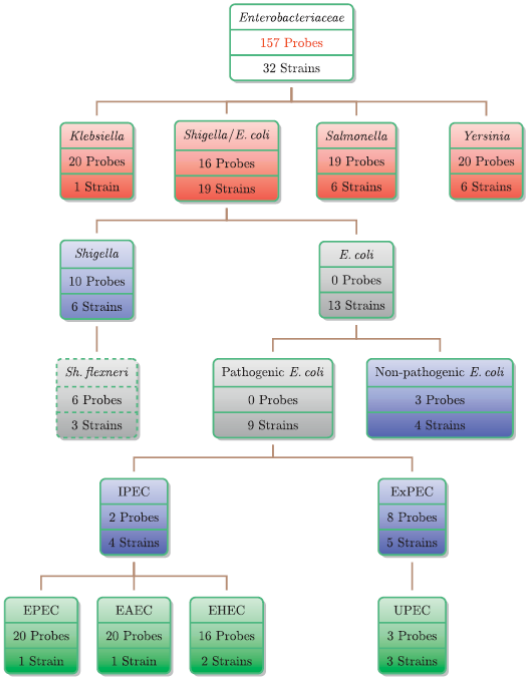
DNA Mikroçip Teknolojileri

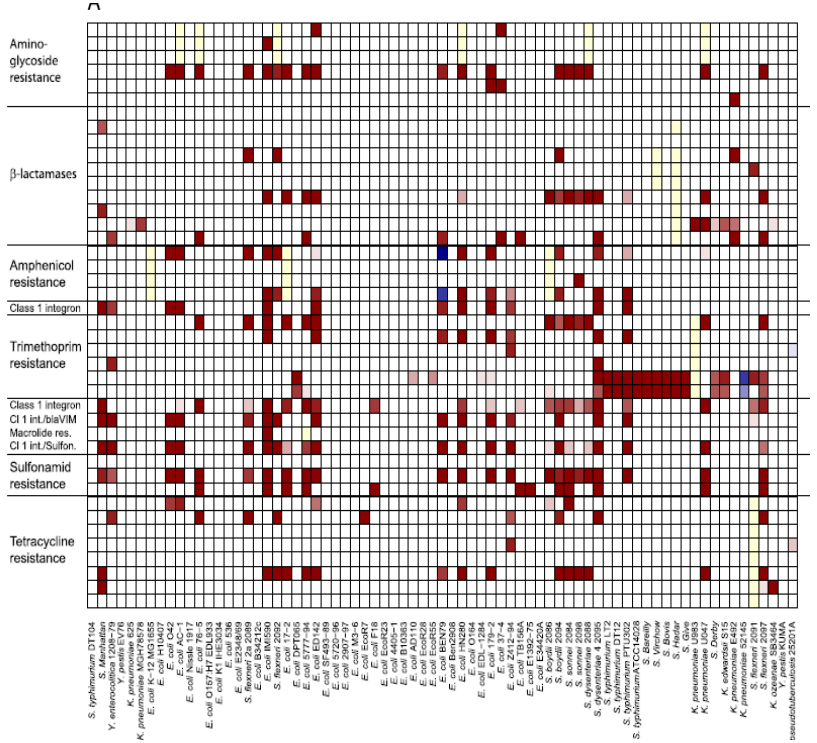
- Toplam 157 prob kullanılarak *Enterobacteriaceae* ailesi üyeleri hem tür düzeyinde tanımlanmış hem de, önemli antimikrobiyallere karşı direnç genleri araştırılmıştır.

RESEARCH ARTICLE Open Access

Friedrich *et al. BMC Genomics* 2010, **11**:591

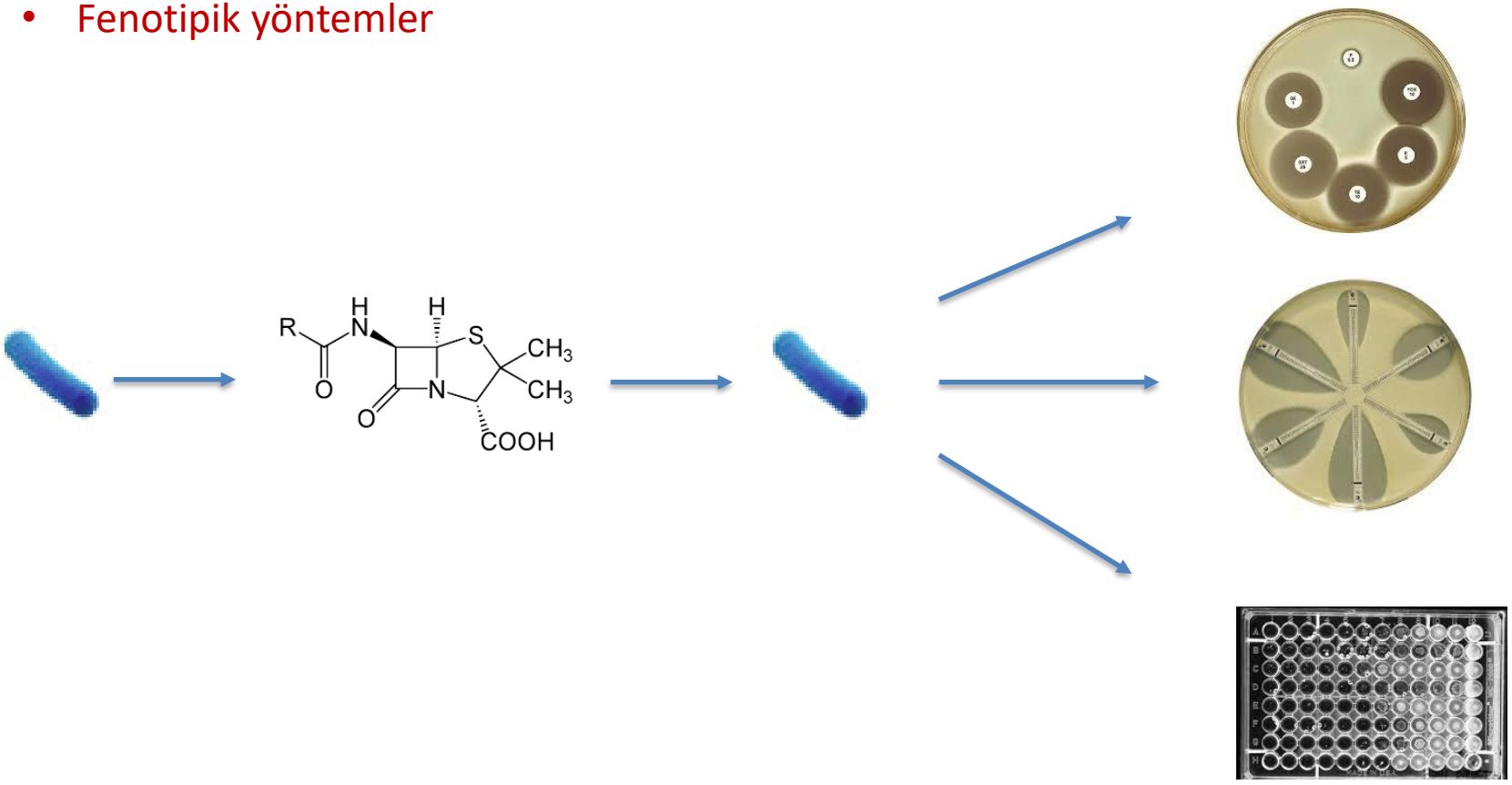
High-throughput microarray technology in diagnostics of enterobacteria based on genome-wide probe selection and regression analysis





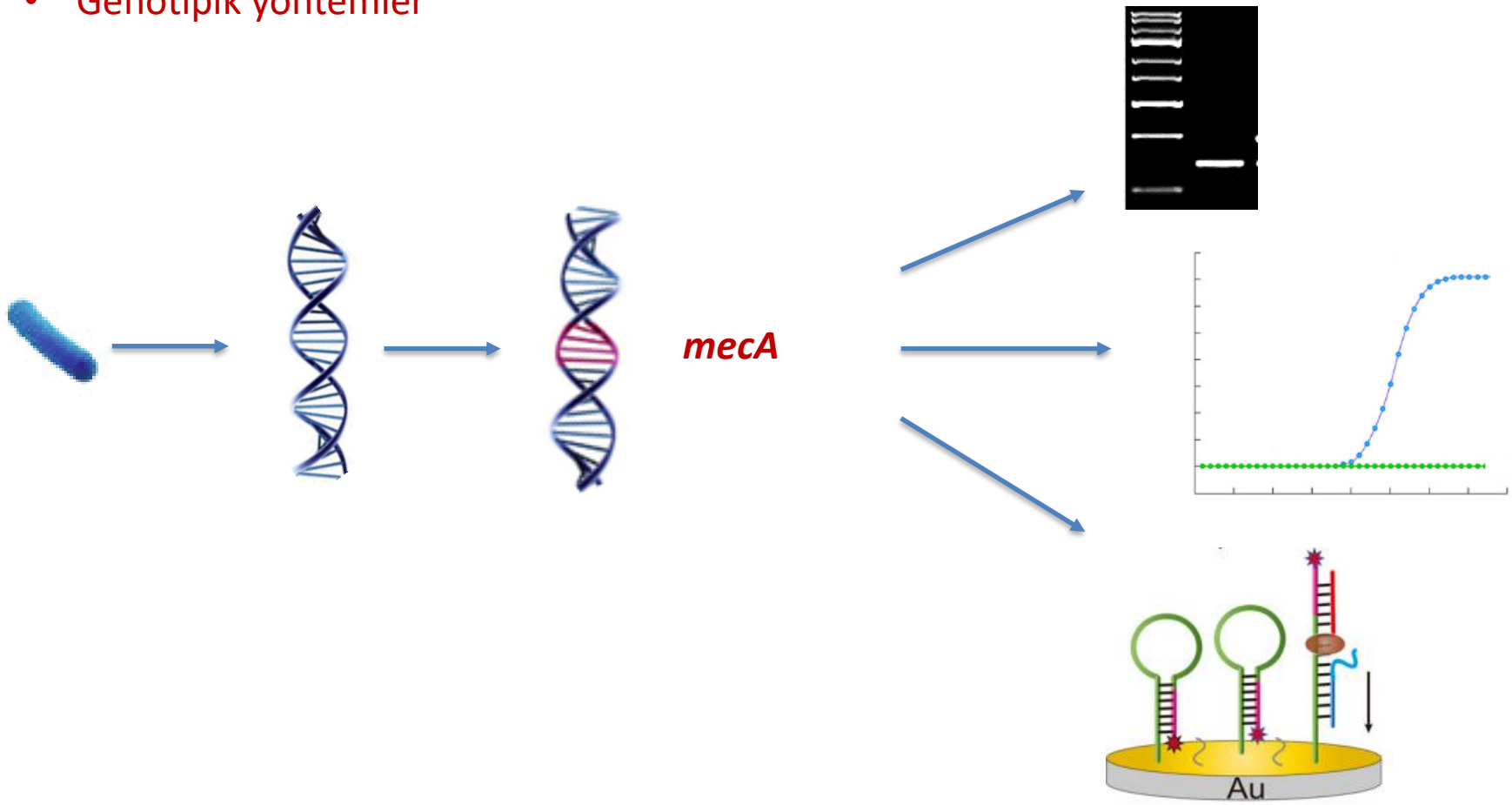
Antibiyotik Direncini Tespit Etmek

- Antibiyotik direncini tespit etmek için genel olarak iki yaklaşım mevcuttur.
  - Fenotipik yöntemler



Antibiyotik Direncini Tespit Etmek

- Antibiyotik direncini tespit etmek için genel olarak iki yaklaşım mevcuttur.
  - Genotipik yöntemler



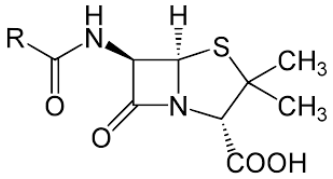
Antibiyotik Direncini Tespit Etmek

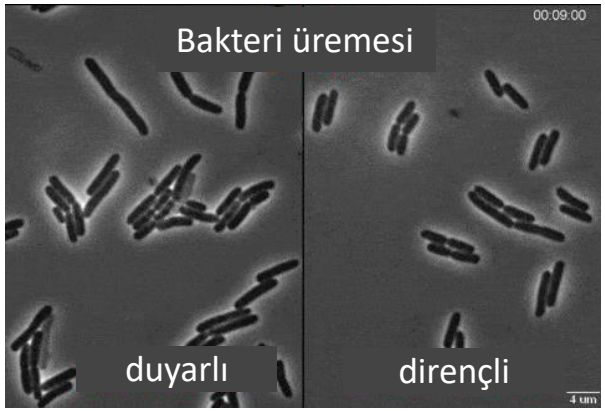
- Antibiyotik duyarlılığı ancak fenotipik yöntemlerle belirlenebilir !

mikroorganizma ile antibiyotik
karşılaştırılmadan duyarlılık sonucundan
bahsedilemez

S. aureus

Penisilin

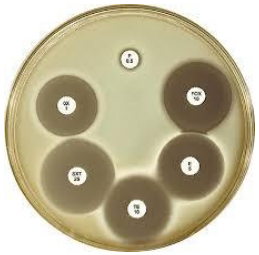




Antibiyotik Direncini Tespit Etmek

- Yeni fikirler, yeni sistemler
  - Fenotipik yöntemlerde üremenin/inhibisyonun gösterilmesi zaman alıcı.

