

by a typical somatic alteration. Most commonly a translocation of genetic material between chromosomes.

Solid Tumors: Have somatic mutations that alter the growth properties of cells to cause malignancies. the ultimate evidence of malignancy, metastasis is gained through multiple somatic alterations.

The sugar-phosphate backbone, the phosphate groups links the 5' carbon of one sugar to the

hydroxyl group of the 3' carbon of the next sugar via a phosphodiester bridge. Therefore the backbone of the nucleic acid strand has a directionality (polarity) that is determined by the 5' to 3' carbons of the sugar in the chain. This directionality of DNA ensures that genes are always transcribed and translated in the same direction. The sequence of a nucleic acid chain is written by convention in the 5' to 3' direction using the base names

08.00

to indicate the order of the nucleotides, for example

09.00

5'-AGTCTTG-AT-3'.

10.00

11.00

In each nucleotide, the nitrogenous base is attached to the 1' carbon of the five carbon sugar and the phosphate is attached to the

12.00

13.00

14.00

15.00

16.00

17.00

18.00

19.00

20.00

Dolar \$:

Euro € :

Altın :

Borsa :

08.00

result from cellular and environmental agents. The sequence of one DNA chain determines the sequence of the

09.00

10.00

11.00

12.00

13.00

14.00

15.00

16.00

17.00

18.00

19.00

20.00

Dolar \$:

Euro € :

Altın :

Borsa :

Because GC pairs are held together by three hydrogen bonds compared with two for AT pairs, regions of DNA containing higher amounts of GC pairs are held together more strongly than regions with more AT pairs. Each DNA turn of the helix contains 10 bp and forms two grooves: a wide major groove and a narrower minor groove.

The human genome is composed of approximately 3 billion bp of DNA. The DNA of each chromosome

08.00

09.00

10.00

11.00

12.00

13.00

14.00

15.00

16.00

17.00

18.00

19.00

20.00

Dolar \$:

Euro € :

Altın :

Borsa :

is sequentially wrapped around cores of eight small proteins called histones to form a chain of nucleosomes, with each nucleosome containing approximately 200 bp of DNA. Maximally condensed DNA, called heterochromatin,

Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

8

OCAK

January / Januar / Январь

8. Gün

Pazar / Sunday / Sonntag / Воскресенье

1. Hafta / Week / Woche / Иеделя

is "metabolically inactive" and is located at the periphery of the nucleus. Less condensed DNA, called euchromatin, is "metabolically active" and found more centrally in the nucleus.

Dolar \$:

Euro € :

Altın :

Borsa :

The human genome consists of 46 chromosomes that are given number names by length, plus two sex chromosomes called X and Y.

Chromosome 1 is the longest chromosome and chromosome 22 is the shortest. Each somatic cell contains two of each of the chromosomes 1 through 22, plus two sex chromosomes. Each germ cell (egg or sperm) contains one of each of the 22 numbered chromosomes plus one sex

chromosome, X in eggs and either X or Y in sperm. Ribosomal RNA (rRNA) is the most abundant RNA, composing 10% to 50% of the total cellular RNA.

The rRNA is synthesized as large precursors in the nucleolus and then cleaved enzymatically into functional units. When complexed with proteins rRNA forms the ribosomes, the cellular components on which proteins are synthesized. mtDNA encodes 13 structural genes that are components of the respiratory chain and

oxidative phosphorylation system,
as well as two rRNA and 22
tRNAs. All normal human cells
have hundreds of mitochondria
per cell, and ^{*}mitochondrial in-
heritance is exclusively maternal.
Mutations in the mtDNA can result
in maternally inherited genetic di-
seases, because ^{*}mitochondria
in the zygote are derived from
the egg. Approximately 1.5 % of
the human genome codes for
proteins. ^{*}The satellite DNA

consists of tandemly repeated
sequences that are located in spe-
cific sites on chromosomes such
as the centromeres and telomeres.
^{*}The human genome contains approx-
imately 30,000 genes encoding there-
fore, at least the same number
of proteins, which control all aspe-
cts of the development and func-
tioning of humans. ^{*}Pseudogenes
are DNA sequences that are
homologous to (have a similar
sequence to) normal gene.

