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КАФЕДРА ИНОСТРАННЫХ ЯЗЫКОВ

Методическая разработка по английскому языку для студентов II курса по специальностям ИДМ, БТ и БМА

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Данная методическая разработка ставит своей целью подготовить студентов II курса к чтению оригинальной технической литературы на английском языке по своей специальности.
Пособие затрагивает такие темы, как создание нового медицинского оснащения, разработка новых компьютерных технологий и программного обеспечения, сотрудничество и здоровая конкуренция крупных медицинских и приборостроительных концернов, необходимые для нормального функционирования и развития рынка медицинского оборудования. Также рассматривается роль современных компьютерных технологий в разработке, создании и применении новых исследовательских методов и медикаментов для лечения различных заболеваний.
В методическом пособии большое внимание уделяется работе над лексикой, введению и закреплению новых слов, необходимых для чтения и понимания текстов по данной тематике.
Основная цель упражнений, следующих за текстами, заключается в проверке понимания прочитанного, развития навыков аннотирования и реферирования, а также в повторении и закреплении изученного грамматического материала.

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PART 1

BASIC TEXTS

TEXT 1

Antibiotics – A Market Reborn?

The new report from HBS Consulting "Antibiotics – A Market Reborn?" provides an in-depth analysis of the prominent marketing issues facing the industry today including market figures and forecasts and in its review of global research activity in this area seeks to offer informed insight into the direction the market is destined to take.

Antibiotics have been the humble panacea for many infectious diseases since the introduction of the penicillin class in the 1940's. Since that time, the clinical effectiveness of antibiotics has meant that these drugs have been considered an important and indispensable part of the physician's armoury. If we are to believe all the stories we read it would seem that antibiotics have had their glory days and we now face a period of immense hardship as bacteria begin to adapt and develop resistance to the very drugs on which we have begun to rely upon so heavily.

From a purely commercial viewpoint there is the need to attempt an understanding on whether or not we will begin to see an effect on the dynamics of the global antibiotics market. How successful have the major pharmaceutical companies been in accepting the challenge of developing novel antibiotics and will the introduction of new products help to revitalize this mature market sector? In addition, it is interesting to note how various governments are tackling the issue of bacterial resistance and implementing shifts to use of generic product versus branded product.

In order to shed light on these and other relevant questions, HBS Consulting, a leading international consultancy for medical devices and pharmaceuticals, has recently completed an in-depth market and strategic analysis of the major global markets for antibiotics.

<u>Does the antibiotics market remain an attractive one?</u>

The global antibiotics market is a mature, low growth market, with a total value in excess of $24bn in 1999.

HBS Consulting has analyzed the markets in US, France, Germany, Italy, Spain and Japan which had combined revenues in 1998 of $17.4bn million growing by 7.7 percent in 1999. The HBS analysis forecasts this to rise to in excess of $20bn market in 2003.

Price cuts are common within the market as a whole, with many governments not only negotiating lower drug prices but also strongly influencing the medical profession to prescribe less and choose generics where possible. These factors have been shown to inflict a pertinent restraint action on market development.

<u>Bacterial Resistance: Storm in a Teacup?</u>

The media, has been creating a near-hysterical hype around the likelihood of a new stronger type of bacteria, labelled as "superbugs" growing in hospitals in industrialized countries.

According to the present study, the threat which the superbugs pose to society has been overestimated and that we are not by any means close to a medical catastrophe. The emergence of antibiotic resistant strains over the last decade of the 20-th century has coincided with a consistently high level of research activity with an emphasis on bringing to market new generations of antibiotics. The introduction of Linezolid in 2000 is but one example of success in the area. As well as offering new hope in the battle against vancomycin resistant bacteria the introduction of its adds life to a staid market. The P&U product not only offers the company first mover advantage in the new antibiotic class which

it has spawned but also a market opportunity, that by 2005 could translate into product sales of between $550 to $600m.
Further evidence of a resurgence, and growth potential, in the antibiotics market comes from Johnson and Johnson's experiences with Floxin/Levaquin. Worldwide sales are thus far, in 2000, up 59% over 1999 fuelled by demand outstripping that for the quinolone antibiotic class as a whole.
Smaller biotech companies are adding to the excitement in the market through their focussed efforts of the production of novel antibacterial compounds. Companies such as Microcide, Cubist, and Pantherix, have a committed focus on the antibacterial market sector and their continuing success in attracting investment to support their development programs adds testament to the attractiveness of their market strategies.

The future

The most exciting recent event has been the FDA approval of the previously mentioned antibiotic Linezolid, representing the first new class of antibiotic in nearly 30 years: the oxazolidinones. Newer oxazolidinones based on the Linezolid structure have been reported in pre-clinical studies to exhibit even greater potency than the currently marketed drug.
Where will the other breakthroughs occur and which areas are poised to offer scope for enhanced revenue generation? In the short term, developments in the 3-keto macrolide (ketolides) class present a strong market opportunity. For example, the potency of compounds such as Abbott's ABT-773 combined with favourable tolerance suggests that this drug if it were to come through the phase 3 clinical trials offers blockbuster potential. The present study also reviews the possibility and potential impact of emerging technologies in the antibiotics arena as well as offering commentary on the companies destined to be the winners and losers in the global market.

Study the vocabulary

Destined предназначенный
Humble скромный, простой, бедный
Indispensable необходимый, обязательный
Physician [fi`ziʃn] врач
Immense [i`mens] огромный, громадный
Hardship лишения, испытания
Resistance сопротивление, противодействие, сопротивляемость
Relevant [`relivənt] 1)относящийся к делу 2)уместный
Mature [mə`tjuə] зрелый, созревший
In excess of... больше чем, сверх
Inflict наносить (удар, ущерб)
Pertinent [`pə:tinənt] подходящий, уместный
Restraint стеснение, ограничение
Label 1)прикреплять ярлык 2)относить к какой-либо категории
Overestimate переоценивать
Spawn [spo:n] порождать
Staid уравновешенный
Strain культура
Resurgence возрождение
Break-through крупное достижение

1. Answer the following questions

1.What has been the humble panacea for many infectious diseases since the introduction of the penicillin class?
2.When was the penicillin class introduced?
3.Why do we now face a period of immense hardship of antibiotics?
4.Who completed an in-depth market and strategic analysis of the major global markets of antibiotics?
5.What kind of market is the global antibiotics market?
6.What has the media been creating a near-hysterical hype around?
7.What has the emergence of antibiotic resistant strains coincided with?
8.What does the P&U product offer?
9.What is adding to the excitement in the market?
10.What class does the antibiotic Linezolid present?
11.What is labelled as "superbugs"?

2. Complete the sentence

Antibiotics have been the humble panacea for many infectious diseases since...
The clinical effectiveness of antibiotics has meant that these drugs have been considered...
We now face a period of immense hardship as...
The media has been creating a near-hysterical hype around...
Smaller biotech companies are adding to the excitement in the market through...
The most exciting recent event has been the FDA approval of the previously mentioned antibiotic Linezolid representing...
The present study also reviews the possibility and potential impact of...

3.A. Give the English equivalents of the word combinations

Предоставить глубокий анализ; развивать сопротивляемость; всемирный рынок антибиотиков; оказывать сдерживающее действие; новый, более сильный тип бактерии; бактерии, устойчивые к антибиотикам; линезолид, представляющий новый класс антибиотиков; продукт, основанный на линезолидной структуре; возможное воздействие появляющихся технологий на рынок антибиотиков.

3.B. Give the Russian equivalents of the word combinations

Market figures; global research activity; penicillin class; global antibiotics market; market sector; in-depth market and strategic analysis; low growth market; drug prices; market development; antibiotic resistant strains.

4. Put different questions to the sentences

1.Antibiotics have been the humble panacea for many infectious diseases since the introduction of the penicillin class in the 1940's.
2.These drugs are considered an important and indispensable part of the physician's armoury.
3.These factors were shown to inflict a pertinent restraint action on market development.
4.The media has been creating a near-hysterical hype around the likelihood of a new stronger type of bacteria, labelled as "superbugs" growing in hospitals in industrialized countries.
5.The P&U product not only offers the company first mover advantage in the new antibiotic class which it has spawned but also a market opportunity, that by 2005 could translate into product sales of between $550 to $600m.
6.The present study also reviews the possibility and potential impact of emerging technologies in the antibiotics arena as well as offering commentary on the companies destined to be the winners and losers in the global market.

5. Choose the true variant

1.Antibiotics have been considered...

a)a valuable market product;

b)an important and indispensable part of the physician's armoury;

c)a drug no one has begun to rely upon heavily;

d)a research object.

2.Bacteria begin...

a)to inflict a pertinent restrain action on market development;

b)to exhibit even greater potential;

c)to adapt and develop resistance to the very drugs on which we have begun to rely upon so heavily;

d)to add more excitement in the market.

3.The firm has recently completed...

a)a pertinent restrain action on market development;

b)the approval of the antibiotic Linezolid;

c)research with an emphasis on bringing to market new generations of antibiotics;

d)an in-depth market and strategic analysis of the major global markets of antibiotics.

6. Translate the following sentences paying attention to the function of the Infinitive

Bacteria begin to adapt and develop resistance to the very drugs on which we have begun to rely upon so heavily.

In order to shed light on these questions, the Research Laboratory has recently completed a comprehensive study.

The HBS analysis forecasts revenues of the firm to rise to in excess of $20bn market in 2003.

New diagnostics to be used for examination of patients on advanced stages of disease have been developed.

Some categories of patients are not recommended to take x-ray examination.

The laboratory staff seeks to extend the equipment's service life.

The new report in its review of global research activity in this area seeks to offer informed insight into the direction the market is destined to take.

If some changes are found a course of treatment should be taken to prevent the disease development.

Newer oxazolidinones based on the Linezolid structure have been reported in pre-clinical studies to exhibit even greater potency than the currently marketed drug.

2 new powerful robot systems are being used to identify new chemical structures to be used in tumor therapy.

Godfrey Hounsfield created a device to study the brain.

Some patients have serious reasons to undergo this procedure.

Some laboratories use robots to produce genetic material needed for the research.

Some patients tend to believe magnetic-resonance tomography to be better than the computer one.

This development provokes new questions and problems to be adequately solved.

The present study also reviews the companies destined to be the winners and losers in the global market.

TEXT 2

Human Genome Research And DNA Chip Technology - Ethical Aspects

Today, progress in human genome research contributes considerably to the identification of disease related genes. Not only does it broaden the clinically relevant diagnosis opportunities, but it also allows the development of novel therapy concepts. Furthermore, there are increasing indications that the effectiveness and tolerance of drugs in patients is influenced by their individual genetic predisposition (polymorphisms). It is therefore likely that genetic data gathered during human genome research will not only play an increasingly important role in molecular genetic diagnostics, but also for the planning and development of novel pharmaceuticals.

As this development clearly demonstrates, human genome research will expand our knowledge about human genes considerably. New results on the structure and function of a gene that was previously unknown, or only incompletely, are published almost weekly. Novel methods, such as DNA Chip Technology, allowing the simultaneous analysis of thousands of genes, will speed up this development and enormously deepen our understanding of the molecular basis on disease processes.

These developments provoke new questions and problems that have to be adequately solved. A central one concerning the application of chip technology might lie in its incompatibility with the differentiated human genetic guidelines for the performance of molecular genetic tests. These guidelines require that a qualitative explanation of the test during consultation prior to the test and the decision autonomy of the test persons must be guaranteed (i.e. require quality control for genetic consultations).

Simply the drastically increased capacity of genetic diagnostics, allowing the simultaneous analysis of various disease genes, suspect genes and mutations, could cause problems with respect to ensuring an adequate information transfer and understanding of the topic, as a prerequisite for the informed consent.