18-24 saat



16-18 saat

8-10 saat

6-8 saat

Antibiyotik Direncini Tespit Etmek

- Fenotipik testlerdeki gelişmeler;

  mikroorganizma üremesinin ya da üremenin inhibisyonunun hızla tespit edilmesi temeline dayanmaktadır.

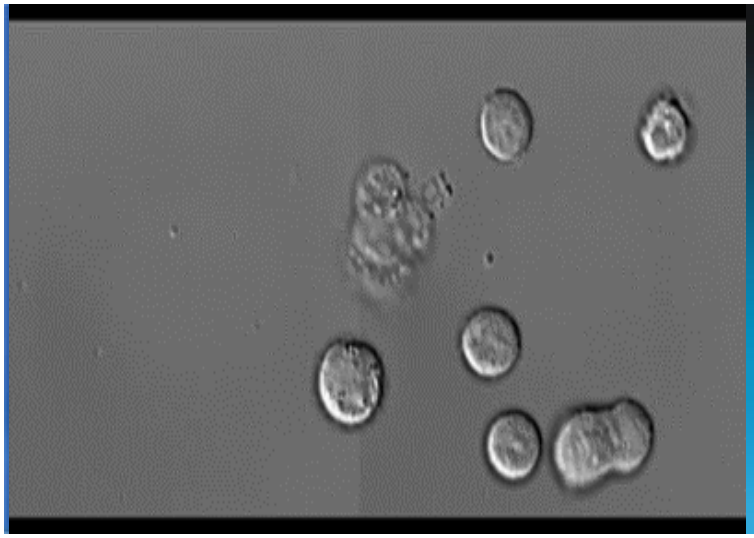
  - Kolorimetrik
  - Biolüminesans
  - Kemilüminesans
  - Nefelometrik

  - Spektrometrik cihazlar
  - Zaman-atlamalı mikroskop
  - Raman-spektrometresi
  - Atomik güç mikroskobu

Antibiyotik Direncini Tespit Etmek

Zaman Atlamalı Mikroskobik Yöntemler

- Hücrelerin canlı kalarak çoğalabildikleri bir ortamda, belirli zamana aralıklarında çekim yapabilen mikroskoplar.



Antibiyotik Direncini Tespit Etmek

Zaman Atlamalı Mikroskobik Yöntemler

- Mikroorganzimalar üzerine antibiyotik etkisi 6 – 30 dakikada tespit edilebiliyor.

JCM
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Real-Time Optical Antimicrobial Susceptibility Testing

Marlene Fredborg,[a] Klaus R. Andersen,[b] Erik Jørgensen,[b] Aida Droce,[a,c] Tom Olesen,[b] Bent B. Jensen,[a] Flemming S. Rosenvinge,[d] Teis E. Sondergaard[a,c]

Department of Animal Science, Faculty of Science and Technology, Aarhus University, Tjele, Denmark[a]; Unisensor Ltd., Allerød, Denmark[b]; Department of Biotechnology, Chemistry and Environmental Engineering, Aalborg University, Aalborg, Denmark[c]; Odense University Hospital, Department of Clinical Microbiology, Odense, Denmark[d]

Rapid antibiotic susceptibility testing is in high demand in health care fields as antimicrobial-resistant bacterial strains emerge and spread. Here, we describe an optical screening system (oCelloScope) which, based on time-lapse imaging of 96 bacteria-antibiotic combinations at a time, introduces real-time detection of bacterial growth and antimicrobial susceptibility with imaging material to support the automatically generated graphs. Automated antibiotic susceptibility tests of a monoculture showed statistically significant antibiotic effects within 6 min and within 30 min in complex samples from pigs suffering from catheter-associated urinary tract infections. The oCelloScope system provides a fast high-throughput screening method for detecting bacterial susceptibility that might entail an earlier diagnosis and introduction of appropriate targeted therapy and thus combat the threat from multidrug-resistant pathogenic bacteria. The oCelloScope system can be employed for a broad range of applications within bacteriology and might present new vistas as a point-of-care instrument in clinical and veterinary settings.

Antibiyotik Direncini Tespit Etmek

Zaman Atlamalı Mikroskobik Yöntemler

Fredborg et al.

FIG 1 The oCelloScope detection system. (a) P
detection principle. A volume of 50 µl of a gr
dimensional (2D) picture. (c) 2D picture of *S. al*
microscope.

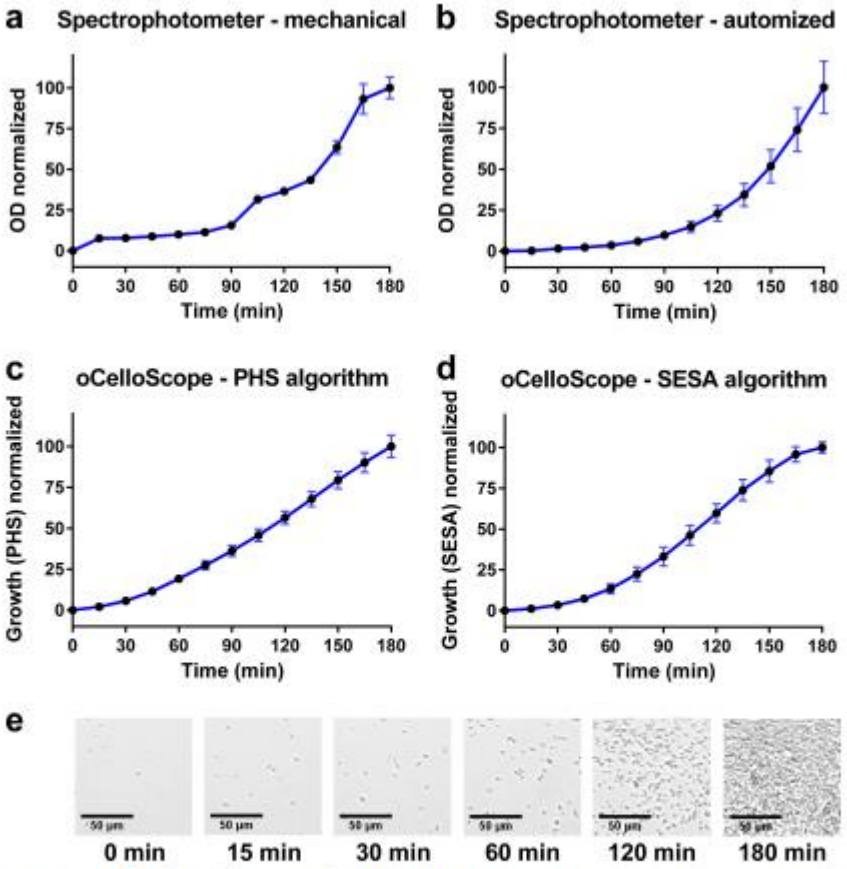
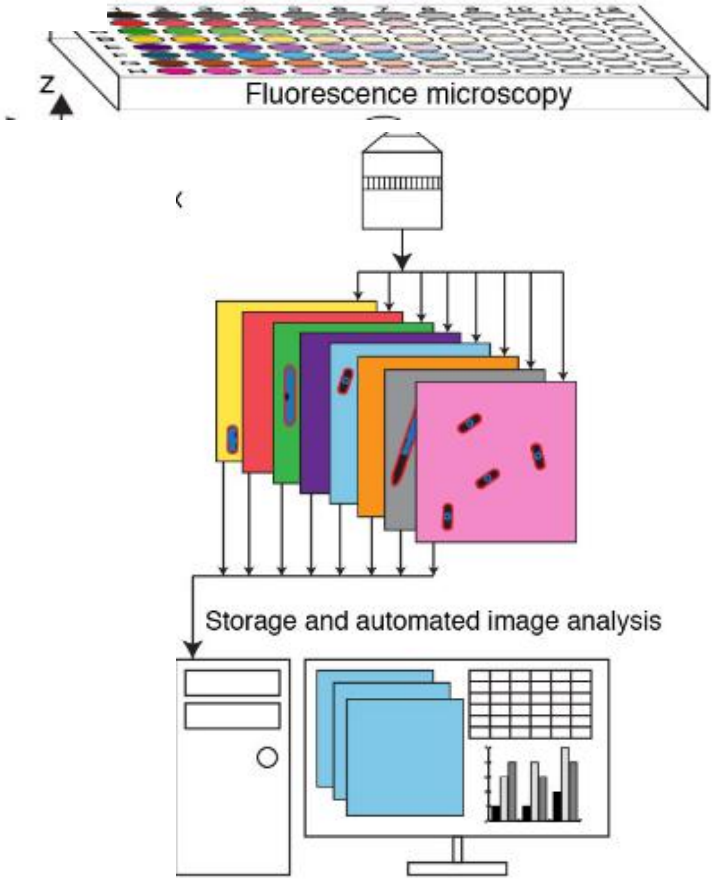


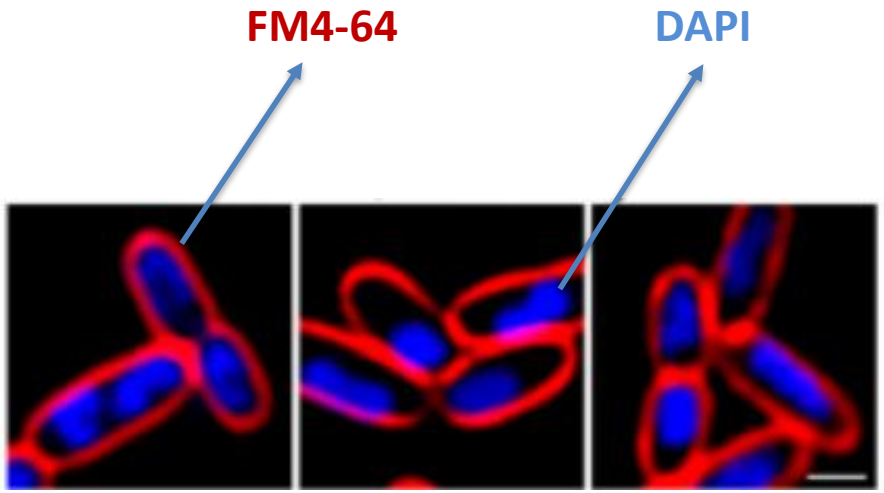
FIG 2 Bacterial growth of *S. aureus* assessed by the oCelloScope and traditional OD measurements. (a) Growth was measured by optical density in a standard laboratory spectrophotometer with one cuvette. The absorbance was measured at 600 nm. (b) Growth was measured by optical density (absorbance, 655 nm) using a standard laboratory plate reader with a 96-well plate. (c) Growth was measured by optical density using the oCelloScope pixel histogram summation (PHS) algorithm. (d) Growth was measured by the oCelloScope segmentation and extraction of surface area (SESA) algorithm. (e) Pictures taken by the oCelloScope showing bacterial growth to different time points. All experiments were done as eight replicates, and standard derivations are shown as error bars on the curves. Scale bar, 50 µm.