Because of changes in their nucleotide sequence compared with the genes from which they were derived, pseudogenes do not generate functional proteins.

The protein-coding regions of genes are called exons, whereas the noncoding gene regions located between the protein-coding regions are called introns. The base sequence boundaries between

exon and introns are not random. In most instances, the first

two bases at the 5' end of each intron are GT, whereas the last two bases at the 3' end of each intron are AG. The regulatory regions ^(promoters - enhancers) are used to receive cellular signals indicating that the protein en-

Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. 15 OCAK January / Januar / Январь

15. Gün Pazar / Sunday / Sonntag / Воскресенье 2. Hafta / Week / Woche / Неделя

coded by a specific gene is needed or not needed by the cell, and then to facilitate the transcription or silencing of the gene. In bacteria a single RNA polymerase is responsible

For transcription of all RNA types,
In eukaryotic cells, each type
of RNA species is synthesized
by a different DNA-dependent
RNA polymerase. In eukaryotic
cells, transcription and primary
transcript processing occur in the
nucleus and in the mitochondria.
The first nucleotide of the RNA
transcript is usually a purine
(A or G), followed by each
additional nucleotide as specified
by the DNA sequence, in a reaction

Similar to DNA replication. The original
complementary DNA strand then dis-
places the newly formed RNA strand
because the DNA-DNA duplex is
more stable than the RNA-DNA
duplex. The DNA strand that
functions as the template for
the protein is called the "template"
strand whereas the newly formed
RNA is called the "complementary"
or "coding" strand. A primary
RNA transcript cannot function as
a template for protein synthesis.

until it is processed. RNA processing is initiated by the addition of a specifically modified nucleotide, 7-methylguanosine also termed a "cap" to the 5' end of the RNA strand by a unique 5' to 5' phosphodiester bond. After the RNA transcript is complete the 3' end of the capped RNA is cleaved 15 to 30 nucleotides 3' of downstream of the sequence AAUAAA, which is also known as the polyadenylation signal.

Each set of three nucleotides in the mRNA is called a codon and encodes an amino acid. Peptidyl transferase then links the new amino acid onto the growing protein chain through a peptide bond between the carboxyl group of the previous amino acid and the amino group of the new amino acid. Initiation codon AUG, termination codon sequences are UAA, UAG or UGA. All cells of an individual possess the same nuclear DNA, different cells

any given gene is primarily determined by transcription factors some of which act as activators (turning on transcription) and some as repressors (turning off transcription). Sets of genes can activate and complete developmental programs involved in cell differentiation and organ development. The DNA sequences flanking each gene contain "Transcriptional control elements"

Dolar \$

Euro €

Alun :

Borsa :

that plays a major role in regulating transcription by determining which factor will bind the DNA. Promoters are the regions within the gene that direct the binding of RNA polymerase to the template DNA. Different RNA polymerases bind different promoters and are classified into three major groups by function. Most housekeeping genes and many of the tissue specific genes also contain a high proportion of CG dinucleotides called CpG islands in

Dolar \$

Euro €

Alun :

Borsa :

their 5' ends CpG islands are targets for methylation and have a role in controlling gene expression, such that methylated genes are silenced and unmethylated genes allow for gene expression. DNA sequences called "Enhancers" can be located up to several kilobases from the promoter region and can act to increase the transcriptional activity of many genes. These mechanisms can result.

in expression of different gene products or different levels of expression of the same gene product. Mutations can be either germline (occurring in gamete producing cells) or somatic (all other cells). Somatic mutations are not transmitted from one generation to the next. Germline mutations can be transmitted from one generation to the next. When considering a single gene, different versions of the gene are called alleles. Same gene have the same cellular

Function. the different allelic forms of a protein may be more or less effective and other alleles may not function at all. This is the basis for genetic differences between individuals. Mutations that change an amino acid in a protein are categorized as missense mutations. Mutations that create a stop codon are called nonsense mutations and result in premature translation termination and a

Dolar \$:

Euro € :

Altın :

Borsa :

shorter protein. When the repeat unit is a three-nucleotide sequence the region is called a "trinucleotide repeat". These mutations are also referred to as dynamic mutation because the mutation can change from generation to

Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

29

OCAK

January / Januar / Январь

29. Gün

Pazar / Sunday / Sonntag / Воскресенье

4. Hafta / Week / Woche / Иеделя

generation by changes in the number of tandem repeats. Point mutations are changes of a single nucleotide or base pair to a different nucleotide. This change may (nonsilent mutation)

Dolar \$:

Euro € :

Altın :

Borsa :

or may not (silent mutation) change an amino acid in the encoded protein. The mutation type and its location within the gene are strongly associated with the severity of the disease. In general, length mutation (insertions and deletions), Frameshifts, nonsense point mutations, and splicing mutations reduce the amount of the protein and protein activity (haploinsufficiency). In contrast, missense mutations

usually result in a relatively normal amount of the protein, but its function is altered. Aberrant methylation status of specific genes, either hypomethylation or hypermethylation without any form of genetic mutation per se, can affect the development and progression of carcinomas. Either global or individual gene hypomethylation results in the activation of "Silenced" genes previously turned off after

embryonic development has ended. This activation causes inappropriate expression of these genes in somatic tissues and ultimately in increased cell growth. In addition, decreasing the methylation of various chromosomal regions results in increased karyotypic instability and consequently increased DNA damage susceptibility from exposure to mutagens.

Dolar \$: Euro € : Altın : Borsa :

DNA hypermethylation of certain sequences including promoter sequences, can be triggered in response to this DNA demethylation, resulting in the silencing of tumorigenic inhibitors. The ends of chromosomes are known as telomeres. The telomeres contain both double-stranded and single-stranded repeats of TTAGGG and function to protect the chromosomal ends from fusion, recombination and

Dolar \$: Euro € : Altın : Borsa :

degradation resulting from double stranded DNA breaks. After each cell division the length of the chromosomal telomeres is reduced by approximately 100 base pairs. At some point, the telomeres are judged by the cellular machinery to be too short, and the cells become apoptotic. The predominant mechanism to maintain or lengthen telomeres involves an enzyme

called telomerase. Human telomerase, though inducible in some stem cells of skin and the hemopoietic system, is generally most active during embryonic development. Reexpression of the

Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

5 SUBAT
February / Februar / Февраль

36.Gün
Pazar / Sunday / Sonntag / Воскресенье

telomerase enzyme is required to bypass senescence, a critical step in the transformation of human cells. The analysis of telomerase activity in tumor

specimens has evolved from initial functional assays of the telomerase enzyme activity to quantifying the mRNA expression of one of the telomerase genes (RT-PCR). It should be noted, however, that telomerase can be expressed by inflammatory cells, leading to false-positive results. The excess iron is deposited preferentially within parenchymal cells of

the liver and other organs and is thought to catalyze the generation of reactive oxygen species that perturb cellular metabolism by a variety of mechanisms including peroxidation of membrane lipids. The oxidative insults result in cellular dysfunction, reactive fibrosis, and in advanced states organ failure.

CELL BIOLOGY 13/11/2006
unit 4 DNA structure and the genetic code.
We inherit 23 chromosomes from each parent. Each set

of 23 chromosomes encodes, a complete copy of our genome and is made up of 6×10^9 nucleotides (or 3×10^9 base pairs). The current estimate number of genes that encode messenger RNA is in the range of 30 000. In each organism there are also approximately 100 genes that code for ribosomal RNAs and transfer RNAs as nucleon-

Dolar \$:

Euro € :

Altın :

Borsa :

tides are added to the chain by the enzyme DNA polymerase. The bond forms between the hydroxyl group on the 3' carbon of the deoxyribose of one nucleotide and the α -phosphate group attached to the 5' carbon of the next nucleotide. Adjacent nucleotides are hence joined by a 3'-5' phosphodiester link. Sugar-phosphate backbone lie on the outside of the molecule, and the purines and

Dolar \$:

Euro € :

Altın :

Borsa :

08.00 and pyrimidines lie on the
 09.00 inside of the molecule
 10.00 purines A G
 11.00 pyrimidines C T U ^{BASE}

12.00 The purine adenine (A) would
 13.00 fit nicely with the pyrimidine
 14.00 thymine (T) forming two
 15.00 hydrogen bonds. Thus A
 16.00 always pairs with T, and
 17.00 G always pairs with C.