The integration of analysis, evaluation of genetic data into electronic data storage and processing results constitutes a further problematic zone in chip based diagnostics. This kind of information could be of great interest in various contexts and thus possibly also constitute a larger risk factor for the tested persons. Hence the advent of chip technology will induce numerous changes, particularly in terms of data accessibility of, for example genetic data.

Given these arising problems, the ethical, legal and social implications of this developing technology will increase in political importance. In the future, solving these problems will prove to be important prerequisites for the responsible use of these novel technical options.

Study the vocabulary

DNA (deoxyribonucleic acid) ДНК
Identification [ai`dentifi`keiʃn] опознание
Tolerance толерантность, способность переносить что-либо
Incompatibility несовместимость
Prior ['praiə]предшествующий
Simultaneous ['simə]l'teinjəs] одновременный
Prerequisite предпосылка
Induce вызывать, стимулировать
Guideline общий курс; руководство
Consent согласие
Accessibility доступность
In terms of на языке, с точки зрения

1. Answer the following questions

1.What does human genome research considerably contribute to?
2.What is the effectiveness and tolerance of drugs in patients influenced by?
3.Where can genetic data play an important role?
4.What will novel methods do?
5.What is one of central problems provoked by new developments?
6.What do genetic guidelines for performance of molecular genetic tests require?
7.What problems could the drastically increased capacity of genetic diagnostics cause?
8.What constitutes a further problematic zone in chip based diagnostics?
9.Why do chip based diagnostics constitute a larger risk factor for the tested persons?
10.What changes will the advent of chip technology induce?

2. Complete the sentence

Progress in human genome research contributes considerably to…

New results on the structure and function of a gene that was previously unknown, or only incompletely...

Novel methods, such as... will speed up this development and enormously deepen our understanding of...

One of the problems, concerning the application of chip technology might lie in...

The drastically increased capacity of genetic diagnostics, allowing... could cause problems with respect to...

The integration of analysis, evaluation of genetic data into electronic data storage and processing results constitutes...

Solving these problems will prove to be...

3.A. Give the English equivalents of the word combinations

Исследование генома человека; расширять возможности; молекулярная основа заболевания; допускать одновременный анализ различных генов заболевания; обеспечение адекватной передачи информации; проблемная зона в диагностике, основанной на чипах; представлять больший фактор риска для людей, проходящих обследование; генетические данные, собранные во время исследования; значительно расширять знания о человеческих генах; во время консультации, предшествующей тесту.

3.B. Give the Russian equivalents of the word combinations

Human genome research; diagnosis opportunities; therapy concepts; genetic data; molecular genetic diagnostics; DNA Chip Technology; human genetic guidelines; test persons; quality control; disease genes; adequate information transfer; electronic data storage; risk factor; novel technical options.

4. Choose the true variant

1.Progress in human genome research contributes considerably to...
a)the identification of molecular basis on disease process;
b)the identification of disease related genes;
c)a qualitative explanation of the test during consultation prior to the test;
d)the treatment of gene diseases.

2.The integration of analysis, evaluation of genetic data into electronic data storage and processing results constitutes...
a)problems with respect to ensuring an adequate information transfer;
b)a further problematic zone in chip based diagnostics;
c)a larger risk factor for the tested persons;

d)numerous changes.

5. Translate the following sentences paying attention to the function of the Participles

1. Today, progress in human genome research contributes considerably to the identification of disease related genes.
2. There are increasing indications that the effectiveness and tolerance of drugs in patients is influenced by their individual genetic predisposition.
3. Being gathered during human genome research genetic data play an increasingly important role in molecular genetic diagnostics.
4. X-rays having been discovered, a new stage of medical diagnostics began.
5. When accepted by everybody novel methods allowing the simultaneous analysis of thousands of genes will speed up this development.
6. A central problem concerning the application of chip technology might lie in its incompatibility with the differentiated human genetic guidelines for the performance of molecular genetic tests.
7. The drastically increased capacity of genetic diagnostics, allowing the simultaneous analysis of various disease genes, suspect genes and mutations, could cause some problems.
8. Having completed their study the researchers realized that that method constituted a larger risk factor for the tested persons.
9. A new method based on novel technologies was accepted by all laboratories participating in the project.
10. An alternative method for determination of the number of viable cells in culture, based on the fluorescence of proteins expressed in mammalian cells was proposed recently.
11. Human genome research will expand our knowledge about human genes considerably contributing to the identification of disease related genes.
12. The doctors showed negligence omitting to warn the patient.
13. Some changes in organism having been found, a course of treatment preventing disease development should be taken.
14. Once completed, this research will considerably contribute to the development of new biological technologies.

TEXT 3

Growth Assessment Using Fluorescent Mammalian Cells

An essential parameter in research and development work with animal cells is the determination of the number of viable cells in culture. Standard methods require preparation steps such as sampling, dilution, and microscopic cell counting. We propose an alternative based on the fluorescence of a recombinant protein (green and yellow fluorescent proteins, GFP and YFP respectively) constitutively expressed in mammalian cells. This method is simple, fast, precise and non-invasive.

A number of Human Embryo Kidney cell lines stably expressing cytoplasmic GFP or YFP have been established and studied in detail. Detection of the fluorescence of these proteins does not require cofactors or other preparation.

The number of fluorescent cells correlates linearly with their fluorescence signal within and above the range encounted in normal cultures.

<u>Growth kinetics can be determined in two hours</u>

We observed that the total fluorescence of exponentially growing population also correlates with viable cell number determined by the old method over time. In other words, the average fluorescence per cell in the population is constant. Only later in the

culture, when the viability drops, the total fluorescence slightly overestimates the cell number. The precision of the measurement allows the determination of growth rates from fluorescence measurements as little as 2 hours apart, as opposed to the days required with classical techniques.

Improved precision

Increasing the number of replicates necessitates more wells plated initially, and eventually a few more plates to measure. As such, reproducible data can be obtained from a large number of individual cell cultures, simultaneously and/or within very brief time intervals. Samples can be measured repeatedly. This approach reduced sampling error, a major source of imprecision.

Concluding remarks

By definition, analytical reliability of a method depends on the criteria for accuracy, precision, specificity, and detectability. The practicability of the method lies in on its speed, cost, technical skill requirements and dependability. The kinetic data obtained allow for rapid identification of trends and provide more information than a simple end-point analysis.

We are applying this technology to the rapid assessment of environmental conditions (for example, culture parameters, media additives or other treatments) in the development of a production process for another recombinant protein (antibody), and of artificial cell growth matrices in a tissue engineering project.

Other potential applications include screening or quality control of reagents or culture plates. We are interested in other suggestions, both in terms of an industrial collaboration and/or an academic research program. We are convinced that these methods can be applied to many other cell lines of interest.

Study the vocabulary

Assessment оценка
Fluorescence свечение
Viable ['vai∂bl] жизнеспособный
Mammal млекопитающее
Sample собирать образцы
Dilution разбавление, разжижение
Invasive [in'veisiv] вторгающийся, агрессивный
Embryo ['embriou] зародыш, эмбрион
Kidney ['kidni] почка
Cofactor сопутствующий фактор
Adherent [∂d'hi∂r∂nt] клейкий
Detach отделять, выделять
Solution раствор
Validity обоснованность
Disrupt разрывать, нарушать
Well источник
Verify подтверждать
Drop падать, снижаться
Necessitate делать необходимым
Replicate повтор
Screen зд.выбирать путем отсева

Curve ['kə:v] график, диаграмма
Entail влечь за собой, вызывать
Suspension суспензия
Imprecision неточность
Practicability целесообразность, осуществимость
Dependability надежность
Tissue ['tiʃu:] ткань
Additive ['æditiv] добавка

1. Answer the following questions

1.What is an essential parameter in research and development work with animal cells?
2.What are standard preparation steps?
3.What is a new method based on?
4.What cell lines have been established and studied in detail?
5.What does the total fluorescence signal correlate with?
6.What is the major source of imprecision?
7.What are potential applications of this technology?
8.What criteria does analytical reliability of novel method depend on?
9.Where does the practicability of the method lie?
10.What are current applications of technology?

2. Complete the sentence

An essential parameter in research and development work with animal cells is...
Detection of the fluorescence of these proteins does not require...
Preparation of samples from adherent cultures includes...
To increase the validity of the measurement...
The number of fluorescent cells correlates linearly with...
The total fluorescence of exponentially growing population also correlates with...
The average fluorescence per cell in the population...

3.A. Give the English equivalents of the word combinations

Клетки млекопитающих; альтернативный метод, основанный на свечении рекомбинантного/рекомбинирующего (участвующего в генетической рекомбинации) протеина; клетки почки зародыша человека; трудоемкий ручной способ; среднее свечение клетки; точность измерения; в течение очень коротких временных интервалов; аналитическая надежность метода; быстрая оценка условий окружающей среды.

3.B. Give the Russian equivalents of the word combinations

Research and development work with animal cells; cell lines; human embryo kidney; manual counting; standard fluorescence plate reader; reproducible data; to reduce sampling error; tissue engineering project; selective markers.

4. Choose the true variant

1.The determination of the number of viable cells in culture is an essential parameter in...
a)rapid assessment of environmental conditions;
b)research and development work with animal cells;
c)sampling;
d)cell counting.
2.The new method is based on...
a)manual microscopic cells counting;

b)fluorescence of a recombinant protein expressed in mammalian cells;
c)standard preparation steps;
d)detaching cells.
3.The practicability of the method lies in…
a)reduced costs;
b)potential applications;
c)speed, cost, technical requirements and dependability;
d)applying new technologies.
4.Scientists are convinced that these methods...
a)can be applied to many cell lines of interest;
b)are very useful;
c)can bring them the Nobel prize;
d)can be applied only to the rapid assessment of environmental conditions.
5. Translate the following sentences paying attention to the function of the Gerund
Some pharmaceutical companies achieved success in attracting investment for supporting their development programs.
Captured embolic material is then withdrawn by using a catheter.
Fluorescence measurements entail simply transferring the plate from the incubator to the plate reader.
Doctor insisted on patient's going this procedure.
Success largely depends on processing a machine-generated image.
Increasing the number of replicates necessitates more wells plated initially, and eventually a few more plates to measure.
DNA encodes all the information necessary for building and maintaining life in complex human being.
A course of treatment taken timely can prevent from disease developing.
We learned about new diagnostic method having been developed.
His having metallic implantants was a serious reason not to undergo magnetic tomography.
This approach reduced sampling error, a major source of imprecision.

TEXT 4

Studying Mosquito Immune Responses To Malaria Infection

Malaria is one of the worlds most devastating diseases causing over 2 million deaths yearly and subjecting over 400 million humans to suffering. The disease involves three organisms connected through complex interactions; the Plasmodium parasite, which causes the disease, is transmitted between the human hosts by the Anopheles mosquito vector. The disruption of any of these interactions would break the transmission chain and lead to the eradication of malaria. The largest efforts towards malaria control have been concentrated on vaccine, drug and insecticide development but have yet not lead to any substantial epidemiological improvement in the third world. During the last decade a significant effort has been invested on the study of the vector mosquito and its interactions with the parasite, and has generated important knowledge on this intimate and finely tuned relation. Our laboratory is mainly studying the mosquito's innate immune system and how it may contribute to the observed parasite losses occurring in both susceptible and refractory mosquitoes. The dissection of the components involved in the anti-malarial innate immune responses may lead to the elucidation of the mechanisms underlying parasite killing and provide clues for the development of novel biological control strategies for malaria.

Malaria's life cycle in the mosquito

The Plasmodium parasites are introduced in the mosquito's organism with the blood meal from an infected host. They travel through the mosquito's organism lodging in its parts on different development stages and finally translocate into the salivary glands from where they can be transmitted to a new host.