Antibiyotik Direncini Tespit Etmek

Floresans Mikroskobik Yöntemler

- *Bacterial cytological profilling* (BCP), bakterilerin morfolojik analizi ile antibiyotik duyarlılık





Antibiyotik Direncini Tespit Etmek

Florens Mikroskobik Yöntemler

- *Bacterial cytological profiling*, %100 doğrulukla 1-2 saat için metisilin
  30 dakikada daptomisin direnci tespiti

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Research Paper

Bacterial Cytological Profiling (BCP) as a Rapid and Accurate Antimicrobial Susceptibility Testing Method for *Staphylococcus aureus*

D.T. Quach [a,d], G. Sakoulas [b], V. Nizet [b,c], J. Pogliano [d], K. Pogliano [d,*]

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Staphylococcus aureus
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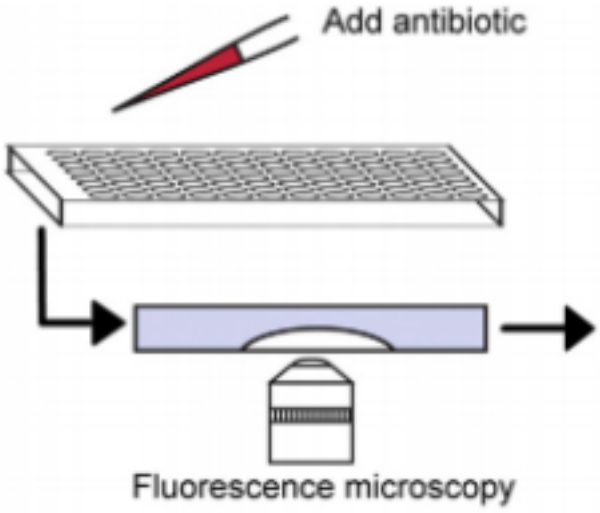
ABSTRACT

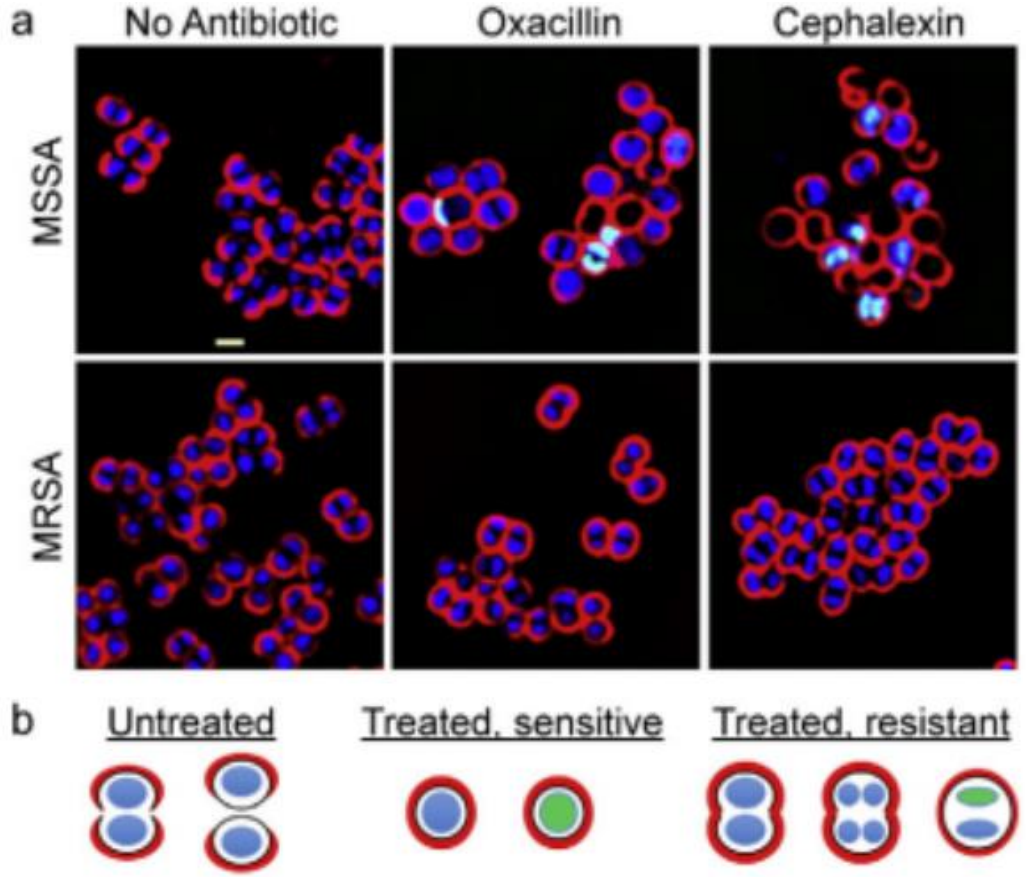
Successful treatment of bacterial infections requires the timely administration of appropriate antimicrobial therapy. The failure to initiate the correct therapy in a timely fashion results in poor clinical outcomes, longer hospital stays, and higher medical costs. Current approaches to antibiotic susceptibility testing of cultured pathogens have key limitations ranging from long run times to dependence on prior knowledge of genetic mechanisms of resistance. We have developed a rapid antimicrobial susceptibility assay for *Staphylococcus aureus* based on bacterial cytological profiling (BCP), which uses quantitative fluorescence microscopy to measure antibiotic induced changes in cellular architecture. BCP discriminated between methicillin-susceptible (MSSA) and -resistant (MRSA) clinical isolates of *S. aureus* (n = 71) within 1–2 h with 100% accuracy. Similarly, BCP correctly distinguished daptomycin susceptible (DS) from daptomycin non-susceptible (DNS) *S. aureus* strains (n = 20) within 30 min. Among MRSA isolates, BCP further identified two classes of strains that differ in their susceptibility to specific combinations of beta-lactam antibiotics. BCP provides a rapid and flexible alternative to gene-based susceptibility testing methods for *S. aureus*, and should be readily adaptable to different antibiotics and bacterial species as new mechanisms of resistance or multidrug-resistant pathogens evolve and appear in mainstream clinical practice.

Antibiyotik Direncini Tespit Etmek

Optikal Difüzometri

- SYTOX, DAPI, WGA, FM-64 gibi floresan boyalar

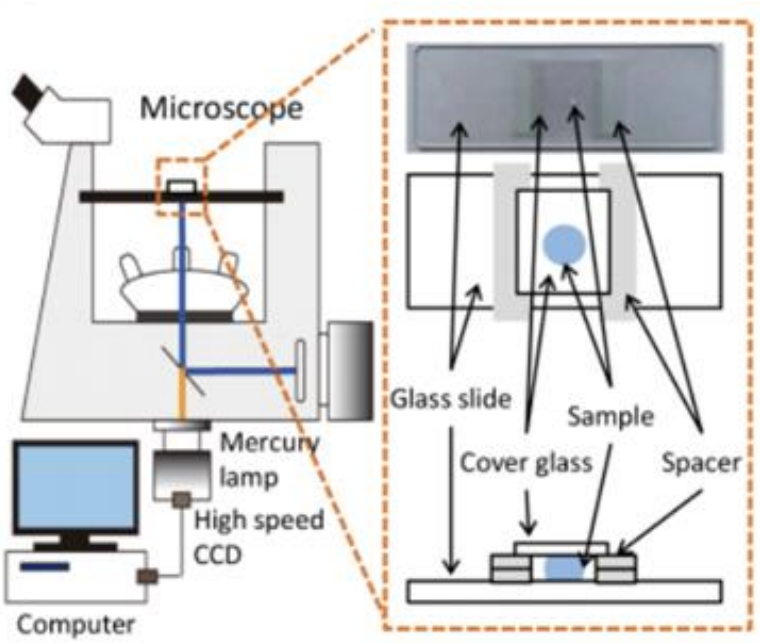


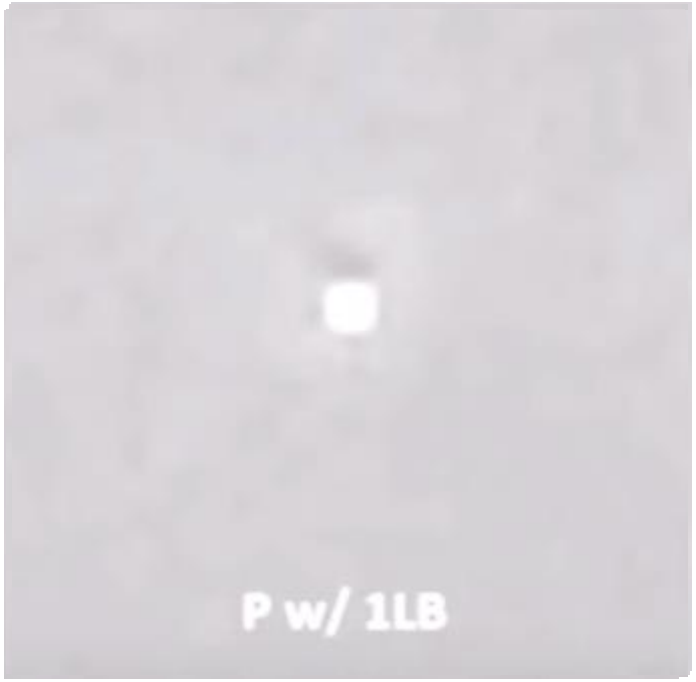


Antibiyotik Direncini Tespit Etmek

Optikal Difüzometri

- Parçacıkların difüzyon katsayılarını ölçmek için tasarlanmış bir sistemdir.

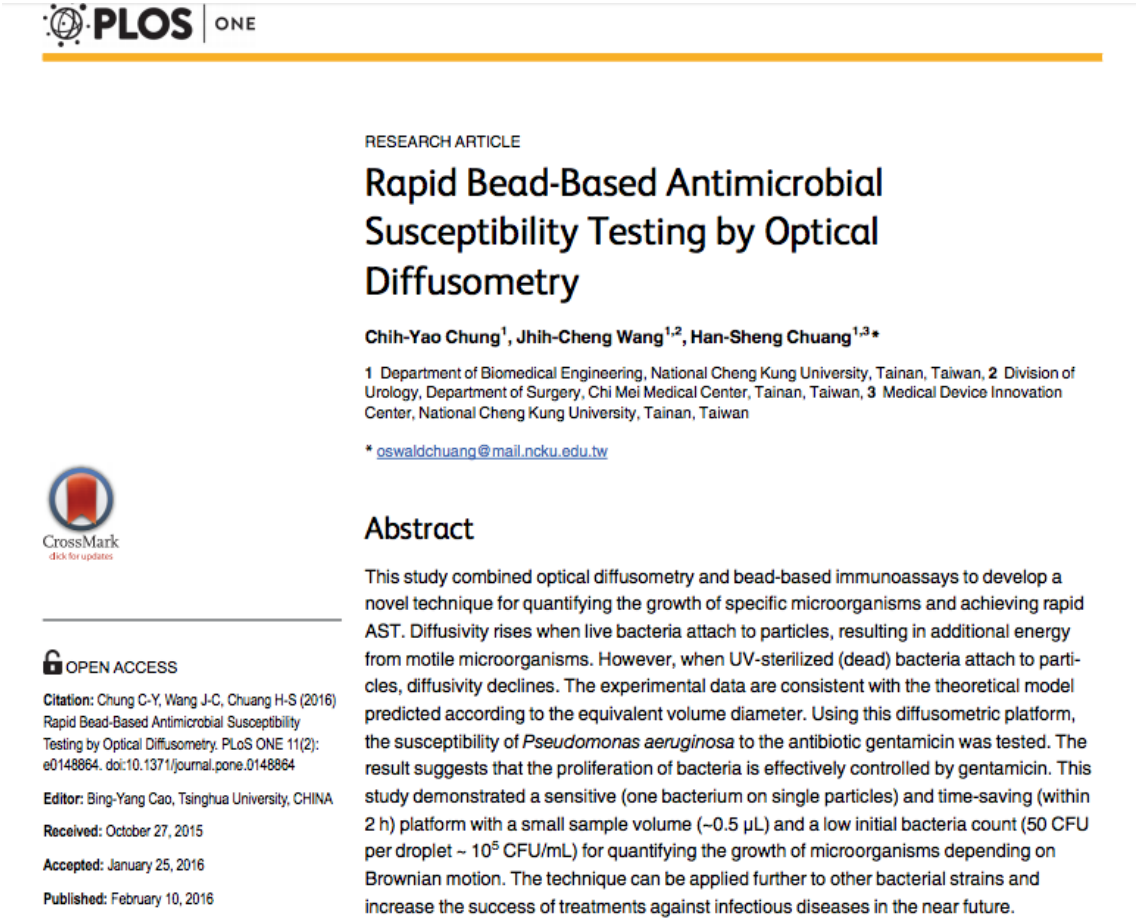




Antibiyotik Direncini Tespit Etmek

Optikal Difüzometri

- Optikal difüsometri ve *bead-based immunoassays* yöntemlerinin kombine edildiği yöntemde, *P. aeruginosa*'da gentamisin direnci iki saat içerisinde tespit edilebilmiştir.