18.00 The three hydrogen bonds
 19.00 formed between G and C
 20.00 produce a relatively strong

Dolar \$:

Euro € :

Altın :

Borsa :

08.00 base pair. There are two grooves
 09.00 along the surface of the DNA
 10.00 molecule. One is wide and deep
 11.00 the major groove - and the
 12.00 other is narrow and shallow -
 13.00 the minor groove. Proteins can

Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa.
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

12

ŞUBAT

February / Februar / Февраль

43. Gün

Pazar / Sunday / Sonntag / Воскресенье

6. Hafta / Week / Woche / Неделя

use the grooves to gain access
 to the bases. The two chains
 of DNA are said to be antipar-
 allel because they lie in the oppo-
 site orientation with respect

Dolar \$:

Euro € :

Altın :

Borsa :

to one another, with the 3' hydroxyl terminus of one strand opposite the 5' phosphate terminus of the second strand.

On average each human chromosome contains about 1.3×10^8 base pairs (bp) of DNA. 46 chromosomes in all represent about 2 m of DNA. The code is read in sequential groups of three codon by codon. Adjacent

Codons do not overlap, and each triplet of bases specifies one particular amino acid. Sixty-one codons specify an amino acid and the remaining three act as stop signals for protein synthesis. Methionine and tryptophan are the only amino acids coded for by single codons. The other 18 amino acids are encoded by either 2, 3, 4, or 6 codons and so the code is degenerate.

08.00

09.00

10.00

11.00

12.00

13.00

14.00

15.00

16.00

17.00

18.00

19.00

20.00

Dolar \$:

Euro € :

Altın :

Borsa :

Pa. Sa. Ça. Pe. Cu. Cmt. Pz. Pa. Sa. Ça. Pe. Cu. Cmt. Pz. Pa. Sa. Ça. Pe. Cu. Cmt. Pz. Pa. Sa. Ça. Pe. Cu. Cmt. Pz. Pa. Sa.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

08.00

09.00

10.00

11.00

12.00

13.00

14.00

15.00

16.00

17.00

18.00

19.00

20.00

Dolar \$:

Euro € :

Altın :

Borsa :

Pa. Sa. Ça. Pe. Cu. Cmt. Pz. Pa. Sa. Ça. Pe. Cu. Cmt. Pz. Pa. Sa. Ça. Pe. Cu. Cmt. Pz. Pa. Sa. Ça. Pe. Cu. Cmt. Pz. Pa. Sa.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

will have been introduced into the messenger RNA template.

A shortened protein, usually without function, is produced. A mutation that inserts or deletes a nucleotide will change the normal reading frame and is called a frameshift mutation. Tryptophan

U G G → U deleted, A mutation that changes the codon from one amino acid to that for another is a missense mutation. In CAA

changed to U

→ his CAU. Amino acid with charged hydrophilic side chains usually have A or G - Purine in the second position. Those with hydrophobic side chains usually have C or U - pyrimidine - in that position. Histones are positively charged because they contain high amounts of the amino acids arginine and lysine and bind tightly to the negatively

08.00

charged phosphates on DNA.

09.00

The synthesis of a new DNA molecule is catalyzed by DNA

10.00

11.00

polymerase III. Its substrates are the four deoxyribonucleoside triphosphate, dATP, dCTP, dGTP, and

12.00

13.00

Ca. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

19

SUBAT

February / Februar / Февраль

50. Gün

dTTP. DNA polymerase III catalyzes the formation of a phosphodiester link between the 3'-hydroxyl group of one sugar residue and the 5'-phosphate group of

a second sugar residue.

① Synthesizes DNA in the 5' to 3' direction. ② The template strand is read in the 3' to 5' direction. However, the two strands of the double helix are antiparallel. They cannot be synthesized in the same direction because only one has a free 3'-hydroxyl group, the other has a free 5' phosphate group. No DNA polymerase has been found that can.