Fortunately not all mosquitoes species can transmit malaria parasites. Longevity and feeding preferences are the two most important determinants of the mosquito's vectorial capacity. Other factors determining capacity to spread malaria are the molecular interactions between the mosquito and the parasite and the ability of the mosquito innate immune system to recognize and kill the parasite. In a genetically selected mosquito refractory strain all malaria parasites are being killed through a defense reaction. The observed parasite losses occurring in susceptible strains may also, at least partly, result from innate immune responses mounted against them.

Mosquitoes are fighting against malaria

Mosquitoes, as other insects, can protect themselves from infectious microorganisms through their innate immune system which consists of humoral and cellular defense reactions.

The mosquito is fighting against malaria by activating its immune system during the stages of infection when the parasite is moving across and between epithelial tissues. This was first shown through the transcriptional activation of immunity genes upon malaria infection. The activation correlated temporally and spatially with the parasites passage through the vector and also coincided with the stages where large parasite losses had been documented; first at 24 hours post infection and again later, at about 11 days. A more direct link between innate defense reactions and malaria parasite killing was established by showing that nitricoxide, which is produced by the immune responsive nitricoxide synthase, was limiting parasite development at the certain stages. It was also shown that parasite development is compromised in mosquitoes which have been pre-immune challenged by injury and bacterial infection.

Studying anti-malaria immune responses

The first, and still ongoing, approach for the identification of genetic elements involved in Plasmodium killing is the genetic mapping of quantitative trail loci (QTL) controlling killing malaria parasites in refractory mosquito's organism. Three such QTLs have been defined and are currently used for the positional cloning of the genetic determinants of this trait.

In another approach, immune responsive mosquito genes have been extensively used as markers for assaying the activation of mosquito defense against malaria infection at the transcriptional level. Six such putative immunity genes were initially used for the temporal and spatial characterization of molecular immune responses during the course of malaria infection. One gene, defensin, encoded an antimicrobial peptide. Three genes encode proteins known to be involved in binding to microorganisms and could thus play roles as recognition receptors. Two genes encode a serine proteases and a serine protease-like molecule respectively. Serine proteases are frequently involved in signaling and amplification cascades leading to the activation of defense reactions.

Several different defense reactions may be involved in the mosquito's anti-malaria responses during the various stages of infections. The definition and dissection of these reactions would require the study of a much larger number and variety of genes, which would encode components involved in the different defense mechanisms. One of the laboratory has recently initiated a functional genomic approach for dissecting immune responses mounted against

various classes of microorganisms including the malaria parasite. In a recent pilot gene discovery project, over 2500 new genes were discovered through a mass DNA sequencing approach. The analysis of the unique features of anti-microbial, anti-fungal and anti-malarial immune responses in both susceptible and refractory mosquitoes will facilitate us to assign gene clusters to specific immune activation pathways and defense reactions. In addition to generating knowledge on anti-microbial and anti-malarial innate immune responses these studies will also shed light on the global effect malaria infection exerts on the mosquito, some of which are likely to be important for vector competence.

Study the vocabulary

Devastate ['dev∂steit] опустошать, разорять
Response реакция
Map строить карту
Trail след
Loci['losai] pl от locus расположение гена в хромосоме
Trait признак
Amplification расширение, увеличение
Competence способность
Exert оказывать воздействие
Cluster['klΛst∂] зд. группа
Subject подвергать
Parasite ['pær∂sait] паразит
Mosquito комар
Vector переносчик болезни
Disruption разрыв
Eradication [i'rædi'kei∫∂n]искоренение
Insecticide [in'sektisaid]средство против насекомых
Innate ['i'neit] врожденный
Immune невосприимчивый, иммунный
Susceptible [s∂`sept∂bl] восприимчивый
Refractory упорный (о болезни), крепкий (об организме)
Dissection анализ, разбор
Elucidation разъяснение
Clue ключ к разгадке
Lodge временно находиться
Salivary ['sæliv∂ri] слюнный
Gland железа
Species виды, классы
Longevity долговечность
Humoral гуморальный, относящийся к любой жидкости в организме человека
Cellular клеточный
Putative ['pju:t∂tiv] предполагаемый
Fungus ['fΛŋg∂s] грибок
Transcription транскрипция (первый этап реализации генной информации в клетке, в процессе которой происходит биосинтез молекул информационной РНК на материале ДНК)
Assay [∂'sei] проба

1. Answer the following questions

1.What three organisms are involved in malaria disease?

2.What can provide clues for the development of novel biological control strategies for malaria?

3.What are the plasmodium gametocytes introduced in the mosquito organism with?

4.What are the two most important determinants of the mosquito's vectorial capacity?

5.What are other factors determining capacity to spread malaria?

6.What reactions does a mosquito's innate immune system consist of?

7.How many immunity genes were initially used for temporal and spatial characterization of molecular immune responses?

8.What makes it possible to predict a gene function based on its expression pattern under certain conditions?

9.What will studying mosquito's immune responses do?

2. Complete the sentence

The disease involves three organisms...

The dissection of the components involved in the anti-malarial innate immune responses may lead to...

The Plasmodium parasites are introduced in the mosquito's organism with...

Finally the Plasmodium parasites will successfully translocate into...

Not all mosquitoes species can...

Longevity and feeding preferences are...

The mosquito's innate immune system consists of...

Invading microorganisms are recognized by...

3.A. Give the English equivalents of the word combinations

Врожденная иммунная система комара; иммунные реакции; вести к разъяснению механизма, лежащего в основе уничтожения паразитов; новые стратегии биологического контроля; переносить малярийных паразитов; слюнные железы; способность врожденной иммунной системы комара распознавать и уничтожать паразитов; уничтожать посредством защитной реакции; временная и пространственная характеристика молекулярных иммунных реакций; противомикробные, противогрибковые, противомалярийные иммунные реакции.

3.B. Give the Russian equivalents of the word combinations

Devastating disease; drug and insecticide development; innate immune system; biological control strategies; transmit malaria parasites; salivary gland invasion; defense reaction; activate defense mechanisms; immune responsive mosquito genes; encode proteins; require the study; functional genomic approach.

4. Choose the true variant

1.Plasmodium parasite, causing malaria is transmitted between the human hosts by...

a)handshake;

b)animal bites;

c)anopheles mosquito vector;

d)various insects.

2.Mosquitos can protect themselves from infectious microorganisms through...

a)innate immune system;

b)a defense reaction;

c)antibiotics;

d)powerful weapon.
3.Mosquito's innate immune system consists of…
a)molecular reactions;
b)genetic reactions;
c)cellular reactions;
d)cellular and humoral reactions;
4.Generating knowledge on anti-microbial and anti-malaria responses these studies will…
a)explain malaria parasites killing mechanism;
b)shed light on global effect malaria exerts on mosquito;
c)create anti-malaria vaccine;
d)protect malaria parasites.
5. Translate paying attention to the verbs in Passive and then transform the sentences changing Passive into Active
1.The Plasmodium parasite, which causes the disease, is transmitted between the human hosts by the Anopheles mosquito vector.
2.The largest efforts towards malaria control have been concentrated on vaccine, drug and insecticide development by many research laboratories all over the world.
3.During the last decade a significant effort was invested on the study of the vector mosquito by Malaria Studying Center.
4.The Plasmodium parasites are introduced in the mosquito organism with the blood meal from an infected host.
5. All malaria parasites are being killed in the by refractory mosquitoes through a defense reaction.
6.Invading microorganisms are recognized by receptors molecules.
7.Antibiotics have been considered for a long time the panacea for many infectious diseases by physicians.
8.New diagnostic centers are being set up throughout the country by health care providers.
9.Novel diagnostic methods based on advanced technologies are being worked on by scientists in many countries.
10.Necessary materials for genetic research will be provided by biological laboratories participating in the project.
11.The drug tolerance in patients is influenced by their individual predisposition.

TEXT 5

In Search For New Anticancer Agents By Means Of A Protein Kinase Technology Platform

Protein kinases regulate a multitude of physiological processes by transfer of phosphate residues. This group of enzymes plays a central role in control of growth, division, and differentiation of cells. There is a lot of evidence that the elevated activity as well as loss of activity control of different protein kinases is involved in the initiation and progression of tumors. Because of this function, protein kinases are considered to be promising targets for the development of novel anticancer agents. The KTB Tumor Research Laboratory (Germany) has recombinantly produced 40 human protein kinases and developed a novel kinase test for determination of kinase activity in microplates.

Despite extensive research efforts, the therapeutic treatment of tumor patients is still not satisfying. However, recent findings from molecular biology research open new strategies for tumor therapy. In the past years, number of new molecular structures, so-called

targets, have been identified which with high probability are causally involved in the initiation and progression of tumors. Among these are many protein kinases which are generally accepted as promising targets for the development of novel anti-cancer agents. Protein kinases are enzymes which transfer phosphate residues onto protein molecules and thus trigger a change in the molecular conformation of the phosphorylated proteins. Among the 20 physiologically occurring amino acids only serine, threonine, and tyrosine can be phosphorylated by protein kinases. Based on their substrate specificity, protein kinases are divided into two groups, the Serine/threonine kinases and the tyrosine kinases.

Protein kinases as target molecules

Over the last decade it has been well established that protein kinases are involved in tumor development in several ways. Mutations in the genes of certain protein kinases can result in a growth advantage for one cell compared to other surrounding ones, which then divides more quickly or in an uncontrolled manner. A lot of data suggest that in particular tyrosine kinases of growth factor receptors and the cycline-dependent kinases regulating the cell cycle are involved in this transformation from normal cells to tumor cells.

Furthermore, protein kinases play a role in the regulation of programmed cell death (apoptosis). By activating certain protein kinases in tumor cells apoptosis signals can be turned off. This eliminates an important biological repair mechanism, namely the elimination of tumor cells through apoptosis. A third molecular mechanism contributing to tumor development involving protein kinases is tumor angiogenesis. The rapid growth of solid tumors is only made possible if small clones of tumor cells, which are not yet vascularized, are being connected to the already existing vascular blood system.

Due to the multiple roles protein kinases play in the initiation of cell transformation and progressive growth of tumors, substances inhibiting these enzymes are expected to be used as therapeutic agents for the treatment of cancer patients. The novel chemical structures should either specifically inhibit tumor cell proliferation, induce apoptosis or inhibit tumor angiogenesis.

Recombinant protein kinases

High throughout screening with protein kinases has become possible due to the application of recombinant DNA Technology. Up to now, 40 human protein kinases have been cloned at the laboratory which were expressed in insect cells using recombinant baculoviruses. Most of the protein kinases are targets for the development of new tumour therapeutics. Some of the kinases, however, were expressed to verify the selective kinase inhibitory effect of identified hits.

The protein kinase assay

Until a few years ago, only time-consuming filtration assays were available for determination of the catalytic activity of protein kinases. In the meantime, different companies offer new technologies suitable for microplates. Among them are the SPA method (scintillation proximity assay) developed by Amersham and the homogeneous time-resolved fluorescence methods, which are offered by Packard or Wallac.

The laboratory developed its own method. The special feature of this method is that the substrate while still in solution during the reaction, before the subsequent washing step, is immobilized on the microplate using a simple method. This procedure can be applied to different substrates. The test is very simple, robust and suitable for kinases.

First successes

The technology platform described here is used by this laboratory for its own drug

discovery projects or in cooperation with pharmaceutical companies. The ultimate goal of all activities is the identification of novel chemical structures which are suitable for tumour therapy.

Different compound libraries are used for primary screening. On the one hand, collections are screened which have been produced using classical organic synthesis, on the other hand, collections of natural substances are tested. In addition, substances derived from combinatorial chemistry are also screened for inhibition of protein kinases.

Worldwide there are the number of protein kinase inhibitors currently under clinical testing. The KTB in Freiburg, Germany, is associated with a Oncology Research Hospital (Tumor Biology Center Freiburg) with 200 patients. This substance, which was developed with significant contribution from KTB, acts as an inhibitor of tumor angiogenesis.