PLOS ONE

RESEARCH ARTICLE

Rapid Bead-Based Antimicrobial Susceptibility Testing by Optical Diffusometry

Chih-Yao Chung[1], Jhih-Cheng Wang[1,2], Han-Sheng Chuang[1,3]*

1 Department of Biomedical Engineering, National Cheng Kung University, Tainan, Taiwan, **2** Division of Urology, Department of Surgery, Chi Mei Medical Center, Tainan, Taiwan, **3** Medical Device Innovation Center, National Cheng Kung University, Tainan, Taiwan

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OPEN ACCESS

Citation: Chung C-Y, Wang J-C, Chuang H-S (2016) Rapid Bead-Based Antimicrobial Susceptibility Testing by Optical Diffusometry. PLoS ONE 11(2): e0148864. doi:10.1371/journal.pone.0148864

Editor: Bing-Yang Cao, Tsinghua University, CHINA

Received: October 27, 2015

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Published: February 10, 2016

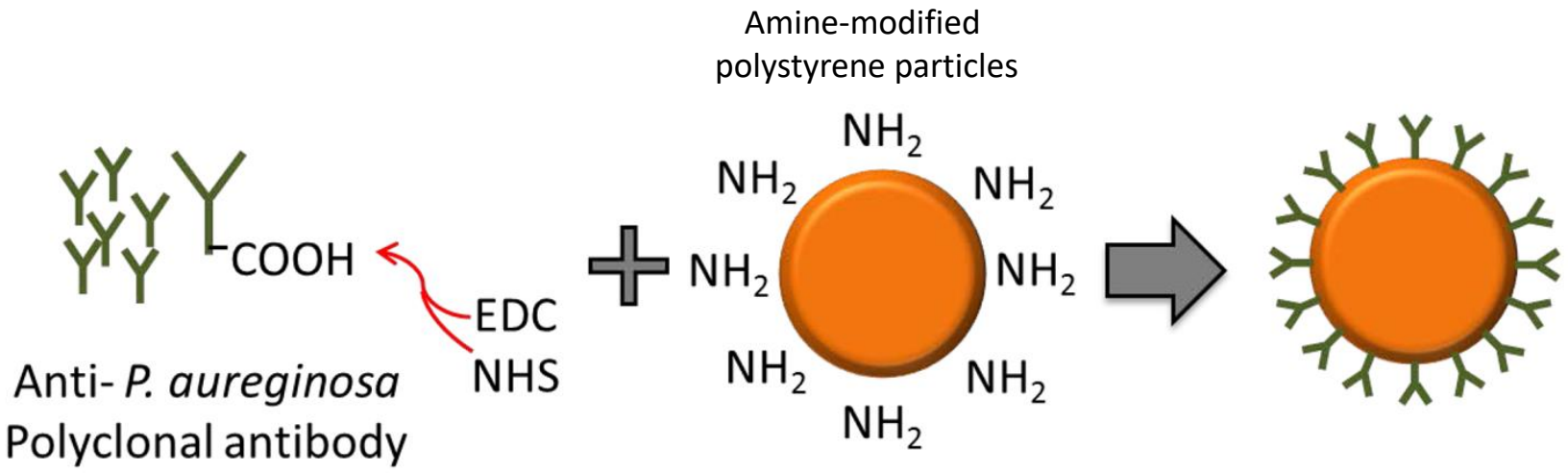
Abstract

This study combined optical diffusometry and bead-based immunoassays to develop a novel technique for quantifying the growth of specific microorganisms and achieving rapid AST. Diffusivity rises when live bacteria attach to particles, resulting in additional energy from motile microorganisms. However, when UV-sterilized (dead) bacteria attach to particles, diffusivity declines. The experimental data are consistent with the theoretical model predicted according to the equivalent volume diameter. Using this diffusometric platform, the susceptibility of *Pseudomonas aeruginosa* to the antibiotic gentamicin was tested. The result suggests that the proliferation of bacteria is effectively controlled by gentamicin. This study demonstrated a sensitive (one bacterium on single particles) and time-saving (within 2 h) platform with a small sample volume (~0.5 μL) and a low initial bacteria count (50 CFU per droplet ~ 10^5 CFU/mL) for quantifying the growth of microorganisms depending on Brownian motion. The technique can be applied further to other bacterial strains and increase the success of treatments against infectious diseases in the near future.

Antibiyotik Direncini Tespit Etmek

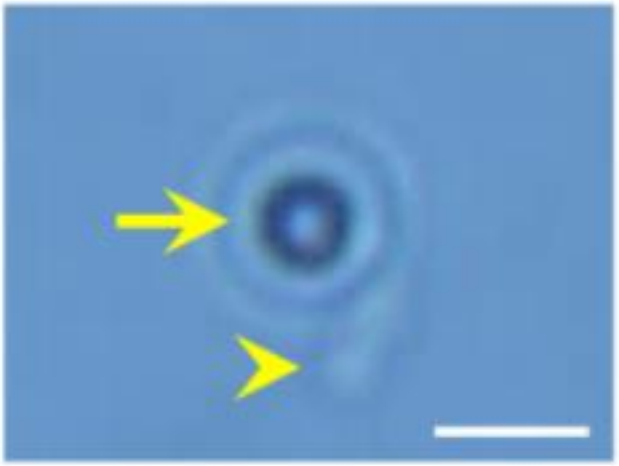
Optikal Difüzometri

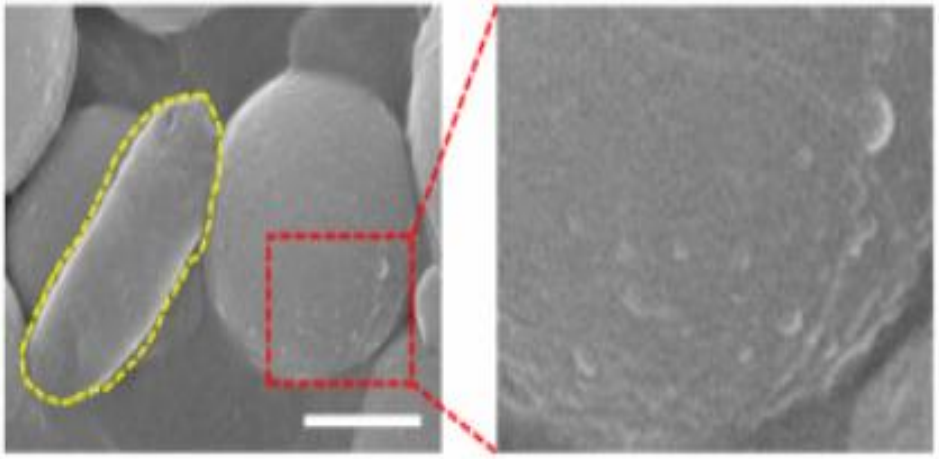
- Antikorun aktive edilmesinde EDC-NHS kimyasalları kullanılarak antikorun polystyrene matrikse bağlanması.



Optikal Difüzometri

- Boncuklar üzerinde yakalanmış *P. aeruginosa*.





