

Busta n. 4

Descrivere la tecnica della RT-PCR quantitativa e le sue applicazioni.

Principi di funzionamento di un microscopio ottico

Statuto Sapienza Università di Roma: le Facoltà (art. 12).

Ordinamento di dati in excel in un campo in ordine alfabetico crescente.

The role of estrogens in breast cancer is well established as a promoter of hormone-responsive cancer subtypes. Estrogen receptor (ER) isoforms  $\alpha$  and  $\beta$  belong to a superfamily of ligand-regulated nuclear transcription factors. Genomic signaling of ER involves a complex cascade of signaling events via the functioning of several co-activator/co-repressor molecules that culminates in the estrogen-response-element-mediated target gene expression of c fos and c jun. These signaling pathways are also involved in endocrine therapy resistance.

Busta n. 11

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Descrivere la procedura di estrazione del DNA da un campione biologico e sua quantificazione.

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Sequencing genomico: finalità e caratteristiche

Legge n. 240/2010: Ricercatori a tempo determinato (art. 24).

A cosa serve un *cloud*?

Cancer affects everyone, regardless of age, gender, or social status, and represents a tremendous burden for patients, families, and societies. In 2020, one in six deaths were caused by cancer, accounting for 10 million premature deaths worldwide. Cancer has been a leading cause of mortality since the 1970s, but only in 2016 did it become part of the UN global agenda, as part of Sustainable Development Goal target aiming to reduce premature mortality from non-communicable diseases.

Busta n. 3

Descrivere i principali tipi di RNA e loro funzioni.

Frazionamento cellulare: caratteristiche e applicazioni

Statuto Sapienza Università di Roma: i Dipartimenti (art. 11).

Che cosa è l'estensione di un *file*?

Progression of female breast and colon cancer to advanced-stage metastatic disease represents a major cause of mortality in the female population. The American Cancer Society projects combined new cases at 333,230 and cancer-related deaths at 68,060 in 2022. Conventional treatment options for breast cancer include cytotoxic chemotherapy, selective estrogen receptor modulators, selective estrogen receptor degraders, cyclin-dependent kinase inhibitors and aromatase inhibitors.

Busta n. 2

Descrivere la tecnica del western blot e sue applicazioni.

Elettroforesi nativa, SDS-PAGE e isoelettroforesi: differenze e caratteristiche generali

Statuto Sapienza Università di Roma: articolazione delle strutture (art. 10).

In excel da cosa è identificata ogni cella?

The process of epithelial to mesenchymal transition (EMT) is a key stage in the development of malignant tumors. Cells activating an EMT program lose their apico-basal polarity and tight junctions but acquire the ability for migration, invasion, and extravasation. EMT is a complex and multi-stage process that is accompanied by sequential repression of epithelial gene expression concomitantly with activation of mesenchymal genes. Notably, the cell may acquire an intermediate phenotype characterized by the presence of both epithelial and mesenchymal signs.

Busta n. 8

Descrivere la procedura di estrazione di RNA totale da un frammento di tessuto e da linee cellulari in coltura.

Colorazione in Ematossilina-Eosina: applicazioni e caratteristiche

Statuto Sapienza Università di Roma: il Nucleo di Valutazione di Ateneo (art. 21).

Qual è la definizione e la funzione di "database"?

Among the thyroid neoplasias originating from follicular cells, we can include well-differentiated carcinomas, papillary (PTC) and follicular (FTC) thyroid carcinomas, and the undifferentiated anaplastic (ATC) carcinomas. Several mutations in oncogenes and tumor suppressor genes have already been observed in these malignancies; however, we are still far from the comprehension of their full regulation-altered landscape. Even if only 2% of the human genome has the ability to code for proteins, most of the noncoding genome is transcribed, constituting the heterogeneous class of noncoding RNAs (ncRNAs), whose alterations are associated with the development of several human diseases, including cancer.

Busta n. 14

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Descrivere, nella pianificazione di un esperimento su animali, l'applicazione del principio delle 3R.

Quali e quanti protocolli di lisi cellulare possono essere usati per ottenere un estratto proteico.