Outlook

The discovery of new protein kinases has not yet reached its end. Again and again there are reports on new protein kinases suitable as targets for tumor therapy. Therefore, the kinase panel at KTB will be continuously expanded over the next few years. New assay methods, such as time-resolved fluorescence (TRF) or fluorescence polarization (FP), are being established as part of the KTB "Protein Kinase Technology Platform".

It would also be desirable to determine the profile of kinase inhibitors in parallel for a multitude of protein kinases using chip technology – if possible even inside the cell. First preliminary tests which look promising have already been performed.

Whether protein kinases will still play a role as targets in drug discovery in 10 years will mainly depend on what progress is made in the marketability of kinase inhibitors, whether for tumor therapy or for treatment of other diseases.

Study the vocabulary

Agent средство

Profile особенность

Kinase киназа (фермент, катализирующий перенос фосфатной группы и формирование АТФ)

Residue ['rezidju:] остаток

Tumour (=tumor) ['tju:m∂] опухоль

Initiation инициация, возникновение

Trigger запускать

Conformation устройство; форма

Substrate субстрат

Angiogenesis развитие сосудов

Vascularize васкуляризировать, прорастать сосудами

Inhibit [in'hibit] препятствовать, задерживать

Proliferation распространение путем деления клеток

Fusion ['fju:з∂n] слияние, соединение

Cleavage расщепление

Elution разделение, вымывание

Scintillation ['sinti'lei∫∂n] сверкание, мерцание, вспышка

Proximity близость

Threonine треонин (аминокислота)

Tyrozine тирозин (аминокислота)

Screen выбирать путем отсева

Library зд. фонд

Serine серин (аминокислота)

1. Answer the following questions

1.In what way do protein kinases regulate a multitude of physiological processes?

2.Why are protein kinases considered to be promising targets for the development of novel anticancer agents?

3.What opens new strategies for tumor therapy?

4.What amino acids (among the 20 physiologically occurring ones) can be phosphorylated by protein kinases?

5.What groups are protein kinases divided into?

6.What are protein kinases involved in?

7.What is apoptosis?

8.What is the third molecular mechanism contributing to tumor development involving protein kinases?

9.What has made throughout screening with protein kinases possible?

10.What assays were available for determination of the catalytic activity of protein kinases a few years ago?

11.What technologies are offered today?

12.What substance developed with significant contribution from KTB acts as an inhibitor of tumour angiogenesis?

2. Complete the sentence

1. Among these are many protein kinases which are generally accepted as...
2. Elevated activity as well as loss of activity control of different protein kinases is causally involved in...
3. Protein kinases are enzymes which...
4. Mutations in the genes of certain protein kinases can result in...
5. Due to the multiple roles protein kinases play in the initiation of cell transformation and progressive growth of tumors, it is expected that...
6. Until a few years ago, only time-consuming filtration assays...
7. The KTB developed its own method based on...

3. A. Give the English equivalents of the word combinations

Противораковое средство; нехирургическое лечение больных с опухолями; в различных органах и тканях; устранение раковых клеток посредством апоптозиса; молекулярный механизм, способствующий развитию опухоли.

3.B. Give the Russian equivalents of the word combinations

Protein kinase technology platform; molecular biology research; tumour therapy; growth factor receptors; vascular blood system; tumour cell proliferation; recombinant DNA technology; scintillation proximity assay; drug discovery project; 96 channel pipette.

4. Choose the true variant

1.Protein kinases are considered to be...

a)new anticancer agents;

b)promising targets for the development of novel anticancer agents;

c)involved in the initiation and progression of tumors;

d)a reason of a programmed cell death (apoptosis);

2.Another molecular mechanism contributing to tumour development involving protein kinases is...

a)tumour angiogenesis;
b)tumour cell proliferation;
c)transfer of phosphate residues;
d)tumour cell apoptosis.
3.The KTB developed its own method based on...
a)the application of recombinant DNA technology;
b)measuring the incorporation of phosphate into the relevant substrate;
c)fluorescent mammalian cells;
d)molecular biology research.
4.The substance which was developed with significant contribution from KTB, acts as...
a)a control of growth, division and differentiation of cells;
b)a transfer of phosphate residues;
c)an important biological mechanism;
d)an inhibitor of tumour angiogenesis.
5. Translate the sentences paying attention to the Complex subject
1. Protein kinases are considered to be promising targets for the development of novel anticancer agents.
2. Substances inhibiting certain enzymes are expected to be used as therapeutic agents for the treatment of cancer patients.
3. Most of the protein kinases are likely to be targets for the development of new tumour therapeutics.
4. This procedure was said to be applied to different substrates.
5. Protein kinases have been found to regulate a multitude of physiological processes by transfer of phosphate residues.
6. Newer drugs based on the linezolide structure have been reported to exhibit even greater potency the currently marketed ones.
7. These factors have been shown to inflict a pertinent restraint action on market development.
8. In the pre-computer era of medical diagnostics, the human brain, safely covered with cranium seemed never to be seen.
9. Several different defense reactions have been found to be involved in the mosquito's anti-malaria responses.
10. Over the last decade protein kinases have been established to be involved in tumor development in several ways.
11. This development is suggested to play an important role in drug discovery in several years.

TEXT 6

Linear Drives Helps In The Effort To Decode The Blueprint Of Life

The Human Genome Project is an ambitious venture. A ten-year international collaboration has recently completed the first draft of the sequence of the three billion parts of the human genome. To support the sequencing effort, vast quantities of genetic material needed to be prepared for participating laboratories. And this was a job that could only be done by robots. Linear Drives' motors have proved to be ideal for driving the robots at the speed and precision demanded.

Once completed, the Human Genome Project (HGP) will tell us more about ourselves

than we've found out in the previous two centuries of biochemical sciences. The project is designed to map the entire human genome, the blueprint for life itself, providing scientists with a reservoir of information that will form the basis of genetic research for future generations.

HGP is an international effort formally begun in October, 1990. The project was initially planned to last fifteen years, but rapid technical advances have seen the completion of the first draft in just ten. The project has the ambitious targets of identifying the 100,000 or so genes in human deoxyribonucleic acid (DNA) and determining the sequence of the chemical bases that make up the DNA. The 3 billion chemical bases in the human genome are organized into 24 distinct, physically separate microscopic units called chromosomes which are found in the nucleus of a person's many trillions of cells. All the 80,000 to 100,000 genes predicted to be encoded in the genome are arranged linearly along these chromosomes. DNA encodes all the information necessary for building and maintaining life in remarkably complex human beings.

Parallel work was needed to make the project manageable even within a ten-year time span. This came in the form of international collaboration between laboratories world-wide, and in automation of the sequencing itself. Supporting the sequencing effort was itself a mammoth task, demanding the preparation of millions of samples of genetic material.

One unit that has specialized in the preparation of genetic material is the Resource Center and Primary Database (RZPD) of the German Human Genome Project (DHGP). The Resource Center is part of the world-famous Max-Planck-Institute for Molecular Genetics, based in Berlin.

The primary objectives of the Resource Center are to provide all groups engaged in the German Human Genome Project with standardized and high-quality biological materials. These materials come in the form of gene libraries; individual 'clones', high-density clone filters and DNA and protein filters.

As all the strands making up human DNA would stretch more than 5 feet but would be only 50 trillionths of an inch wide) it is not practical to conduct individual experiments on complete strands of DNA. To make them more manageable each strand is 'chopped' into around 10,000 pieces. In addition, although 99% of human DNA is identical, there are differences. Scientists need to use reference material, so that experiments can be conducted on material that is known to be identical and can be meaningfully compared.

The Resource Center has built up libraries of genetic samples. Researchers ask the Resource Center to provide parts of the libraries for the sequencing work. There are several ways this can be done, but a typical system is to use 'clone colonies' arrayed on high-density filters.

A clone is a small piece of the target DNA (in this case the human material) 'inserted' into a piece of bacterial DNA. The bacterial DNA is then introduced to a host bacterium. Cell division of the host will produce identical clones (a clone colony) of the DNA insert as part of normal cellular replication.

The disadvantage of 'chopping' the DNA is that a laboratory can never be sure where the particular gene or section of interest is located within a clone library. To resolve this, the Resource Center supplies thousands of different clone colonies on a single high-density filter. In other words a recipient laboratory receives thousands of clone colonies, each with a different DNA insert. This means that genetic screening can be conducted in parallel, compressing the time spent analyzing inevitably redundant clone colonies. Each high-density

filter can have up to 50,000 clone colonies on a 22x22cm array, although 30,000 colonies is more typical.

The Resource Center uses robots to produce the high-density colony arrays. The robots are driven by linear motors supplied by Linear Drives Ltd.

"At the moment three robots are used at the Resource Center, and one is in preparation," explains Dr Zehetner, the Resource Center's Scientific Director. "The aim is to make biological materials easily accessible to many groups working on different aspects of genome research."

"Individual robots can be used for different tasks. It's important that our robots can run 24 hours a day without technical problems," adds Zehetner.

The robots' tasks could not be done manually.

"The job demands fast movements with high reproducible accuracy," notes Zehetner. "When we were constructing our robots, we found that Linear Drives offered the best motor solution. Its motors definitely gave us the best accuracy and resolution, allowing us to increase the spotting density on the filters."

"When we first started using Linear Drives' motors we had to learn how to set them up to get the best performance," Zehetner comments. "But Linear Drives were extremely helpful, we understood how to get the best use from the motors, and now setting up any new robot is very easy."

The Research Center's robots use slightly different motors than Linear Drives' latest ThrustTube product. The primary difference is that the Germans use two-phase devices rather than the latest three-phase version. In addition, the Research Center uses Linear Drives' own amplifiers (other amplifiers are all three phase),although the encoder and controller are proprietary models that are common to the latest product.

According to Linear Drives' Sales and Marketing manager Rob Houghton: "There isn't much difference in the design of the previous two-phase motors and the newer three phase ones. Speed is slightly higher on the newer products."

Another major benefit of Linear Drives' motors is the ease with which they can be integrated and used within a robot design. The motor is electrically identical to rotary servo motors, which allows it to be powered and controlled by industry-standard servo drives.

The staff of Research Center itself has found a number of benefits from using Linear Drives' motors. Not least is the quiet operation that suits the laboratory's working environment. With no internal moving parts the motors are virtually maintenance free, and very durable, enabling the 24 hour operation demanded by Dr Zehetner's team.

But perhaps, the key to success is in the motors' resolution and repeatability. The colony spacing on the high-density filters is easily within the resolution of the motors, but it is also important that the colonies are accurately positioned. "The clones need to grow on the filters," explains Zehetner. "It's important that spacings are accurately maintained, otherwise the colonies could grow and touch, cross-contaminating the genetic material."

According to Houghton, linear motors can hold much better positional accuracy because there is no mechanical backlash as may be experienced by rotary motor and ball screw units.

The Resource Center's robots have been invaluable in aiding the Human Genome Project, and other genetic projects besides. More than 6000 scientists are registered with the Resource Center using materials and requesting information from the Primary Database. The number of customers who have used either material or services increased by more than 400%

from July 1995 to January 2000. In total more than 24,300 filters, 75,000 pools and 150,000 clones have been distributed.

It seems that the application of state-of-the-art technology from chromatographs, genetic sequencers and industrial robots driven by the latest linear motors, has been the key to unlocking the human genome. It underscores the interdependence of man and machine in the new century. Without human intellect, the machines wouldn't exist, yet without their assistance we would remain ignorant of the very blue print of life hidden in the nucleus of every cell. As Zehetner concludes: "The work couldn't be done without the robots."