Optikal Difüzometri

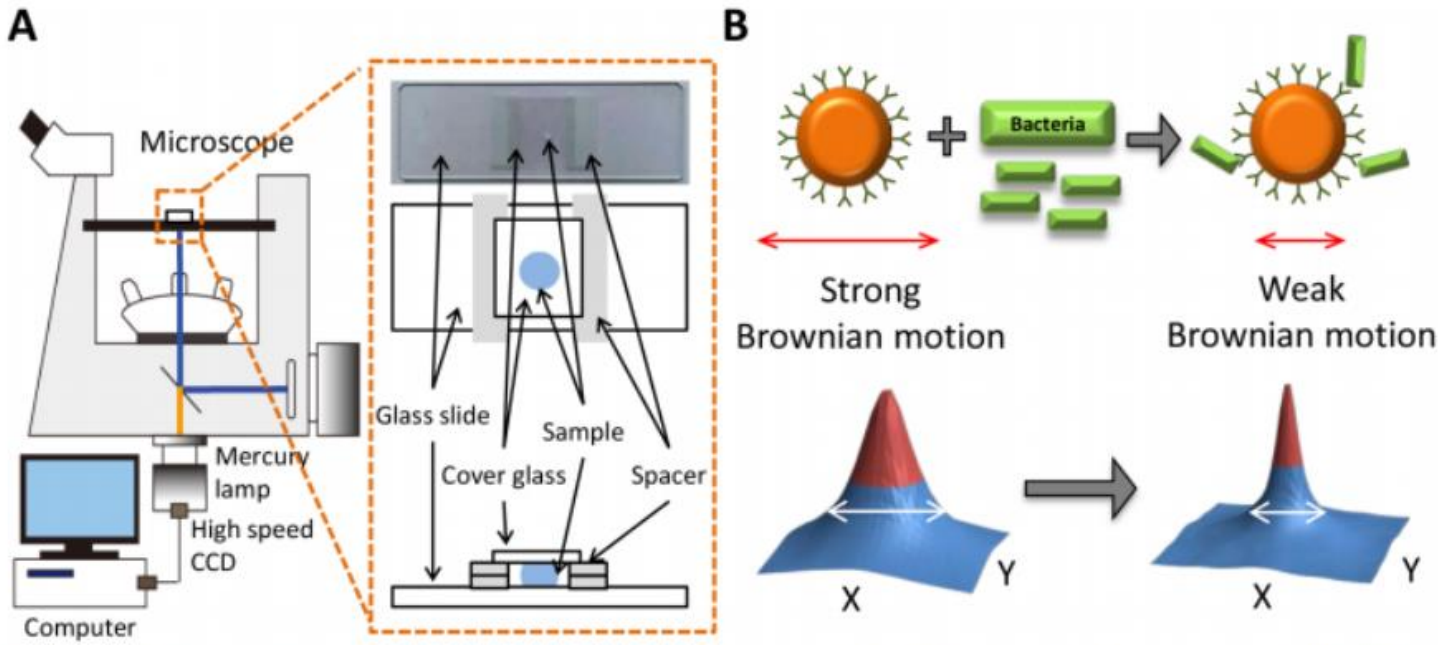
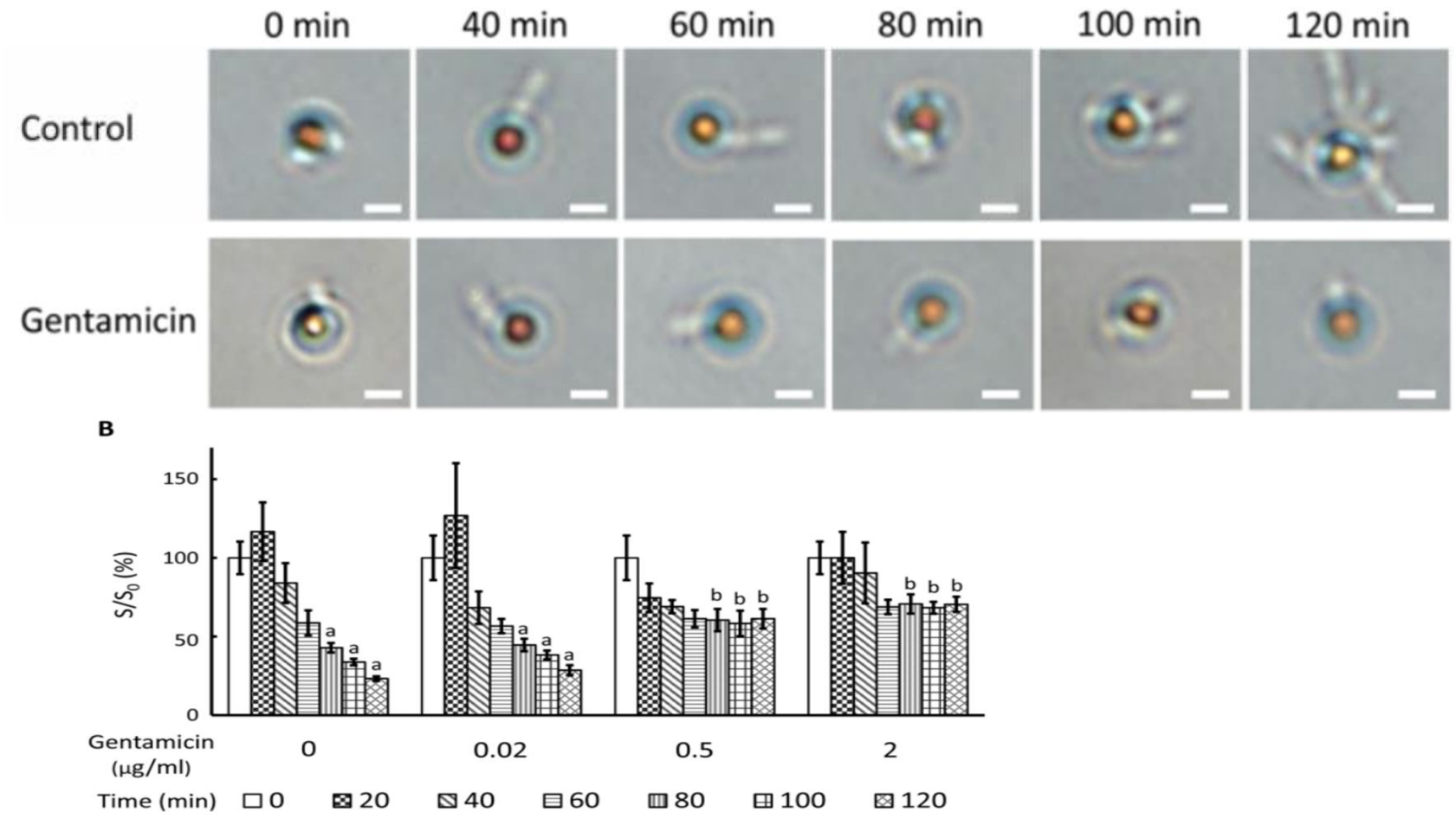


Fig 1. The optical diffusometric platform. (A) Schematic of the optical diffusometry. (B) The relationship of Brownian motion and the particle size change due to the bacterium-particle binding. The corresponding diffusivity values are derived from the cross-correlation algorithm. A large particle diameter results in a narrow correlation peak.

doi:10.1371/journal.pone.0148864.g001

Optikal Difüzometri



Ticari sistem- Accelerate Diagnostics Pheno System

- Accelerate Diagnostics; direkt örnekten hızlı tanımlama ve duyarlılık

Accelerate Diagnostics - Pheno System

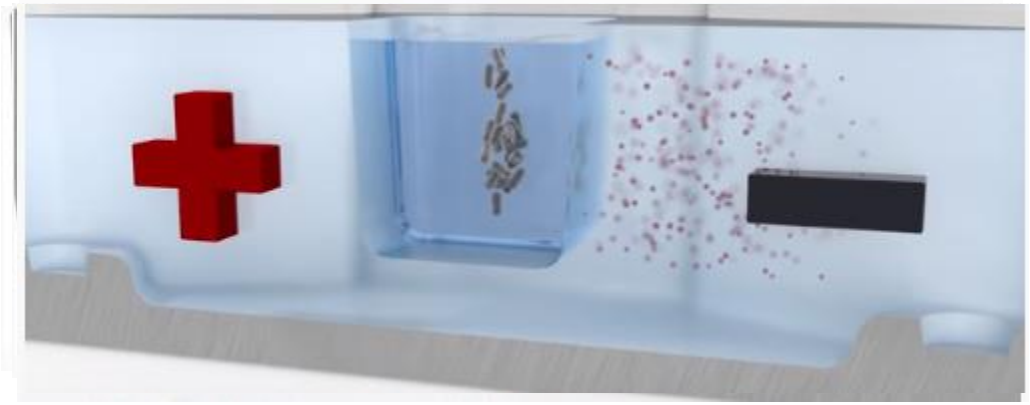
- Örnekteki bakteriyi saflaştırma ve çoğaltmak

1 saat

8-48 saat

Accelerate Diagnostics - Pheno System

- Bakteri hücrelerin örnek muayene maddesinden saflaştırılması için elektroforez ve filtreleme sistemi (elektrofiltrasyon).



Accelerate Diagnostics - Pheno System

- Mikroorganizmanın tanımlanması

1 saat

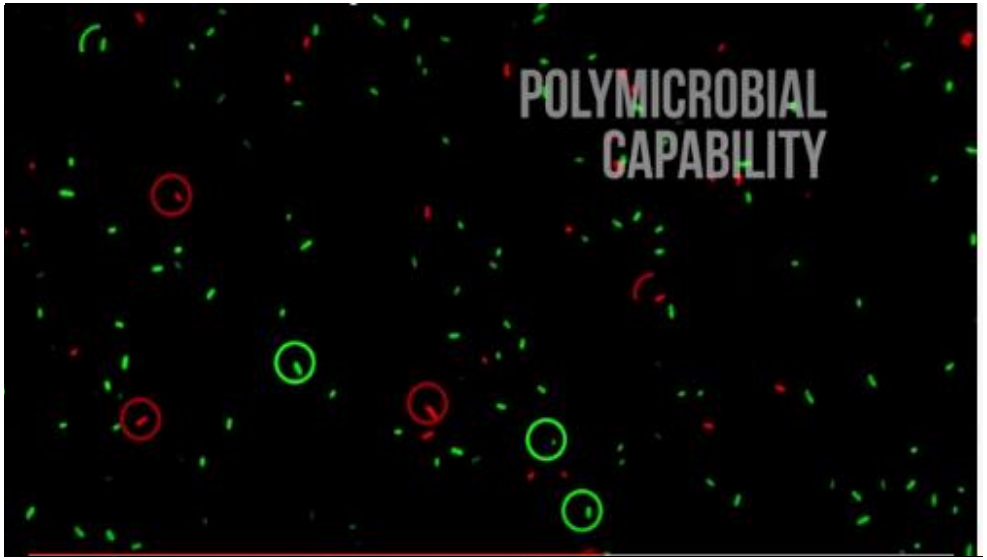
8-48 saat

Accelerate Diagnostics - Pheno System

- Multiplexed Fluorescence in situ Hybridization (FISH)

Accelerate Diagnostics - Pheno System

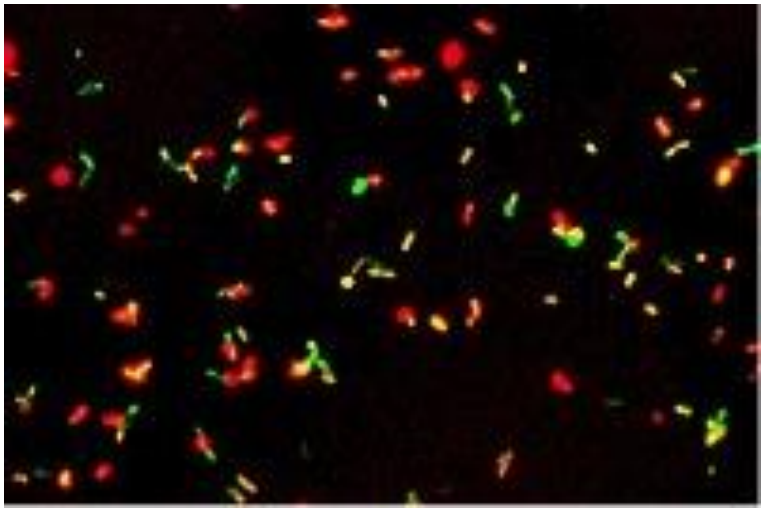
- *Multiplexed Fluorescence in situ Hybridization* (FISH)



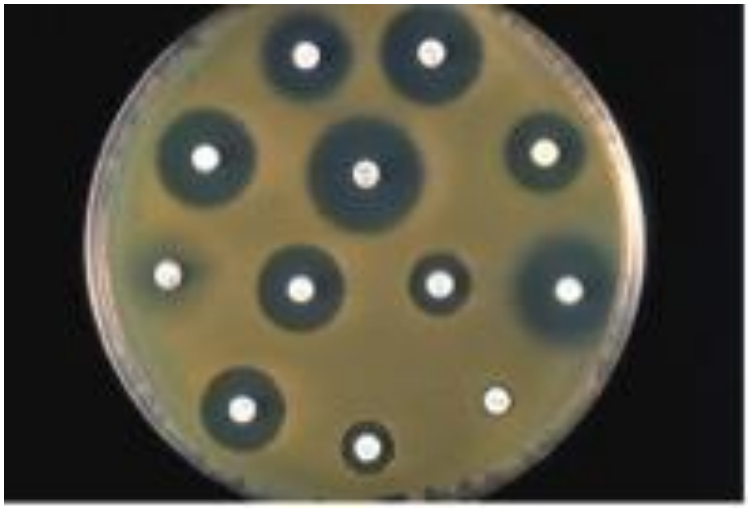
Accelerate Diagnostics - Pheno System

- Antimikrobial duyarlılıklarının belirlenmesi

4-5 saat



24-48 saat



Accelerate Diagnostics - Pheno System

- Antimikrobial duyarlılık testi; zaman-atlamalı mikroskop ile üreme/inhibisyonun takibi

Accelerate Diagnostics - Pheno System

- Antimikrobial duyarlılık testi; zaman-atlamalı mikroskop ile üreme/inhibisyonun takibi

Accelerate Diagnostics - Pheno System

ORIGINAL ARTICLE

Rapid Automated Microscopy for Microbiological Surveillance of Ventilator-associated Pneumonia

Ivor S. Douglas[1], Connie S. Price[2], Katherine H. Overdier[1], Robert F. Wolken[3], Steven W. Metzger[4], Kenneth R. Hance[4], and David C. Howson[4]

[1]Division of Pulmonary Sciences and Critical Care Medicine, [2]Division of Infectious Disease, and [3]Respiratory Therapy, Department of Medicine, Denver Health Medical Center, Denver, Colorado; and [4]Accelerate Diagnostics, Inc., Tucson, Arizona