Synthesize DNA in the 3' to 5' direction; that is, by attaching a nucleotide to a 5' phosphate, so the synthesis of the two daughter strands must differ: one strand, the leading strand, is synthesized continuously while the other, the lagging strand, is synthesized discontinuously. DNA polymerase III can synthesize both daughter strands, but must make the lagging strand as a series of

short 5' to 3' sections. The fragments of DNA, called Okazaki fragments. The most common damage suffered by a DNA molecule is "depurination" the loss of an adenine or guanine because the bond between the purine base and the deoxyribose sugar to which it is attached is hydrolyzed by water. Within each human cell about 5000 -

10,000 depurinations occur every day.

Deamination is a less frequent event it happens about 100 times a day in every human cell. ultraviolet light or chemical carcinogens such as benzo-pyrene, found in cigarette smoke, can also disrupt the structure of DNA. The absorption of ultraviolet light can cause two adjacent thymine residues to link and form a thymine

08.00
09.00
10.00
11.00
12.00
13.00
14.00
15.00
16.00
17.00
18.00
19.00
20.00

dimer. If uncorrected thymine dimers create a distortion in the DNA helix known as a "bulky lesion". This inhibits normal base pairing between the two strands of the double helix and blocks the replication process. If there were no way to correct altered DNA, the rate of mutation would be intolerable. DNA excision and DNA repair

Dolar \$: Euro € : Altın : Borsa :

08.00
09.00
10.00
11.00
12.00
13.00

enzymes have evolved to detect and to repair altered DNA. The role of the repair enzymes is to cut out (excise) the damaged portion of DNA and then to repair the base sequence. Two types

Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

26 ŞUBAT
February / Februar / Февраль

57. Gün
Pazar / Sunday / Sonntag / Воскресенье

8. Hafta / Week / Woche / Идея

of excision. Repair are described in this section: base excision repair and nucleotide excision repair. Each of these repair mechanisms are: (1) An enzyme

Dolar \$: Euro € : Altın : Borsa :

Recognizes the damaged DNA (2) the damaged portion is removed, (3) DNA polymerase inserts the correct nucleotide(s) into position (according to the base sequence of the second DNA strand), and (4) DNA ligase joins the newly repaired section to the remainder of the DNA strand. The protein-coding regions of almost all eukar-

Dolar \$:

Euro € :

Altın :

Borsa :

Pa. Sa. Ca. Pe. Cu. Cnt. Pz. Pa. Sa. Ca. Pe. Cu. Cnt. Pz. Pa. Sa. Ca. Pe. Cu. Cnt. Pz. Pa. Sa. Ca. Pe. Cu. Cnt. Pz. Pa. Sa.

gotic genes are organized as a series of separate bits interspersed with noncoding regions. The protein-coding regions of the split genes are called exons. The region between are called introns, short for intervening sequences. A single protein is often composed of a series of domains, with each domain performing different role. The breaks between exons usually correspond to domain boundaries. Only about 1.5% of the

Dolar \$:

Euro € :

Altın :

Borsa :

Pa. Sa. Ca. Pe. Cu. Cnt. Pz. Pa. Sa. Ca. Pe. Cu. Cnt. Pz. Pa. Sa. Ca. Pe. Cu. Cnt. Pz. Pa. Sa. Ca. Pe. Cu. Cnt. Pz. Pa. Sa.

human genome codes for exonic sequences (i.e. makes protein) with about 23,5% coding. For introns, tRNA genes and ribosomal RNA (rRNA) genes. Most protein-coding genes occur only once in the genome and are called single-copy genes. Some sections of DNA are very similar in sequence to other members of their gene family but do not produce mRNA.