Study the vocabulary

Arrange располагать
Redundant чрезмерный
Blueprint схема
Distinct различный, отдельный
Compile [k∂m'pail] собирать (факты, данные)
Sequence последовательность
Mammoth громадный
Strand нитка (бус)
Chop рубить
Insert вставлять
Array [∂'rei] 1) множество;2)выстраивать
Axis (axes (pl)) ось
Encode шифровать, кодировать
Exploit разрабатывать
Comprise включать, содержать в себе
Thrust нагрузка, давление, напор
Rod прут, стержень, брус
Axial ['æksi∂l] осевой
Coil проволочная спираль, катушка
Flux течение, поток
Rotary вращательный
Contaminate [k∂n'tæmineit] портить, загрязнять
Backlash мертвый ход, зазор, люфт
Stray отклоняться
Lead screw ходовой винт
Strip полоса
Underscore подчеркивать

1. Answer the following questions

1.What draft has recently been completed by a ten-year international collaboration?
2.What job could be done only by robots?
3.What have Linear Drives' motors proved ideal for?
4.In what way are genes arranged?
5.Why was supporting the sequencing effort itself a mammoth task?
6.Where is the Resource Centre located?
7.What are primary objectives of Resource Centre?
8.What has the Resource Centre built up?
9.What does the Resource Centre use robots for?

10.What design are all Linear Drives' motors based on?
11.What are benefits of Linear Drives' motors?

2. Complete the sentence

1. The Human Genome Project is...
2. The HG Project is designed to...
3. One unit that has specialized in the preparation of genetic material is...
4. To make strands of DNA more manageable each strand...
5. Individual robots can be used for...
6. ThrustTube exploits a unique and remarkably simple design which comprises...
7. The major benefit of Linear Drives' motors is...

A. Give the English equivalents of the word combinations

Человеческий геном; большое количество генетического материала; требуемые скорость и точность; формировать базу генетических исследований для будущих поколений; физически изолированные микроскопические единицы, называемые хромосомами; десятилетний срок; главное преимущество; внутренние подвижные части; схема жизни, спрятанная в ядре каждой клетки.

3.B. Give the Russian equivalents of the word combinations

Human Genome Project; a ten-year collaboration; human being; Resource Centre; Primary Database; high quality biological materials; high-density clone filters; DNA and Protein filters; high-density colony arrays; the best motor solution; two-phase motors.

4. Translate the sentences paying attention to the Complex Object

1.We know the Human Genome Project to be an ambitious venture.
2.The company didn't expect the project to map the entire human genome.
3.They declared the project to last fifteen years.
4.The scientists watched the bacterial DNA be introduced to a host bacterium.
5.The Resource Center makes robots produce the high-density colony arrays.
6.We want the job to be done with high reproducible accuracy.
7.We found "Linear Drives" to offer the best motor solution.
8.For a long time physicians have been considering antibiotics to be panacea for many infectious diseases.
9.Some patients tend to believe magnetic tomography to be better than the computer one.
10.Little children find this procedure to be very difficult to go through.
11.Scientists expect progress in human genome research to contribute considerably to the identification of disease related genes.

5. Choose the true variant

1.The project is designed to...
a)decode the blueprint of life;
b)encode all the information necessary for building and maintaining life;
c)prepare high quality genetic material;
d)map the entire human genome.
2.All genes predicated to be encoded in the genome are arranged...
a)perpendicularly to the chromosomes;
b)chaotically;
c)linearly along the chromosomes;
d)staggered.
3.The Resource Centre has built up..

a)a new building;
b)libraries of genetic samples;
c)Linear Drives' motors;
d)participating laboratories.
4.The Resource Centre uses robots to produce...
a)precise gene calculation;
b)high quality biological materials;
c)the basis of genetic research for future generations;
d)high-density colony arrays.

TEXT 7

Quality Plastic Laboratory Products For The Research Industry

Researchers have always struggled with the fact that a good percentage of their samples (DNA, enzymes, proteins, whatever) stick to the wall surface of the pipette tips or tubes which they are using. A few years ago, some manufactures offered siliconized products to the market, but this was not the answer. One company offered a 'slippery' tip which was gased with a fluorocarbon gas. But the results were very inconsistent. Axygen Scientific, Inc., after two years of investigation, formulated a unique way of changing the complexion of the original polypropylene resin prior to the molding process. The result is the product with no additives which offers a total surface which is smooth. Axygen offers this feature not only with their tips, but also with their other products.

G.I.T. Laboratory Journal International's Dr Hubert Schulz discussed the strategies and products with Bob Hill, Vice President of Sales and Marketing for Axygen Scientific, Inc.

H.S.: Bob, tell me a little about the roots and mission of Axygen Scientific, Inc.

B.H.: Axygen is a manufacturer of disposable plastic products used in research laboratories throughout the world. We manufacture pipet tips, both filtered and non filtered. The company is still very young, having incorporated in June of 1993, however, our revenues today indicate the fastest growth of a company in our arena.

H.S.: Why is this, Bob?

B.H.: I believe that it has to do with the fact that our service truly responds quickly; that our products are, in fact, the best and most consistent quality I have seen in my 27 years in this market; the fact that we have such a large and consistently growing offering of products and lastly, the introduction of Maximum Recovery products last year has helped to put us on the map, not only at the distributor level, but, also at the level of the end user.

H.S.: Have any scientists evaluated Maximum Recovery products?

B.H.: Yes. We have several studies which been completed. In fact, if you visit our Website, you can pull up two of those articles. More will be introduced to the web shortly.

H.S.: What are your plans in Europe, and Germany specifically?

B.H.: We have set up distribution. We do not have plans to add on other distributors. One thing that Axygen offers the distributor is the fact that we desire a close working relationship, versus giving the product to a million distributors and saying "go sell!". We have made some significant moves in Europe over the past several months. We showed at Analytica and plan to show at more of the shows, which coincidentally, happen to be in Germany.

We hired a gentleman in the UK named Colin Keir and his job is to oversee sales in all

of Europe. We also established a warehouse in Scotland in order to supply our distributors with more attractive service and less cost. In Germany, we are presently arranging a relationship with a well known distributor of laboratory supplies. This company has a good sized sales force who sells throughout all of Germany, and to date, they have been very successful selling the Axygen products. We also have brought aboard as a consultant, Eckhard Dobrindt. He is very familiar with the market in Germany, has many contacts and much experience. He will be working closely with our master distributor, once the arrangement is consummated. He will work in an advisory and training role. He will also work closely with end users to help sell the Axygen products.

Competitive manufacturers from the US, over the years have tried to get into the European market and especially Germany, but have failed. I think that they have miscalculated the needs of this market, they have lacked some sensibilities and they have made promises that they could or did not keep. We do not want to make those same mistakes. We must understand that all of your needs in Germany as well as the other European countries. So, we have been very methodical over all of our decisions in Europe, and despite taking our time, we will still sell over $3,000,000 of our products here in the year 2000.

H.S.: What can we expect out of Axygen in the future?

B.H.: Specific to Germany, I would say that you will notice our presence through advertising, through flyers, and through attendance at strategically important shows and through technical offering and seminars at the end user level. Also and this has been key to Axygen's success word of mouth. As we develop more unique products and maintain the high quality and service that we do have, researchers as they rub shoulders will be talking about us. We see this all the time through the high volume of phone calls, faxes, and e-mails which come our way inquiring at out certain products.

Study the vocabulary

Percentage процент, процентное отношение
Stick приставать, прилипать
Tip кончик
Silicon ['silik∂n] кремний
Slippery скользкий
Inconsistent несообразный, противоречивый
Complexion bug оттенок, аспект
Resin ['rezin] смола
Prior to предшествующий чему-либо
Mold (=mould) формовка
Additive ['æditiv] добавка, примесь
Smooth ровный, гладкий
Disposable [dis'p∂uz∂bl] имеющийся в распоряжении, свободный
Evaluate [i'væljueit] оценивать
Versus против, в сравнении с
Hire нанимать
Warehouse товарный склад, оптовый магазин
Consummate ['kons∧meit] доводить до конца, завершать, совершенствовать
Competitive конкурирующий

1. Answer the following questions

1.What fact have researchers always struggled with?
2.What does Axygen Scientific, Inc. manufacture?
3.What pipet tips are produced by Axygen?
4.What products does the company have strong focus on?
5.What do company revenues indicate?
6.What does Axygen desire from distributors?
7.What did the company establish a warehouse in Scotland for?
8.What relationship is Axygen arranging in Germany?
9.What are the functions of the company consultant, brought aboard?
10.Why have competitive manufacturers from the US failed to get into European market?

2. Complete the sentence

1. One company offered a 'slippery' tip which was gased with...
2. Axygen is a manufacturer of... used in...
3. One thing that Axygen offers the distributor is the fact that...
4. Axygen also established a warehouse in Scotland in order to...
5. You will notice Axygen's presence through...

3.A. Give the English equivalents of the word combinations

Высокое процентное соотношение; продукт без примесей/добавок; вся поверхность; формовочный процесс; полипропиленовая смола; исследовательские лаборатории; конкурирующие производители; поверхность стенок.

3.B. Give the Russian equivalents of the word combinations

Quality Plastic laboratory products; research industry; micro centrifuge tubes; distribution level; end user; advisory and training role; pipet tips.

Find the verbals in the text and determine their functions

Choose the true variant

1.A good percentage of researches' samples stick to...
a)centrifuge tubes;
b)microscope plates;
c)the wall surface of the pipet tips;
d)the researchers' fingers.
2.Axygen Scientific, Inc. after two years of investigations offered...
a)a "slippery" pipet;
b)siliconized products;
c)a unique way of changing complexion of the original polypropylene resin;
d)a new molding process.
3.Main product types where Axygen has strong focus in are...
a)products used in research laboratories;
b)"slippery" pipet tips;
c)centrifuge tubes;
d)products used in the area of PCR an HTS.
4.In Germany Axygen is presently arranging relationship with...
a)a well known distributor of laboratory supplies;
b)competitive manufacturers;
c)a consultant brought aboard;
d)research laboratories.

TEXT 8

Alliance In Image-Guided Orthopedic Surgery

A strategic alliance has been announced in which two companies will jointly develop, market, and sell image-guided surgery applications for orthopedic procedures. The alliance, between Smith & Nephew, plc (London, UK) and Medtronic Sofamor Danek (Memphis, TN, USA), focuses on the new proprietary image-guided fluoroscopic surgical navigation systems of Medtronic Surgical Navigation Technologies (SNT).

Smith & Nephew's Orthopedic Division will co-market Medtronic's new iON (intraoperative navigation) image-guided system for orthopedic trauma and total joint surgery in all countries except Japan and South Korea. Medtronic Sofamor Danek will market the system for spinal procedures.

Image-guided surgery (IGS) combines real-time visualization with computer-assisted imaging to provide surgeons with precise navigation during surgical procedures. The iON system utilizes fluoroscopic images rather than computed tomography (CT) or magnetic resonance imaging (MRI), which is an improvement in time, cost, and ease of use. Other benefits of IGS include greater accuracy, increased efficiency in the operating room, and the reduction in the risk of radiation exposure to both patients and operating room personnel.

The core of Medtronic's fluoroscopic IGS technology is the FluoroNav operating system software, which imports and calibrates patient images directly from the c-arm to the iON System, enabling visualization of instrument locations throughout the surgical procedure.

"The combined resources of these sales organizations are sure to make the iON system the market leader in orthopedic image-guided surgery," said Larry Papasan, president of Smith & Nephew's Orthopedic Division.

Study the vocabulary

Application компьютерная программа
Procedure [pre'si:dʒ*ə*] операция
Image образ, подобие, представление
Co-market совместно продавать
Proprietary [pr*ə*'prai*ə*t*ə*ri] патентованный
Trauma ['tro:m*ə*] травма
Joint сустав
Spinal ['spainl] спинной
Precise [pri'saiz] точный
Utilize использовать
Calibrate ['kælibreit] выверять

1. *Answer the following questions*

1.What two companies will collaborate in developing, marketing and selling image-guided surgery applications?