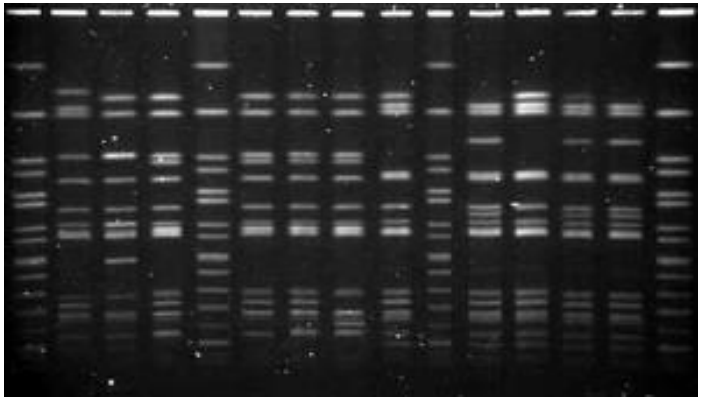
		CLINICAL MICROBIOLOGY PRESENCE/ABSENCE ≥ 1 × 10^4 CFU/mL	
		Positive	Negative
AUTOMATED MICROSCOPY	Positive	7	2
	Negative	0	64
		Sensitivity=100%	Specificity=97%

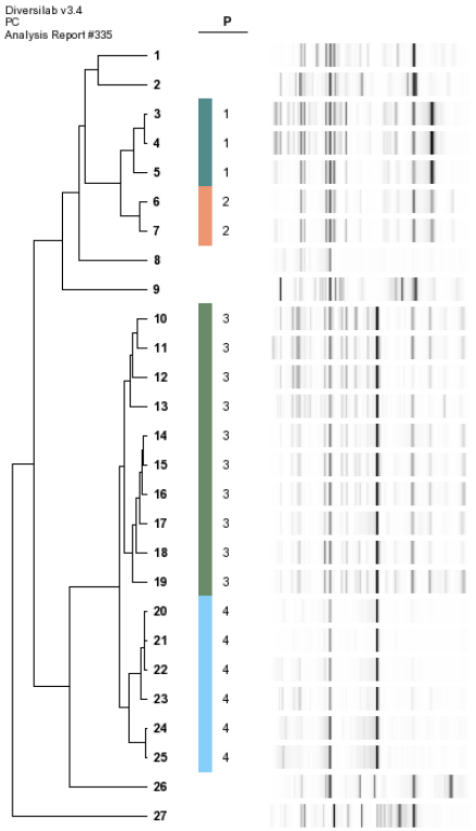
Figure 1. Performance characteristics of automated microscopy compared with clinical culture for qualitative presence or absence of ventilator-associated pneumonia (VAP)-associated bacteria above the VAP diagnostic threshold of 1 × 10^4 colony-forming units (cfu)/ml.

Moleküler Epidemiyoloji

Moleküler Epidemiyoloji

- Bugün için ise moleküler epidemiyoloji terimi; genellikle "moleküler biyolojik yöntemlerle suş tiplendirme" çalışmalarına verilen ortak bir isim gibi kullanılmaktadır.





Moleküler Epidemiyoloji

REVIEW: EVOLUTION AND DISEASE

Population Biology, Evolution, and Infectious Disease: Convergence and Synthesis

Bruce R. Levin,[1] Marc Lipsitch,[1] Sebastian Bonhoeffer[2]

Traditionally, the interest of population and evolutionary biologists in infectious diseases has been almost exclusively in their role as agents of natural selection in higher organisms. Recently, this interest has expanded to include the genetic structure and evolution of microparasite popu
immune response, and the populatio
es of medical and public health int
these areas, emphasizing the ways
proaches have been contributing to
design and evaluation of interventio

Moleküler epidemiyolojinin sınırlarını;

- etken mikroorganizmanın tespiti
- bulaşma yollarının araştırılması
- virülanslarından sorumlu genlerin belirlenmesi ve
- izolatlar arası klonal ilişkilerin araştırılmasını kapsayan geniş bir yelpazede çizilmiştir.

Moleküler Epidemiyoloji

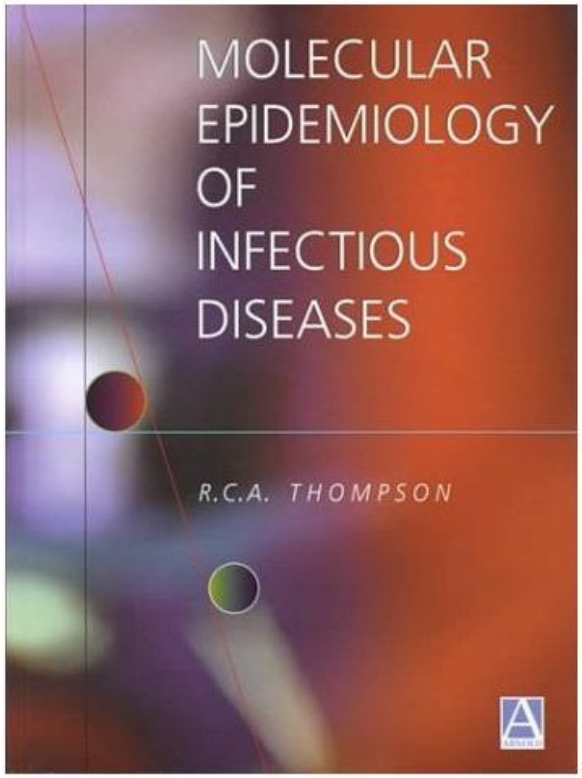
- Hastane infeksiyonuna neden olan etkenlerin izini sürebilmek için;

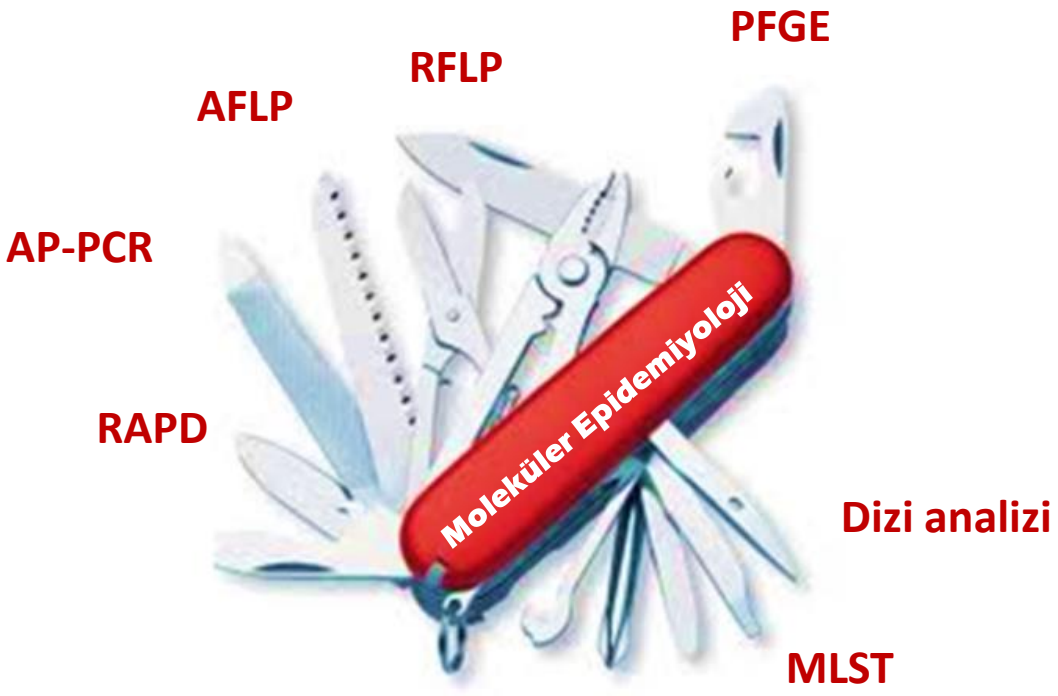
  1. izolatların moleküler karekterizasyonu yapılmalı ve
  2. izolatlar arasındaki klonal ilişkiler genotiplendirme yöntemleriyle araştırılmalıdır.

İzolatların Moleküler Karakterizasyonu

- İzole edilen mikroorganizmaların moleküler karakterizasyonu için;
  - antimikrobiyal direnç genleri
  - virülans genleri
  - mobil genetik elemanları
    - plazmid
    - transpozon
    - İntegron
  - hücre duvar yapıları araştırılmalıdır.

İzolatlar Arasındaki Klonal İlişkilerin Araştırılması

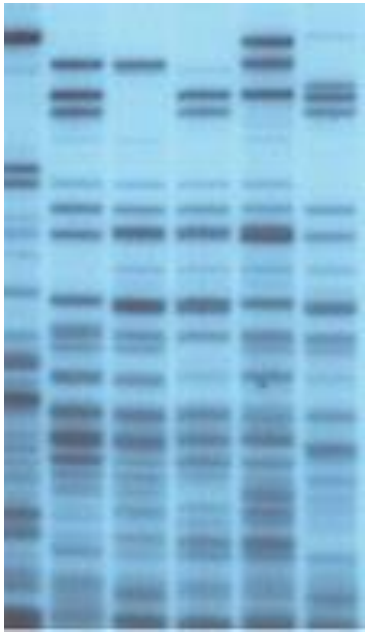




Moleküler epidemiyoloji için yöntemler

- Hastane infeksiyonları ile ilişkili mikroorganizmaların moleküler tiplendirilmesinde; kromozomal DNA polimorfizmine dayalı olan yöntemler, hızlı ve güvenilir olmalarıyla ön plana çıkmaktadırlar.

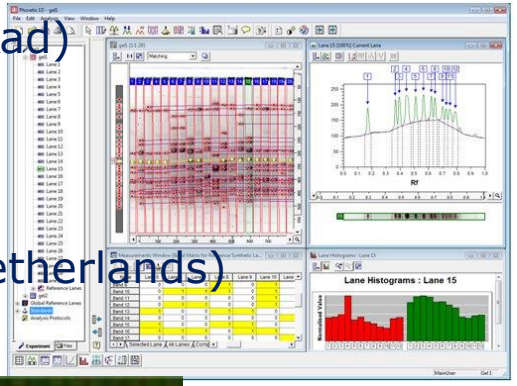
  - *Pulsed field gel electrophoresis* (PFGE)
  - *PCR-restriction fragment length polymorphism* (PCR-RFLP)
  - *Random amplified polymorphic* DNA (RAPD)
  - *Arbitrarily primed polymerase chain reaction* (AP-PCR)
  - *Repetitive extragenic palindromic element*-PCR (rep-PCR)
  - *Amplified ribozomal DNA restriction analysis* (ARDRA)

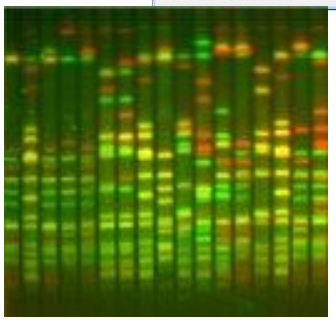


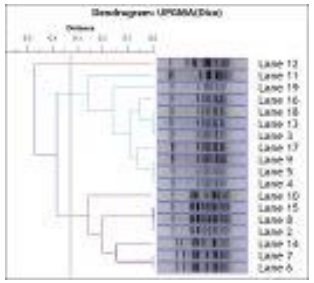
Infect Genet Evol. 2010 Oct;10(7):866-75. Epub 2010 Aug 6.

Pulsed Field Gel Electrophoresis (PFGE)

- Sonuçların analizi ve yorumlanması
  - Bu amaçla en çok kullanılan bilgisayar programları;
    - Gel-Compar (Applied Maths, Kortfijk, Belgium)
    - Dendron (Solltech, Oakdale, Iowa)
    - Diversity Database Fingerprinting Software (Bio-Rad)
    - Gene Profiler (Scanlytics, Fairfaz, Va)
    - Phoretix 1-D (Nonlinear USA, Durham, N.C.)
    - Quantar Pro (KeyGene Producrts, Wageningen, Netherlands)
    - Taxotron (Taxolab, Institut Pasteur, Paris, France)







Pulsed Field Gel Electrophoresis (PFGE)

- Sonuçların analizi ve yorumlanması

Genotip P-VIII

-Suşlar anestezi-reanimasyon yoğun bakım ünitesinden, bir aylık bir dönemde, entübe hastaların trakeal aspiratlarından izole edilmiştir.