Legge n. 240/2010: Ricercatori a tempo determinato di tipo b (art. 24, comma 3, lettera b)

A cosa servono le tabelle Pivot di Excel?

Social inequalities also heavily influence cancer prevention. For example, cervical cancer could be eliminated if all girls had access to human papillomavirus vaccination. Yet nine out of ten women who die from cervical cancer live in low-income and middle-income countries, because of limited access to vaccination, as well as a lack of screening and good quality care. According to WHO, 30–50% of all cancers are preventable and prevention is the most cost-effective long-term strategy for cancer control. Countries that have adopted evidence-based policies to address behavioural risk factors (eg, tobacco and alcohol taxation, counselling, and awareness programmes) show encouraging reductions in the related cancer burden.

Busta n. 7

Descrivere un metodo di quantificazione delle proteine.

PCR: caratteristiche e campi di applicazione

Statuto Sapienza Università di Roma: Organi dell'Università (art. 17).

Cosa è la firma digitale?

In the multi-factorial and multi-step carcinogenic process of sporadic breast and colon cancers, dietary, environmental and hormonal factors exert profound impacts on initiation, promotion and progression. Genetically predisposed patients carrying germ line mutations in the tumor suppressor BRCA1 and BRCA2 genes in breast and in the tumor suppressor APC gene in colon cancer may be at greater risk due to the effects of exogenous factors in developing cancer. Reliable in vitro models of relevant target organs for cancer provide valuable mechanistic approaches to identify efficacious cancer preventive agents and, thereby, complement in vivo investigations on animal models.

Busta n. 10

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Descrivere il significato di accuratezza, sensibilità, specificità, valore predittivo positivo e valore predittivo negativo di un generico test diagnostico.

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Quali sono le componenti di uno spettrometro di massa e loro funzione

Statuto Sapienza Università di Roma: il Collegio dei Revisori dei Conti (art. 24).

In Microsoft Word, come si esegue il controllo ortografico?

After living for more than 2 years with COVID-19—with over 6.2 million confirmed deaths (but probably many more, with an estimated 20 million excess deaths) and over 510 million confirmed cases—the world is at a critical point. The omicron wave, with its high transmissibility and milder course than previous variants, especially for people who are fully vaccinated and without comorbidities, is abating in many countries. Restrictions are being relaxed, and people are slowly returning to pre-pandemic activities, including gatherings, office-based working, and cultural events.

Busta n. 9

Descrivere l'approccio statistico all'analisi di una variabile i cui valori non presentano una distribuzione normale o gaussiana.

Preparazione di un campione per un esperimento di analisi proteomica: dalla lisi alla purificazione

Statuto Sapienza Università di Roma: il Collegio dei Direttori di Dipartimento (art. 23).

In ambiente Microsoft word, come si imposta la funzione "elenco puntato" in un documento?

Metastasis is a multisequential process that allows tumor cells to migrate to tissues distant from the primary tumor. Only a small number of cells escape from the primary tumor; however, the metastases generated are responsible for more than 90% of cancer deaths. Many metastatic processes initially require the total or partial start-up of a program for the transformation of tumor epithelial cells into mesenchymal cells (EMT). The launching of the EMT program is stimulated by cytokines and other elements produced by the diverse types of cells composing the tumor stroma.

Busta n. 6

Descrivere un dosaggio ELISA e le sue applicazioni.

Misurazione dell'espressione genica: approcci e differenze

I diritti riconosciuti agli interessati, così come disposto dal Reg. UE 2016/679 (detto anche GDPR).

In una formula di excel, a cosa serve la funzione "unisci celle"?

It is well recognized that stem cell populations in epithelial organ sites and in respective cancers play distinct and unique roles. The stem cell population is involved in tissue regeneration, organ site homeostasis and in the progression of the premalignant phenotype to a metastatic phenotype. The common and unique cellular and molecular characteristics of normal and cancer stem cells represent important concepts in stem cell biology. More importantly, cancer stem cell biology also facilitates the identification of mechanistic leads for the clinical translatability of the primary and secondary prevention of cancer and efficacious therapeutic intervention.

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Descrivere la tecnica dell'immunoistochimica e delle sue applicazioni.