2.What procedures are image-guided surgery applications developed for?

3.What does the alliance focus on?

4.What system will Medtronic Sofamor Danek market?

5.What does image-guided surgery combine?

6.What are benefits of IGS?

2. *Complete the sentence*

1. Two companies will jointly develop, market, and sell...

2. Smith & Nephew's Orthopedic Division will co-market Medtronic's new iON image-guided system for...

3. IGS combines real-time visualization with...

4. The iON system utilizes...

5. The core of Medtronic's fluoroscopic IGS technology is...

6. The combined resources of these sales organizations are sure to...

3.A. Give the English equivalents of the word combinations

Ортопедическая хирургия; ортопедическая травма; расположение инструментов на протяжении хирургической операции; компьютерная томография; лидер рынка; операции на позвоночнике; более высокая точность.

3.B. Give the Russian equivalents of the word combinations

Fluoroscopic surgical navigation system; navigation technologies; joint surgery; real-time visualization; magnetic resonance imaging; radiation exposure; operating room personnel.

4. Find the verbals in the text and determine their functions

5. Choose the true variant

1.Two companies will jointly develop, market and sell...
a)magnetic resonance imaging system;
b)image-guided surgery applications for orthopedic procedures;
c)new surgical instruments;
d)operating room equipment.

2.Smith&Nephew's Orthopedic Division will co-market Medtronic's new intraoperative navigation image-guided system for...
a)emergency surgery;
b)brain surgery;
c)spinal procedures;
d)total joint surgery.

3.ION system utilizes...
a)magnetic resonance imaging;
b)fluoroscopic images;
c)computed tomography;
d)radiological images.

4.One of benefits of IGS is...
a)low equipment costs;
b)high radiation exposure;
c)reduction of time needed for a procedure;
d)greater accuracy.

TEXT 9

I can see through you

At one time the frail condition of the elderly Soviet elite gave an impetus to domestic medicine that keeps it going even now.

Awarding a Nobel Prize to the inventors of magnetic-resonance tomography all but overshadowed a little Russian jubilee: A quarter century ago, the country's first computer tomographs were launched in Moscow. This happened just five years after a new diagnostic research method was invented, and a year before Allan M. Cormack and Godfrey Hounsfield, the methodology authors, were awarded a Nobel Prize for medicine. Have we since kept up with "diagnostic progress"? How safe is the new procedure? Professor Sergey

Ternovoy, head of the radiation diagnostics and therapy department at the Moscow Sechenov Medical Academy and member of the Russian Academy of Medical Sciences, is interviewed by a MN's correspondent.

"The pre-computer era of medical diagnostics is subdivided into two stages: before the discovery of X-rays and after," Sergei Temovoy says. "X-rays helped look inside the human organism. By the 1970s the method had largely outlived its usefulness. In particular, it seemed that the human brain, safely covered by the cranium, would never been seen. And then came a breakthrough: Godfrey Hounsfield, an employee with a British plate making company, created a device to study the brain. An X-ray generated image was processed by the computer, and there it was -the picture. Several years later, the method was widely used to study the whole organism - the liver, the kidneys, the mediastinum, the vessels, etc. Incidentally, magnetic-resonance tomography is also a spin-off of the breakthrough made at the time: Basically the same mathematical modeling methods are used both in this and other modern technologies (digital ultrasonic diagnostics or isotope diagnostics)."

What is striking is the speed with which the innovation was tapped in this country, behind the Iron Curtain.

The fact is that specialists had been monitoring the latest developments. I for one saw a film about die new procedure at an exhibition, Hospital 1974. At die time, the 4th Main Administration of die Health Ministry was headed by Yevgeny Chazov. He saw at once what opportunities were opened by that discovery. Some of the leading healthcare providers in the Soviet Union served members of the Cabinet and the Politburo, including the Central Clinical Hospital of the 4th Main Administration [popularly known as the Kremlin hospital. — Ed.) and the Institute of-Neurology. Two machines were bought for them and went into operation in 1978.

You were the one who mastered the new methodology at the Kremlin hospital. Do you remember your first patient?

It was the president of a state in North Africa. We had examined him even before the equipment was officially "launched," which did not happen until after it was thoroughly checked by KGB experts. They repeatedly turned it on and off, operating it in various modes to make sure that there were no bugs: After all, the country's top leaders were to be examined there.

Were they not suspicious of all sorts of technical innovations?

Quite the contrary, they put great trust in them. Many asked probing questions about what was being done, and how. Say, Leonid Brezhnev did, one of the most amiable patients. He would shake hands with the doctors, and remember their first names as well as the results of previous examinations. Incidentally, it was because the procedure was practiced on a rather narrowly circumscribed group of patients that we achieved very good results, in some ways even getting ahead of the West. Our patients were to undergo a full medical examination every year, so any change in the organism was identified immediately. For example, we found that a kidney tumor could be detected at a very early stage, when its size did not exceed 2.5 to 3 centimeters. Thanks to that, several years later, the prominent urologist Nikolai Lopatkin developed an entirely new operation to remove an affected piece of the kidney. In the past, the tumor did not make itself felt until it was much larger, and so the whole organ had to be removed.

Many thanks to the Politburo of course for expediting progress. But computer tomography was available only to a select few, wasn't it?

In the late 1980s, when Chazov became the health minister, diagnostic centers began to be created in the capitals of the Union republics and cities with a population of one million and over, which were equipped with, among other things, tomographs. |In addition, doctors had to be trained to operate the equipment. It was planned to set up 55 such centers, but only 36 had been created before the country ceased to exist. Prior to that, a tomograph was installed at the Oncology Center. But of course all of that was a drop in the bucket which was designed for examination of patients in advanced stages of disease while one major advantage of computer tomography is that it can be effectively used to prevent a disease. Say, identify atherosclerosis at an early stage and thus prevent heart attack or stroke. Men (as an at-risk group in cardiovascular diseases) should have a first check of their vessels at age 25 to 30, and if atherosclerotic plaques are found, a course of preventive treatment should be taken.

This examination is too costly to become widespread in Russia.

Yet even die current prices (about 2,000 rubles in Moscow and a little less in the provinces) do not reflect the real costs. The equipment, film, and reagents are very expensive. One examination (without the use of contrast enhancing substances) costs around $400.

So clinics providing computer tomography are operating at a loss? Why?

Because without this no medical healthcare provider can be considered modern. The losses are offset with fees charged for other services. Sometimes however people who need them do not undergo such examinations for other reasons than a lack of money. It is simply that our population has yet to develop the right attitude to health. Say, who will think of atherosclerosis at 30? Others on principle do not want to know anything about it. After all, something will have to be done: a lifestyle changed, a diet followed, smoking given up, etc.

Russia was one of the first countries to start using computer tomography. How does it fare today?

In the number of computer tomographs in use, it ranks somewhere in the low twenties. In all, there are approximately 40,000 in the world today, including about 800 in Russia — half of this number at Health Ministry institutions and the rest at medical facilities attached to various corporations as well as in the private sector. As for the quality standards, in some of our clinics they are higher than in the West, which fact is recognized even abroad. After all, success largely depends on processing a machine-generated image. In the West, this procedure is a conveyor-belt like operation. There is a certain minimum standard, and it is maintained. A doctor there is not prepared to spend extra time on “creative quest”: Money is what counts. Here, however, we still have real enthusiasts.

On the other hand, there is constant talk to the effect that tomographs in Russia are not used effectively enough or not at all. This especially applies to public-sector organizations.

Sometimes they thus seek to extend the equipment’s service life, so it is saved for especially complex cases. The fact is that a simple X-ray tube costs $30,000. Should something happen to it, there is no money to replace it.

You are popularizing computer tomography for preventive purposes, but what about the X-rays?

The radiation is so insignificant that it is harmless for a healthy person. After two weeks of sunbathing in Turkey you run a much greater risk. The only categories that we do not recommend to take it are young children and pregnant women, unless there are serious

reasons to undergo an examination.

Will magnetic-resonance tomography eventually replace computer tomography? After all, it provides more information and does not involve radiation.

It has its own contraindications. Say, it cannot be performed on those who have metallic objects in their bodies (e.g., medical implants). Little children find the procedure very difficult to go through (a person has to lie in an enclosed chamber for a very long time). Also, there was one tragic case (true, not in Russia), when a patient died in the course of an examination. He had an implanted pace-maker that demagnetized under the impact of a tomograph's electromagnetic radiation. He was not aware about the danger while the doctors showed negligence, omitting to warn him. Patients tend to believe that magnetic-resonance tomography is better than computer tomography. I remember one patient I worked hard to persuade to undergo computer tomography first, and then, if need be, magnetic-resonance tomography would be provided free of charge. Then suddenly the tomograph showed that he had a needle in his head (how it got there is a separate story, but the patient absolutely forgot about it). Had he undergone magnetic-resonance tomography, I don't know how it would have ended.

Study the vocabulary

Frail хрупкий, болезненный
Impetus['impit∂s] толчок
Overshadow затмевать
Cranium череп
Mediastinum средостенье
Vessel сосуд
Amiable['eimi∂bl] дружелюбный
Circumscribe ограничивать
Kidney почка
Tumor опухоль
Affected пораженный (болезнью)
Heart attack сердечный приступ
Stroke инсульт
Cardiovascular сердечно-сосудистый
Plaque['plæk] зд. бляшка
Enhance повышать
Offset компенсировать
Fee оплата
Fare быть, поживать
Quest поиски
Harmless безобидный
Pregnant беременная
Pace-maker искусственный водитель ритма
Negligence халатность
Omit опускать, пренебрегать

Answer the following questions

1.When were first computer tomographs launched in Russia?
2.Whom was a new diagnostic method invented by?
3.What 2 stages is the pre-computer era of medical diagnostics subdivided into?

4.What organ was the computer tomograph to study initially?
5.How many machines were bought by Russia and went in operation in 1978?
6.Why did Soviet health providers achieve good results operating first computer tomographs?
7.What did they find?
8.What is one major advantage of computer tomography?
9.What category of patients is not recommended to take x-ray examination?
10.Whom cannot magnetic-resonance tomography be performed on?
11.Why is a magnetic-resonance examination found to be difficult to go through?
12. What do some patients tend to believe?

Complete the sentence

…is subdivided into 2 stages…
…helped to look…
It seemed that… safely covered by… could never been seen.
Several years later the method was widely used to study…
The president of a state in North Africa was examined even before the equipment was…
It was found that a kidney tumor…
Some years later, the prominent… Lopatkin developed an entirely new operation to…
Men as an at-risk group in… diseases should have… at age 25 to 30 and if athero-sclerotic… are found, a course of… should be taken.

3.A. Give the English equivalents of the word combinations

Исследовать весь организм; подвергаться полному медицинскому осмотру; проявляться (давать о себе знать); учреждения Минздрава; предотвращать болезнь; тратить дополнительное время; атеросклеротические бляшки; пытаться продлить срок службы оборудования; незначительная радиация.

3.A. Give the Russian equivalents of the word combinations

To give an impetus to domestic medicine; a new diagnostic research method; radiation diagnostic and therapy department; to outlive its usefulness largely; digital ultrasonic diagnostics; isotope diagnostics; results of previous examinations; a rather narrowly circumscribed group of patients; examinations of patients in advanced stages of disease; to remove an affected piece of kidney.

PART 2

ADDITIONAL TEXTS

TEXT 1

Medtronic To Acquire PercuSurge for $225 Million

In a move to expand its line of vascular products, Medtronic, Inc. (Minneapolis, MN, USA) has agreed to acquire PercuSurge, Inc. (Sunnyvale, CA, USA) for around US$225 million in stock. PercuSurge has developed a device to capture embolic debris that could become dislodged and block downstream vessels during interventional procedures.