Moleküler Epidemiyoloji Ne Zaman Kullanılmalı ?

- Her zaman

New Microbiologica, 31, 401-408, 2008

Infection Correspondence

Epidemiological Characteristics of Fatal *Candida krusei* Fungemia in Immunocompromised Febrile Neutropenic Children

In early 1990s, fluconazole was introduced as a prophylactic antifungal agent after stem cell transplantation (SCT). At the same time, *Candida krusei* emerged as a chief fungal pathogen among the patients with SCT [1, 2]. In our SCT center, which has a 15-bed capacity unit dedicated for children with malignant diseases and 5-bed unit for SCT patients, low-dose fluconazole is routinely included in the posttransplant prophylaxis regimen (starting at day 7). In recent years, we observed mortality due to fungal sepsis in patients undergoing allogenic SCT and chemotherapy. Here, we report the characteristics of the patients having mortal *C. krusei* fungemia and the molecular typing results of the *C. krusei* strains in order to develop more effective policies for treatment and prevention of fungal infections.

The febrile neutropenic episodes of the 47 children (median age: 9.13 ± 4.73 years) were prospectively evaluated from March 2001 to January 2003. For each patient, daily leukocyte counts and body temperatures were measured. Fever was defined as a single oral temperature of ≥ 38.3°C or a temperature of ≥ 38.0°C for ≥ 1 h. Neutropenia was defined as a neutrophil count of < 500 cells/mm^3, or a count of < 1,000 cells/mm^3 with a predicted decrease to < 500 cells/mm^3 (Guidelines from the Infectious Disease Society of America, 1997). Patients who had both fever and neutropenia were recognized as febrile neutropenic. Nine patients developed severe fungal infection during neutropenia. Three of those having bloodstream infection with the *C. krusei* were analyzed in detail, in this study.

Surveillance cultures were taken from blood, throat, stool, urine and catheter exit sites of the patients in the SCT unit when they had febrile episode and/or weekly on a routine basis. Automated blood culture system (Becton Dickinson, pediatric vials, USA) and BACTEC MYCO/F LYTIC (Becton Dickinson) were used for blood cultures. To search exogenous sources of *C. krusei* sepsis, 51 specimens from the hands of 32 health care workers (9 doctors, 11 nurses, 4 laboratory workers, and 8 cleaning staff) and 19 environmental swabs from commonly used areas around the patients (nurse desk, room and toilet doors, refrigerator doors, telephones, etc) were analyzed.

antifungal susceptibility. Molecular typing of the nine *C. krusei* strains of the three patients (three blood, two stool, one urine, one throat, one vagina, and one sputum isolates) was performed by pulsed field gel electrophoresis (PFGE) following the protocol described previously [3].

A total of 156 febrile episodes were recorded in the 47 patients within the 312 febrile neutropenic days. Bacteria were isolated in 28 (52%) and fungi in 26 (48%) of the 54 clinical specimens. It was noted that the patients with prolonged and deep neutropenia (hematological malignancy patients) are under an increased risk for fungal infections [1, 4, 5]. In agreement with these findings, we observed systemic fungal infections with high mortality in recent years. Of the 47 patients with febrile neutropenia, 14 had fungal isolation from various body sites and 9 (19%) died due to fungal infection. Eight of these fatal cases had non-*Candida albicans* infection (Table 1). Distribution of *Candida* spp. among the five non-fatal cases was as follows: *C. krusei* (1), *C. kefyr* (1), *C. albicans* (2), *C. famata* (1). In an Italian tertiary hospital, it was found that 60% of the candidemia episodes were related to non-albicans *Candida* and high mortality rates were observed particularly for hematological (71%) and transplant patients (50%) [6]. In another tertiary care hospital in

Infection 2008; 36: 88-91
DOI 10.1007/s15010-007-6246-1

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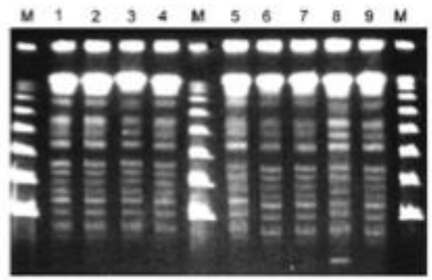

Figure 1. PFGE profile of the 9 *C. krusei* strains. *M* molecular weight marker. *Lanes 1 and 2* patient 1's blood and stool isolates; *lanes 3–6*, patient 2's throat, stool, blood, and sputum isolates, respectively; *lanes 7–9* patient 3's blood, vagina, and throat isolates, respectively.

breaks lasting 1 or 2 days or ineffective doses due to difficulties to obtain liposomal amphotericin B. Amphotericin B treatment was started at tenth day of the febrile neutropenia for two patients and at the first day of the febrile neutropenia and sepsis for the third patient. These patients died on days 8, 21, and 23 after the diagnosis of sepsis. Since there were no concomitant bacterial infections in these patients having many risk factors, the mortality was attributed due to *C. krusei* sepsis. However, it is possible that the high mortality in these patients was

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ca, 30, 131-137, 2007

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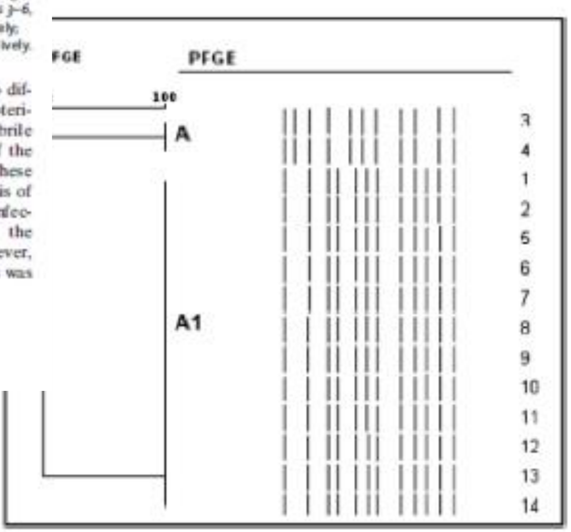
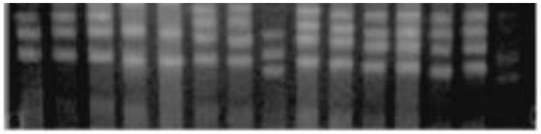
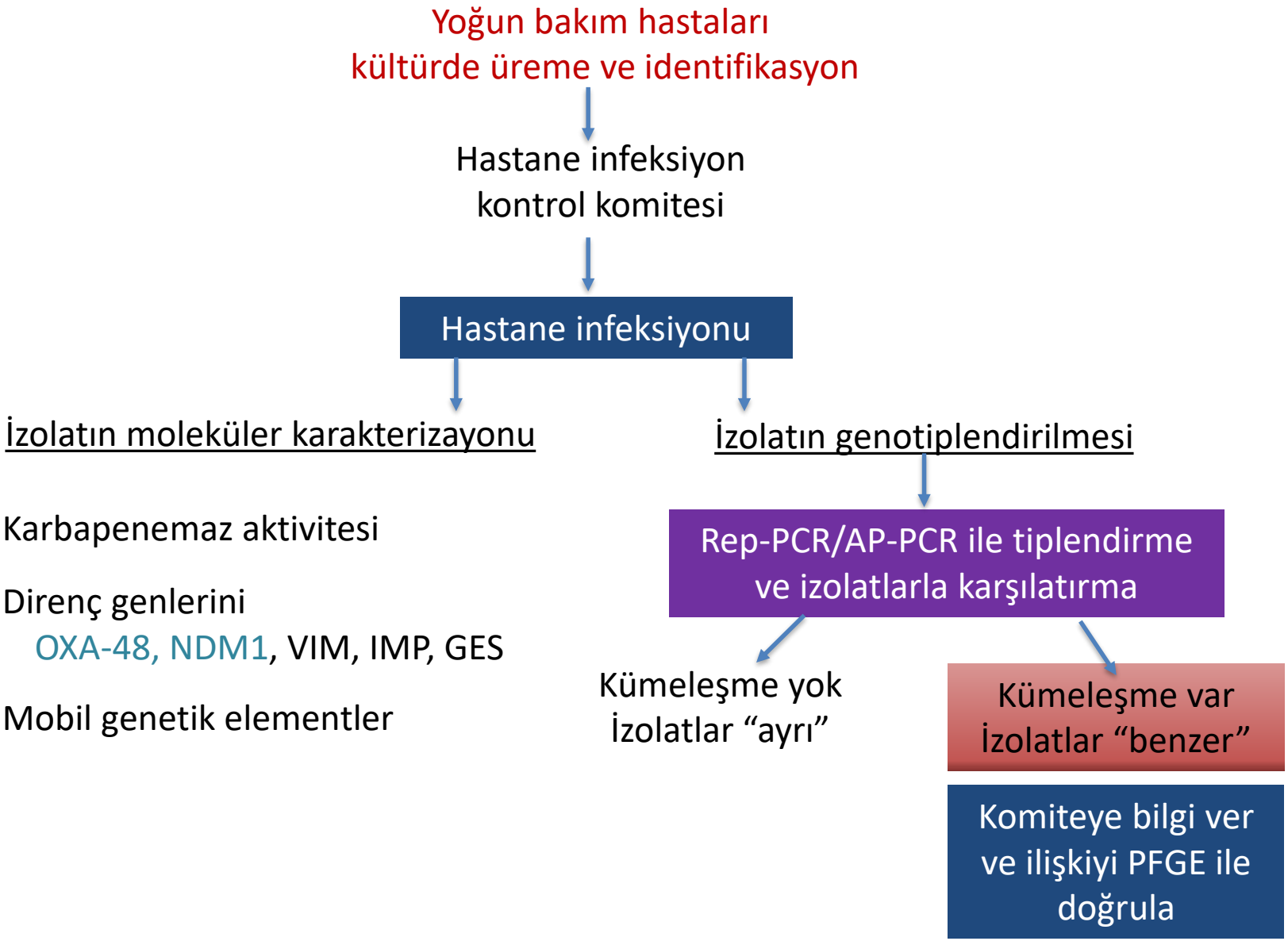
MD,[c] Yasemin Ersoy, MD,[a]