Dolar \$

Euro €

Altın :

Borsa :

These are known as "Pseudogenes". Sometimes DNA that encodes RNA is repeated as a series of copies that follow one after the other along the chromosome. Such genes are said to be tandemly repeated and include the genes that code for ribosomal RNAs (about 250 copies/cell) transfer RNAs (50 copies/cell), and histone proteins (20-50 copies/cell) the products of these genes are required in large amounts. Our genome large portion of

Dolar \$

Euro €

Altın :

Borsa :

of this so-called extragenic
 DNA is made up of repeti-
 tious DNA sequences that
 are repeated many times
 in the genome some seq-
 uences are repeated more
 than a million times and
 are called Satellite DNA.
 Most of the satellite
 DNA is found in a region
 called the "Centromere",
 which plays a role
 in the physical movement

Dolar \$:

Euro €:

Altın:

Borsa:

of the chromosomes that
 occur at cell division and one
 theory is that it has a structural
 function. Our genome also contains
 minisatellite DNA where the tandem
 repeat is about 25 bp long. Mini-

Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu.
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

5

MART

March / März / Март

64. Gün

Pazar / Sunday / Sonntag / Воскресенье

9. Hafta / Week / Woche / Неделя

satellite DNA stretches can be up
 to 20,000 bp in length and are
 often found near the ends of
 chromosomes, a region called
 the "Telomere". Microsatellite DNA

Dolar \$:

Euro €:

Altın:

Borsa:

Pa. Sa. Ça. Pe. Cu. Cnt. Pz. Pa. Sa. Ça. Pe. Cu. Cnt. Pz. Pa. Sa. Ça. Pe. Cu. Cnt. Pz. Pa. Sa. Ça. Pe. Cu. Cnt. Pz. Pa. Sa.

has an even, smaller repeat unit of about 4bp or less.

Genes encoding mRNAs are known as protein-coding genes. A gene is said to be expressed when its genetic information is transferred to mRNA and then to protein. In any gene only one DNA strand acts as the template for transcription. The sequence of nucleotides in RNA depends on their sequence in the DNA template. DNA unwinds and rewinds

Dolar \$:

Euro € :

Altın :

Borsa :

08.00

as RNA Polymerase advances along the double helix, synthesizing an RNA chain as it goes. This produces a "transcription bubble". The RNA chain grows in the 5' to 3' direction, and the template strand is read in the 3' to 5' direction. The nucleotide in the template strand at which transcription begins is designated with the number +1. Transcription proceeds in the "downstream direction", and nucleotides in the trans-

Dolar \$:

Euro € :

Altın :

Borsa :

08.00
09.00
10.00
11.00
12.00
13.00
14.00
15.00
16.00
17.00
18.00
19.00
20.00

cribed DNA are given successive positive numbers. Downstream sequences are drawn, by convention, to the right of the transcription. Start site. Nucleotides that lie to the left of this site are called the "upstream sequences" and are identified by negative numbers. Specific DNA sequence called the "Promoter" which lies just upstream of the gene to be transcribed

Dolar \$: Euro € : Altın : Borsa :

08.00
09.00
10.00
11.00
12.00
13.00
14.00
15.00
16.00
17.00
18.00
19.00
20.00

Each bacterial promoter usually controls the transcription of a cluster of genes coding for proteins that work together on a particular task. This collection of related genes is called an "operon" and is transcribed as a single mRNA molecule called a "polycistronic mRNA". A short time the bacteria produce the proteins necessary for utilizing the new food source. The concentration of the substrate

Dolar \$: Euro € : Altın : Borsa :

(lactose in this case) determines whether or not mRNA is synthesized. The lac operon is said to be under negative regulation by the repressor protein. The transcription of the lac operon is controlled not only by the repressor protein but also by another protein, the catabolite activator protein (CAP). If both glucose and lactose are present, it is more effi-

cient for the cell to use glucose as the carbon source because the utilization of glucose requires no new RNA and protein synthesis all the proteins necessary being already present in the cell. Only in the case

Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu. Ct. Pz. Pa. Sa. Ça. Pe. Cu.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

12 **MART**
March / März / Март

71.Gün
Pazar / Sunday / Sonntag / Воскресенье

10. Hafta / Week / Woche / Иеделя

ce. of glucose, therefore. Does E. coli transcribe the lac operon at a high rate. $\otimes$ This control operates through an intracellular messenger molecule called Cyclic adenosine

Dolar \$:

Euro € :

Altitude:

Borsa :

monophosphate (cyclic AMP)
When glucose concentrations are low, the concentration of cyclic AMP increases. Cyclic AMP binds to CAP, and the complex then binds to a sequence upstream of the lac operon promoter where it has a remarkable effect. Eukaryotes have three types of RNA polymerase. RNA polymerase I transcribes the genes that code for most of

the ribosomal RNAs. All messenger RNAs are synthesized using RNA polymerase II. Transfer RNA genes are transcribed by RNA polymerase III. A newly synthesized eukaryotic mRNA undergoes several modifications before it leaves the nucleus. Unlike DNA, RNA is an unstable molecule. Many eukaryotic protein-coding genes are split into exon and intron sequences. Both the exons and introns are transcribed into mRNA. The

introns have to be removed and the exons joined together by a process known as RNA splicing before the mRNA can be used to make protein. Removal of introns takes place within the nucleus. As well as removing introns, splicing can sometimes remove exons in a process called Alternative Splicing. This allows the same gene to give rise to different proteins of different

times or in different cells. For example, alternative splicing of the gene for the molecular motor dynein produces motors that transport different types of "cargo". The expression of eukaryotic genes can be regulated at more than one place in the cell. Although gene expression in eukaryotes is controlled primarily by regulating transcription in the nucleus, there are many instances in which expression is controlled

Glucocorticoids are an example of transmitters that alter gene transcription. The cells of multi-cellular organisms turn the transcription of genes on and off in response to many extracellular chemicals. Unlike steroid hormones, most of these transmitters cannot enter the cell and must activate intracellular messenger systems inside the cell that in turn carry the signal onward.

From the plasma membrane to the nucleus, mRNA is shorter than its parent DNA sequence and contains no introns.

BOOKS

- 1) Atlas of Genetic Diagnosis and Counseling
- 2) Biochemistry of Signal Transduction and Regulation
- 3) Biological Responses to DNA Damage
- 4) Cancer Cell Signaling: Methods and protocols
- 5) Calcium Signaling

- 6) calcium signaling in Cancer.
- 7) cell cycle control.
- 8) cell Growth: Control of cell size
- 9) cell immortalization.
- 10) clinical Cancer Genetics:
Risk Counseling and Management
- 11) clinical Genetics short course.
- 12) color Atlas of Genetics.
- 13) Cözümlü Genetik Problemleri.
- 14) cytokines.
- 15) DNA Methylation protocols
- 16) Facilitating the Genetic
counseling process

- 08.00 17) clinical cancer Genetics:
09.00 Risk Counseling and Management
10.00 18) counseling About Cancer:
11.00 Strategies For Genetic
12.00 Counseling, 2nd Edition
13.00 19) Practical Guide to Human

Cancer of Cervix

Ca. Pe. Cu. Ct. Pz. Pa. Sa. Ca. Pe. Cu. Ct. Pz. Pa. Sa. Ca. Pe. Cu. Ct. Pz. Pa. Sa. Ca. Pe. Cu.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

MART
March / März / Mapт

85. Gün
Pazar / Sunday / Sonntag / Воскресенье
- 20) A Guide to Genetic Counseling
- 21) Risk assessment and Management in cancer genetics.
- 22) Genetic Counseling For Hereditary Cancer.

09.00 Counseling

24) Hereditary cancers
Assessing your risk/genetic
counseling.

13.00 BIOCHEMISTRY Handwritten

Chapter 13 (part 1)

Carbohydrate Metabolism

16.00
*) chapter 14

oxidative processes

Chapter 15

Electron Transport

Chapter 23

Metabolic Coordination

13. Hafta / Week / Woche / Неделя

5A Chapter 28

09.00 Eukaryotic Genes and their
10.00 Expression

6) Chapter 18

12.00 Lipid metabolism I

13.00 Fatty acid oxidation 640

14.00 ketogenesis 648

15.00

16.00 CANCER

18.00 FINISHED

19.00

Dolar \$: Euro € : Altın :

	Pa.	Sa.	Ça.	Pe.	Cu.	Cmt.	Pz.	Pa.	Sa.	Ça.	Pe.	Cu.	Cmt.	Pz.	Pa.	Sa.	Ça.	Pe.	Cu.	Cmt.	Pz.	Pa.	Sa.	
Temmuz / July / Jul / Hava	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24