The device has been used in more than 5,000 procedures since its release in Europe in 1999 and is now in clinical trials in the United States. The product's first targeted indication is for the treatment of degenerated saphenous vein grafts that show signs of disease following heart bypass surgery. Called the GuideWire Plus Temporary Occlusion and Aspiration system, the balloon-tipped guidewire is inflated briefly to occlude blood flow and capture embolic material that could travel to other vessels or the brain. Captured material is then withdrawn by using an aspiration catheter before the balloon is deflated and blood flow

restored.

PercuSurge will join the Medtronic Vascular organization, headquartered in Santa Rosa, CA (USA). “PercuSurge’s technologies will have a dramatic impact on a physician’s ability to provide comprehensive treatment, reduce complication rates, and save patients’ lives,” said Andy Rasdal, president of Medtronic Vascular.

Vascular сосудистый
Embolic эмболический (приводящий к закупорке кровеносного сосуда)
Debris мн. обломки, осколки
Vessel сосуд
Saphenous vein подкожная вена ноги
Graft трансплантант
Occlusion закрытие, закупорка
Aspiration всасывание
Occlude закупоривать
Guidewire зонд
Inflate надувать
Bypass шунтирование

TEXT 2

Cytomedix Acquires Rights To Novel Wound-Care Agent

The worldwide manufacturing and distribution rights to a wound-healing agent called Procuren have been acquired by Cytomedix (Deerfield, IL, USA) from Curative Health Services (USA). Under the agreement, Cytomedix will purchase Curative’s assets associated with Procuren operations, become the sole manufacturer of the product, and marketProcuren and its own AuTolo-Gel wound-healing product outside the USA. Both products are for the treatment of non-healing wounds.

AuTolo-Gel attempts to mimic the natural mimic process. A doctor harvests a small quantity of platelets from a patient, using apheresis, and mixes them with other ingredients to form a soft gel. This gel is applied directly to a prepared wound surface and covered with a moist dressing, left in place for a week. The gel acts as a scab, delivering growth factors into the wound.

Procuren can be used in those cases where AuTolo-Gel is not appropriate. It requires only 150 ml of patient blood. The platelets are isolated and the therapeutic prepared, in a process similar to the preparation of AuTolo-Gel. The finished product is frozen and shipped back to the clinic and given to the patient. It is not immediately administered to the wound like AuTolo-Gel but can be applied by the patient at home during daily dressing changes. “Today, we are a little closer to our goal of being the world leader in cellular therapy,” said James a Cour, president and CEO of Cytomedix. “This acquisition also adds a distribution channel and expansion platforms on which we will continue to build our business.”

Agent средство
Asset актив, имущество
Mimic имитировать
Harvest собирать
Platelet тромбоцит
Scab струп (на ране)

TEXT 3

Collaboration To Develop Cardiac Patch

A new cardiac implant for the treatment of patients with severe congestive heart failure is being developed by Somanetics Corp. (Troy, MI, USA) and Performance Medical Devices (PMD, Vancouver, Canada). PMD is a developer of specialized medical products, including cardiac implant devices using bovine pericardium tissue.

PMD will help Somanetics design a new implant called the CorRestore patch, will perform clinical trials, and will manufacture the patch, which is for use in an evolving cardiac procedure called surgical anterior ventricular restoration (SAVR). In this procedure, the surgeon restores or remodels an enlarged, poor-functioning left ventricle to more normal size and function by inserting an implant in most cases or closing the defect.

Currently, surgeons fabricate an implant by hand, using off-the-shelf materials, which can result in an implant of variable quality. The new CorRestore patch is intended to standardize the implant and provide a non-clotting pericardium surface and a better-quality seal to minimize leaking. Somanetics has acquired an exclusive worldwide license to a patent relating to CorRestore. The company also manufactures and markets the Invos cerebral oximeter monitoring system.

"PMD's development and manufacturing are done in accordance with ISO 9001 standards and the FDA's quality system regulation requirements for medical devices, assuring a high level of reliability and quality," said Bruce Barrett, president and CEO of Somanetics.

Patch заплата
Congestive застойный
Heart failure сердечная недостаточность
Bovine бычий
Tissue ткань
Anterior передний
Ventricle желудочек
Clot свертываться (о крови)
Cerebral мозговой
Oximeter прибор для измерения уровня кислорода

TEXT 4

Homocysteine Affects Outcome Of Cardiac Transplants

In an animal study, high levels of homocysteine were found to increase the risk of chronic rejection in heart transplant patients. The study suggests that heart transplant patients may be able to reduce this risk by changing their diet to include vitamins B12, B6, or folate in advance of surgery to keep homocysteine levels low. The findings were reported at the annual Clinical Congress of the American College of Surgeons in Chicago (IL, USA).

In the study, one group of animals were fed a diet high in methionine and low in folate, while control animals received a normal diet. After two weeks, the experimental animals developed hyperhomocysteinemia with levels about 20 times higher than controls. In these animals, cardiac transplant grafts survived only 59 days, while grafts in animals receiving a normal diet survived an average of 107 days. The time to onset of rejection was also accelerated in the animals on a high homocysteine diet, averaging 42 days in test animals and 66 days in controls. The researchers focused on studying homocysteine because of its known relationship to the development of atherosclerosis. In the study, high homocysteine levels are assumed to have contributed to the atherosclerotic process, which decreased the blood supply to cardiac grafts and caused the grafts to fail. The research was

conducted by Dr. Susan L. Orloff, of the Oregon Health Sciences University (Portland, USA), and colleagues. “This animal study shows that we can cause high levels of homocysteine and demonstrate a cause-and-effect relationship with vascular disease in cardiac grafts,” explained Dr. Orloff.

Homocysteine гомоцистеин, промежуточный продукт распада цистеина

Rejection отторжение

Onset начало

TEXT 5

Information Management System For Catheterization Labs

A new information management system is designed to improve the speed and efficiency of clinical workflow, administration, and report generation for a catheterization laboratory. With Web-enabled features, the system can help reduce the turn-around time for a final report by more than 75%, says the developer.

Called Catalyst, the system integrates all of the vital pieces of cardiovascular information in an Oracle database for comprehensive information review and analysis. Specifically, it allows health care providers to access tests and reports that integrate waveform, text, and image data. The system also allows storage of cardiology data types in an open, relational database, making the data available to authorized users for research analysis and administrative needs. In addition to integrating hemodynamic, image, and laboratory data, Catalyst allows health care professionals to view up to nine image loops from ultrasound, nuclear medicine, and x-rays on a single screen, a feature that supports greater clinical confidence and efficiency.

In a study conducted at the Cardiac Cath Lab at Rush-Presbyterian-St. Luke’s Hospital (Chicago, IL, USA), the catalyst system decreased the time between case completion and final report distribution from 16 days to less than one hour. Catalyst is the product of Information Technologies, a GE Medical Systems company (Milwaukee, WI, USA). “Catalyst enables hospitals to schedule procedures and generate reports via the Web to significantly improve the workflow, which is critical to support the strong growth in cardiovascular procedures,” said Adam Miller, vice president, cardiology systems, information Technologies.

Comprehensive подробный

Critical решающий

TEXT 6

Simple Tele-Echocardiography System

A simple-to-use system for tele-echocardiography can connect hospitals and offices, support mobile services, and provide on-call service for cardiology over any telecommunications line and from any ultrasound machine, using either video tape or digital media.

Called Tel-Echo, the system encodes data from ultrasound exams and sends them as digital packets to a recipient using a store-and-forward technique, allowing near real-time interaction. Transmission line choices include ordinary telephone lines: ISDN, 3ISDN, T1, and DSL. Choice of transmission line and compression ratio allow the system to be configured to fit the needs of an individual practice and budget. The system was developed by Innovative Medical Solutions (Milwaukee, WI, USA) which designed the system to be both flexible and simple to use.

“Being able to read the exams shortly after they are done results in much improved

patient care," reports Sanjay Parikh, M.D., medical director of pediatric cardiology at St. Vincent Hospital (Indianapolis, IN, USA). "The system has been very important to our outreach program."

On-call относящийся к скорой помощи

Encode кодировать

Ratio соотношение

TEXT 7

GE Licenses Pulse Oximetry Technology

GE Medical Systems Information Technologies (Milwaukee, WI, USA) has signed a licensing agreement that will allow the company to offer the Signal Extraction pulse oximetry technology of Masimo corp. (Irvine, CA, USA) as a platform choice for its line of patient monitoring systems. In addition, GE made a US$5 million equity investment in Masimo.

Masimo's Signal Extraction pulse oximetry is a noninvasive technology used to obtain a patient's oxygenation level and provide healthcare professionals with a reliable source of information for treatment. Masimo pioneered motion and low-perfusion pulse oximetry, and its technology has been proven clinically accurate in more than 20 independent studies, states the company.

"Masimo Signal Extraction Technology will be a powerful addition to our line of industry-leading monitoring and clinical information systems," said Kevin King, vice president of Clinical Systems, GE Medical Systems Information Technologies.

Pulse oximetry измерение уровня кислорода в крови по пульсу

Perfusion перфузия, кровоснабжение тканей

Equity беспристрастность

TEXT 8

Thoratec Labs And Thermo Cardiosystems To Merge

Thermo Cardiosystems (Woburn, MA, USA) and Thoratec Laboratories Corp. (Pleasanton, CA, USA) have agreed to merge in a tax-free exchange of stock valued at US$572 million. The merger will combine the knowledge and resources of two growing companies in the cardiac device market.

Thoratec develops and markets a ventricular assist device that is widely used as a bridge to transplant and for heart recovery following surgery. The company also markets vascular access and bypass grafts. Thoratec reported revenues of $22.5 million in 1999. Thermo Cardiosystems also markets a left ventricular-assist system and as well as an electric HeartMate heart-assist device and blood coagulation testing equipment. The company's 1999 revenues were $79.1 million.

The agreement includes the International Technidyne and Nimbus subsidiaries of Thermo Cardiosystems. Upon completion of the merger, Thermo Cardiosystems' parent, Thermo Electron Corp., will own approximately 34% of Thoratec. The combined new company will be called Thoratec Corporation.

"The proposed combination of these two successful companies will create a world-class medical technology company and assure that we remain competitive within the dynamic world of cardiac surgery and congestive heart failure," said D. Keith Grossman, president and CEO of Thoratec.

Merge сливаться, соединяться

Ventricular желудочковый

Assist помогать
Coagulation свертываемость
Subsidiary филиал
Completion завершение

TEXT 9

Nerve Stimulator Programmed By Hand Held Computer

A vagus stimulator for epileptic patients is being modified to allow programming by a hand held computer utilizing the Windows operating system. This will allow greater flexibility in programming, improve data automation, increase the comfort levels of both patient and doctor, and reduce costs, says developer Cyberonics, inc. (Houston, TX, USA).

Cyberonics is focusing on several key areas for improvement of the device, including utilization of common industry programming standards, commercial off-the-shelf technology from multiple hardware vendors, and flash-card technology for easy data access and distribution. Called the NeuroCybernetic Prosthesis (NCP) System, the implanted stimulator is being studied as a potential treatment for severe depression, obesity, and Alzheimer's disease, in addition to epilepsy.

"We also have plans for development of the programming system based on radio frequency (RF) technology, enabling distance programming of our devices," noted Richard p. Kuntz, vice president of operations at Cyberonics. "This technology should eliminate any physical contact of the programming system with the patient and ultimately decrease patient apprehension."