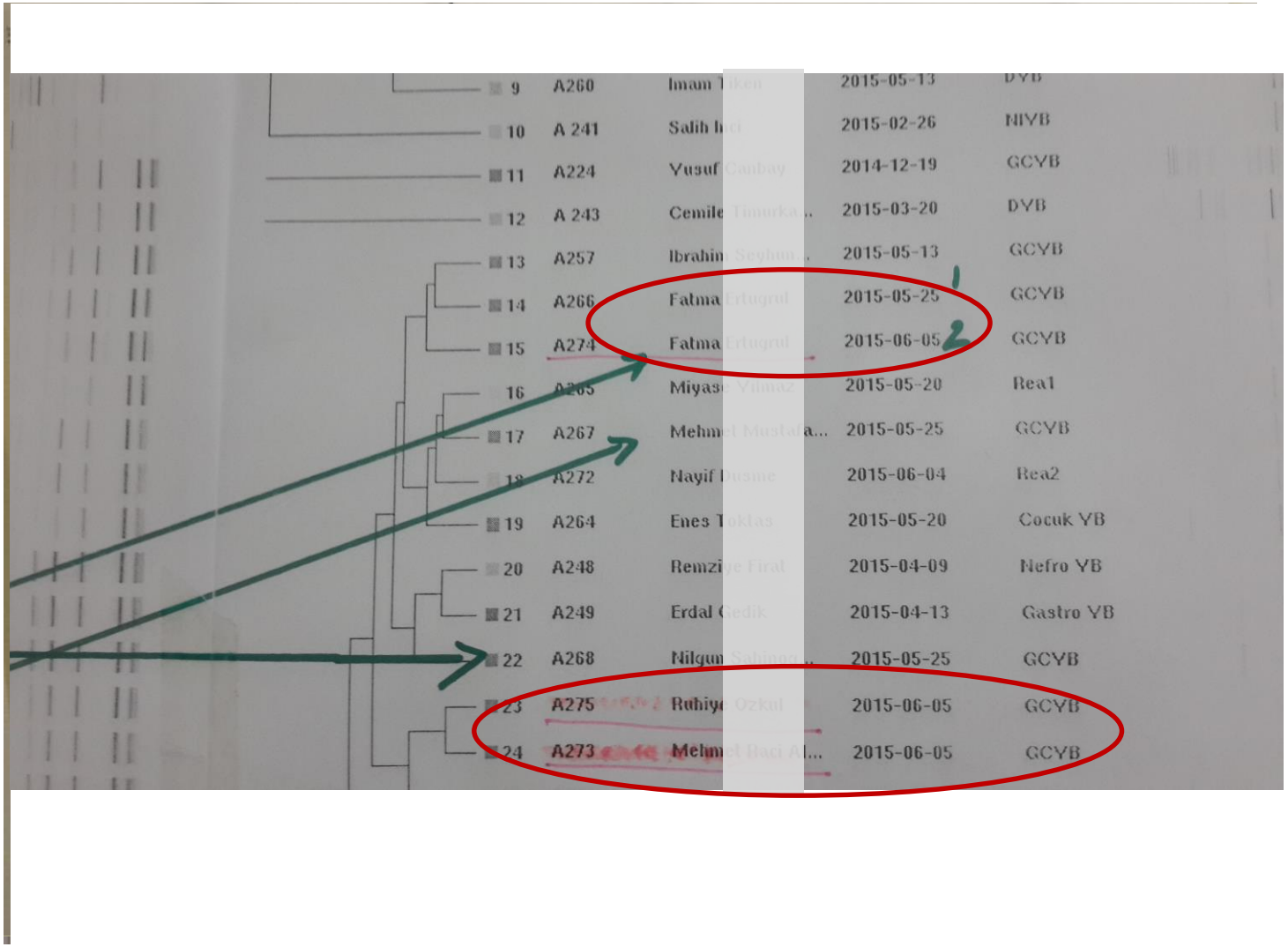




Moleküler Epidemiyoloji Ne Zaman Kullanılmalı ?



Moleküler Epidemiyoloji Ne Zaman Kullanılmalı ?



Eldeki tüm imkanlar kullanılmalı

JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

DZIF

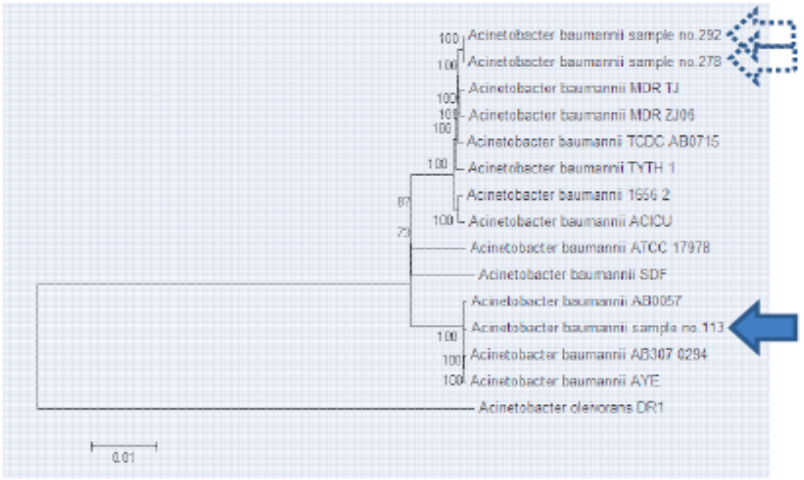
Diagnostic Report: *Acinetobacter baumannii*

Isolate number	113	**Date isolated**	2012-09-04
Origin	Throat swab	**Pat. ID**	XXXX-XXGiXXX

MLST type

1

Phylogeny



Resistance genes	Antibiotic group	Location
bla $_{oxa-72}$	Beta-Lactam	Plasmid 1
bla $_{oxa-66}$	Beta-Lactam	Chromosome
aadA1	Aminoglycoside	Chromosome
sul1	Sulfonamid	Chromosome

Virulence genes detected	Location
Type IV secretion system	Plasmid 2

Assessment

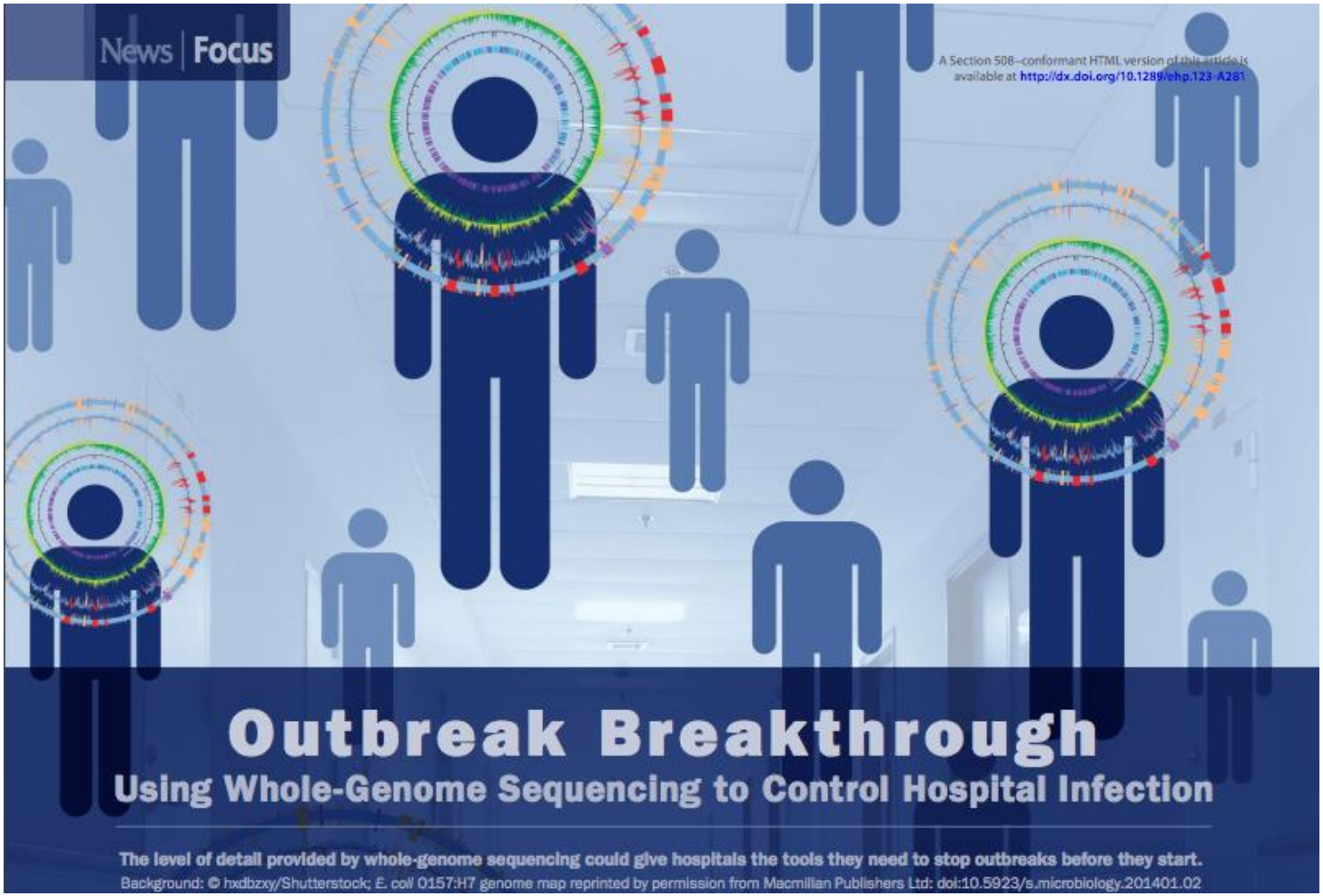
CAVE: Strain with two carbapenemase genes detected. Classified as multiresistant. Phylogeny relation traced to known outbreak strain AB0057. No significant relation to other clinical isolates in recent time frame.

Hygiene: Single patient isolation recommended.

Treatment options: Tetracyclin, Tigecyclin, Colistin (inhalative)

Eldeki tüm imkanlar kullanılmalı

- *Yeni Nesil Dizileme Sistemleri*



Eldeki tüm imkanlar kullanılmalı

Broad Active Surveillance Enabled by Pathogenica's HAI BioDetection Kit

Jack T. Leonard, Adeyemi Adesokan, Stephen Bruso, Thomas Clarke IV, Graeme Doran, Sarah Gruszka, Sarah Mahoney, and Alexander Rolfe

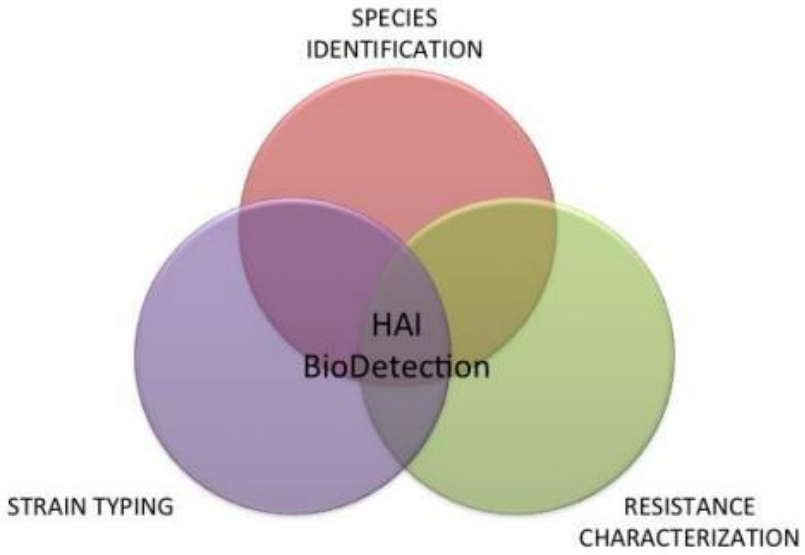
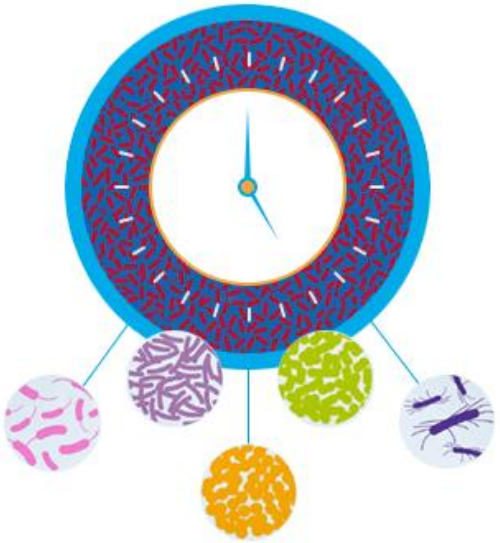


Figure 1: In addition to active surveillance, HAI BioDetection is suitable for strain-typing and antimicrobial resistance characterization.

Eldeki tüm imkanlar kullanılmalı

bioMérieux EpiSeq™* : When Next-Generation Sequencing meets microbiology serving epidemiology

*** Not for diagnostic use**



bioMérieux EpiSeq™, the service of choice to help manage Healthcare-Associated Infections (HAI) using Next-Generation Sequencing (NGS) technology

Fighting Healthcare-Associated Infections is your critical challenge so put the power of Next-Generation Sequencing on your side.

Moleküler Epidemiyoloji Ne Zaman Kullanılmalı ?

- Hastane infeksiyon kontrol komitesine anlık bilgi verdik ve haftalık toplantılarına katıldık.
- Yoğun bakımlarda salgınlardan etkilenen hasta sayısı artmadan müdahale edilmesine katkıda bulunduk.
- Hastane infeksiyon kontrol komitesinin elini güçlendirdik.