Digestione enzimatica: differenza tra digestione in gel e in soluzione e relative applicazioni

Legge n. 240/2010: Ricercatori a tempo determinato di tipo a (art. 24, comma 3, lettera a).

Cosa si intende per connessione *wireless*?

Impressive advances in imaging, genomics, radiology, and personalized treatments have greatly improved cancer treatment, contributing to remarkable improvements in cancer survival, particularly in high-income countries. However, in low-income countries, inadequate access to essential core technologies in surgery, radiotherapy, pathology, and chemotherapy is a huge barrier to effective cancer care. To take just one example, between 2015 and 2019, the average global 5-year childhood cancer survival ranged from 11.6% in Africa to 83.0% in North America.

Busta n. 5

Descrivere la preparazione di una soluzione 2mM di NaCl.

Colture cellulari: caratteristiche generali e principali applicazioni

Statuto Sapienza Università di Roma: Centri di ricerca, Centri di servizi e Centri misti (art. 15).

Quali dispositivi possono essere utilizzati per il *backup* dei dati?

The normal stem cell population in epithelial organ sites is responsible for tissue regeneration and the preservation of homeostatic growth control via regulation of proliferation, differentiation and apoptosis. The Wnt/ $\beta$ -catenin, Hedgehog and Notch signaling pathways play critical regulatory roles in the maintenance, survival and function of the normal stem cell population. In contrast, the cancer stem cells are characterized by the dysregulation of normal regulatory pathways, activation of survival pathways via phosphatidylinositol 3 kinase (PI3K), protein kinase B (AKT), molecular target of rapamycin (mTOR) and nuclear factor  $\kappa$ B (NF $\kappa$ B) signaling and epithelial-mesenchymal transition (EMT).

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Busta n. 1

Descrivere la struttura primaria, secondaria e terziaria di una proteina.

Western blotting: principi generali della metodica

Statuto Sapienza Università di Roma: il Codice etico (art. 9).

In Microsoft Word, cosa si intende per funzione di "giustifica" di un documento"?

The p53 tumor suppressor protein plays the role of the "guardian of the genome" mediating the DNA damage response leading to cell cycle arrest, cellular senescence, and apoptosis. The ability of p53 to interact with numerous protein partners makes it instrumental in various signalling cues. In response to different forms of stress, p53 promotes the expression of genes whose products control cell cycle and apoptosis. As a transcription factor, p53 binds the DNA cognate sites in the regulatory regions of its target genes, including non-coding genes (lncRNAs and microRNAs).

Busta n. 12

Descrivere la strumentazione minima richiesta per l'allestimento di colture cellari.

Cromatografia per affinità: caratteristiche e applicazioni in esperimenti di separazione proteica/peptidica

I compiti demandati al responsabile del procedimento.

Quali sono le principali funzioni di un sistema operativo?

The growing challenges contributing to the rising cancer burden are complex. The global population is ageing, obesity is increasing, and unhealthy diets and sedentary lifestyles have become commonplace. The COVID-19 pandemic caused major delays in cancer diagnosis and treatment worldwide, and increased engagement in well established risk behaviours like tobacco use and harmful alcohol consumption. Some countries, such as South Africa, issued COVID-19 regulations temporarily prohibiting sale of tobacco and alcohol. However, in most countries, the effects of COVID-19 on behavioural risk factors remain a major concern.

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Busta n. 15

Descrivere la strumentazione minima che deve essere presente in un laboratorio che utilizza sostanze tossiche.

NGS e sequenziamento di SANGER: principi e differenze

Regolamento di Ateneo per l'amministrazione, la finanza e la contabilità di Sapienza Università di Roma: il ruolo del senato accademico nel processo contabile.

Cosa si intende per *open data*?

The systemic anti-cancer approach is based on medical/pharmaceutical interventions affecting cancer cells at multiple sites, including local and distant regions. Interventions include: cytotoxic chemotherapy agents used for direct extermination of proliferating cells, hormonal interventions altering the tumor environment and affecting its ability to survive and thrive, biological drugs restoring the function defective proteins in mutated tumors, and immunological medications encouraging effective immune recognition of tumor cells and associated immune response.