Off-the-shelf готовый
Obesity полнота, тучность

TEXT 10

Orthofix To Acquire Kinesis Medical

Orthofix N.V. (London, UK) has agreed to acquire Kinesis Medical Inc. (Bloomington, MN, USA) for US$6 million. Along with the company, Orthofix will acquire Kinesis Medical's star product, OrthoTrac, a patented ambulatory lumbar traction system contained in a lightweight vest. Upon pneumatic activation, the traction system goes into effect, offloading the lower back discs. The device has been shown to produce long-lasting pain relief. Kinesis says it is the only noninvasive, self-administered, ambulatory treatment for sustained treatment of lower-back pain caused by degenerative or herniated discs that has been cleared by the U.S. Food and Drug Administration (FDA).

Lumbar поясничный
Traction вытягивание
Vest жилет
Relief облегчение

PART 3

MY PROFESSION

Biotechnology And Medical Equipment

I am a second-year student of the Automated Systems Department of the Tver State Technical University. My speciality is biotechnology and medical equipment. So in some years I'll be an expert in this field of science.

The engineer's place on the given speciality is found in the system of enterprises, designing medical devices, apparatus, systems and complexes. So engineers working in this field of science project tool-making computing research means. They elaborate calculation

methods, production technology and design, medico-biological investigation methods and expert data processing. Besides the work of engineers includes installation and maintenance of the medical equipment.

Their professional activity consists of the following chief types:

1. Project-constructive.
2. Industrial-administrative.
3. Experimental-research.

The purpose of the engineer's activity is researching problems of medical tool-making, calculation and design of biomedical electro-technology models of various application. The engineers deal with manufacturing experimental specimens, software of project-constructive works, production management and production output, medical equipment purchase or sale on the market.

The special training of engineers includes three series of disciplines: medico-biological, medico-technological and systematic.

High requirements to the standard of knowledge are determined not only by professional skills of engineers, but also orientation of their activity in the interests of public health service. Taking it into consideration 15% of the curriculum is devoted to studying different aspects of biology and medicine. The special attention is paid to exact sciences and complex technologies, electronics and computer science.

We consider our speciality to be very interesting and useful. So we hope to become highly qualified specialists in this field of science.

Study the vocabulary

Device прибор
Tool-making инструментальный; приборостроение
Elaborate детально разрабатывать
Investigation, research исследование
Data processing обработка данных
Installation установка
Maintenance ремонт
Application применение
Specimen образец, экземпляр
Computer science информатика
Purchase покупка
Software программное обеспечение
Sale продажа
Requirement требование
Determine определять
Skills навыки
Public health service здравоохранение
Take into consideration учитывать
Curriculum курс обучения, учебный план
Exact sciences точные науки

Answer the following questions

1. What is your speciality?
2. Where is the engineer's place on the given speciality found?
3. What does the system of enterprises design?

4. What do the engineers elaborate? What does the work of engineers include?
5. What types does their professional activity consists of?
6. What is the purpose of the engineers' activity?
7. What do the engineers deal with?
8. What aspects do the students study?
9. What is the special attention paid to?

Engineering In Medical-Biological Practice

I'm a second year student of the Automated Systems Department of the Tver State Technical University. My speciality is called engineering in medical-biological practice. Automation and computers are now widely used in all branches of engineering. Medical engineering is not an exception. Our speciality might be connected with the following types of professional activity: organizing, technology, research and maintenance. The aim of the medical engineer is to put into operation, to control and to carry out the repairs. We study both general subjects such as biology, chemistry, computing and a lot of special ones.

Tomography, radiology, ultrasound, electrocardiograms are done with the help of computers. Surgeons make operations using electronical equipment. Emergency ambulances use modern technique. And all this equipment needs qualified maintenance and current repairs to be done by specialists.

And that's exactly the kind of specialists we will be after graduation. Such specialists are needed in medico-diagnostic organizations such as hospitals, policlinics, out-patient's department, research institutes, etc. So I think our speciality is a very promising one and we'll be able to find a proper job after graduating from the University.

Study the vocabulary

Ultrasound ультразвук
Emergency ambulance машина скорой помощи
Maintenance техническое обслуживание
Current repairs текущий ремонт
Out-patient's department амбулатория
Put into operation вводить в эксплуатацию

1. Answer the following questions

1. What is your speciality?
2. Why are now computers widely used in engineering?
3. What might your speciality be connected with?
4. What other subjects do you study?
5. What is the aim of the medical engineer?
6. What medical treatments are done with the help of computers?
7. Where are such specialists needed?
8. What do you think about the prospects for the future?

2. Translate into Russian, paying attention to non-finite forms

1. It is rather hard to find today a field of human activity where technological devices serving the most diverse purposes are not employed.
2. Modern engineering presented medicine with an artificial heart, lungs and kidneys, heart activity obviate the use of sleeping pills.
3. In the future it is intended to supply the machine with an artificial intellect.
4. We also want the machine to possess vision – the main informative sense and be able to differentiate color, volumes and configurations.

5. Artificial intellect will be applied in such cases when human physiology cannot compete with an artificial intellect system.
6. These systems will require an operator to deal with them in case of an emergency on the basis of human experience.
7. Robots must be able to orient themselves in an unfamiliar environment, to identify and classify objects, to plan their own actions and to learn in the process of work.
8. Fundamental discoveries which speed up scientific and technological progress appear unexpectedly and are unlikely to be predicted exactly.
9. Most experts agree that biological science and research into universe will prove to be most productive.
10. Achievements in genetics will make it possible to control the heredity of man as well as plants and animals.
11. We know the engineers to design biomedical electro-technology models, they having various application.
12. Medical equipment purchase and sale being of great importance on the market, the engineers manufacture experimental specimens.
13. The professional activity being closely connected with biology and medicine, 15 percent of the curriculum is devoted to studying medico-biological disciplines.
14. The special attention is expected to be paid to exact science, complex technologies, electronics and computer science.
15. The engineers' place on the given speciality is known to be found in the system of enterprises designing medical equipment.

16. The purpose of the engineers' activity is supposed to research problem of medical tool-making.
17. The engineers elaborate medico-biological investigation methods, their work including installation and maintenance of the medical equipment.

GRAMMAR REVISION

THE VERBALS

The Participles

	Active	Passive
Participle 1	Solving 1)определение: *решающий* 2)обстоятельство: *решая* 3)часть простого сказуемого	Being solved 1)определение: *решаемый, который решается* 2)обстоятельство: *будучи решаемым, когда его/ее решали* 3)часть простого сказуемого
Participle 1 Perfect	Having solved Всегда обстоятельство: *Решив*	Having been solved Всегда обстоятельство: *Будучи решенным, после того, как его/ее решили*
Participle 2		Solved 1)определение: *решенная* 2)обстоятельство: *будучи решенным, когда решили* 3)часть простого сказуемого

NOMINATIVE ABSOLUTE PARTICIPLE CONSTRUCTION

НЕЗАВИСИМЫЙ ПРИЧАСТНЫЙ ОБОРОТ

Переводится:

1) в начале предложения – придаточными предложениями с союзами «так как, после того как, когда, если»;

The speed of light being extremely great, we cannot measure it by ordinary method.

Так как скорость света чрезвычайно велика, мы не можем измерить ее с помощью обычных методов.

2) в конце предложения – самостоятельным предложением с союзами «причем, а, и, но»;

All substances consist of molecules, molecules being made up of atoms.

Все вещества состоят из молекул, причем молекулы состоят из атомов.

3) может быть введен словом «with», которое на русский язык не переводится.

With space ships flying so far, we are able to reach some remote planets.

Теперь, когда космические корабли летают так далеко, мы можем добраться до далеких планет.

The Infinitive

	Active	Passive
Indefinite	To help	To be helped
Continuous	To be helping	----
Perfect	To have helped	To have been helped
Perfect Continuous	To have been helping	----

Функции в предложении:
1)Подлежащее
To complete the experiment is their major task.
Завершение эксперимента является их основной задачей.
2)часть составного сказуемого
а)глагольного
The company begins to sell its new operating system.
Компания начинает продавать свою новую операционную систему.
They should hire a new specialist.
Им следует нанять нового специалиста.
б)именного
Their target now is to help sell this kind of software.
Сейчас их цель – способствовать продаже этого вида программного обеспечения.
3)дополнение
We propose to place the results of our research in this periodical.
Мы предлагаем разместить результаты нашего исследования в этом журнале.
4)определение
а)модель «сущ+инф» переводится придаточным предложением в будущем времени с союзом «который» и с оттенком долженствования
They should produce electronical equipment to be useful for this method.
Им следовало бы производить электронное оборудование, которое было бы полезным для данного метода.
б)модель «the first/the last...+инф» переводится глаголом в личной форме
They were the first to form the basis of genetic research for future generations.
Они первыми создали базу для генетического исследования для будущих поколений.
5)обстоятельство цели и следствия переводится придаточным предложением с союзом «чтобы/для того чтобы»
In order to supply surgeons with all necessary equipment the company designs diverse projects.
Чтобы обеспечить хирургов всем необходимым оборудованием, компания составляет различные планы.
COMPLEX OBJECT
СЛОЖНОЕ ДОПОЛНЕНИЕ
(объектный инфинитивный оборот)
«ПОДЛ + СКАЗ + [СЛОЖН. ДОПОЛН: сущ/местоим. в объектном падеже + инфинитив]»
Переводится придаточным предложением, вводимым союзами «что/чтобы/как». Сказуемое может быть выражено следующими глаголами:
1)To want, to wish, should like, to prefer, to expect, to think, to know, to tell, to ask, to allow etc.
We know the disease to involve three organisms connected through complex interactions.
Мы знаем, что заболевание вовлекает три организма, связанных между собой сложными взаимодействиями.
2)To see, to hear, to watch, to feel, to make, to let. После этих глаголов перед инфинитивом не ставится частица «to».
This method let us deepen our understanding of this problem.

Этот метод позволил нам углубить наше понимание этой проблемы.
We watched the surgeons use the new system for spinal procedure.
Мы наблюдали за тем, как хирурги используют новую систему для операции на позвоночнике.
COMPLEX SUBJECT
СЛОЖНОЕ ПОДЛЕЖАЩЕЕ
(субъектный инфинитивный оборот)
Переводится предложением с вводными словами или неопределенно-личным предложением. Сказуемое может быть выражено:
1)глаголами в пассивном залоге:
is said/ was said говорят/говорили
is known/was known известно/как было известно
is reported/was reported сообщают/как сообщали и т.д.
This product is known to be capable of moving a 1 kg load from start to stop.
Известно, что этот продукт способен передвигать килограммовый груз от начала до конца.
2)глаголами в активном залоге:
to seem казаться
to appear казаться, оказываться
to prove доказывать, оказываться
to happen оказываться, случаться
Solving this problem proved to be very important for the responsible use of these novel technical options.
Оказалось, что решение этой проблемы является важным для ответственного использования этих новых технических опций.
3)словосочетаниями:
to be likely вероятно, очевидно
to be unlikely маловероятно, невероятно
to be sure конечно, безусловно
to be certain определенно, несомненно
The definition of different defense reactions is likely to require the study of a much larger number of genes.
Вероятно, что определение различных защитных реакций потребует изучения гораздо большего количества генов.
The Gerund
Формы герундия полностью совпадают с формами причастия 1. Функции герундия в предложении:
1)подлежащее
Developing its own methods helps the company to sell on the European market.
Развитие своих собственных методов помогает компании торговать на европейском рынке.
2)часть составного глагольного сказуемого
They began providing parts of the libraries to the researchers.
Они начали обеспечивать исследователей частями библиотек.
3)дополнение/дополнение с предлогом
They insisted on carrying out this experiment.

Они настояли на проведении эксперимента.
4)определение
The box for keeping surgical instruments has been lost.
Ящик для хранения хирургических инструментов был утерян.
5)обстоятельство (употребляется только с предлогом)
After arranging a relationship with a well-known distributor we grew offering of our products.
Наладив взаимоотношения с широко известным дистрибьютором, мы увеличили сбыт наших товаров.