
# Sidra Medicine
## Pediatric Oncology Report 2022

# SIDRA MEDICINE

## PEDIATRIC ONCOLOGY REPORT 2022

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# WELCOME MESSAGE

**Dr. Wouter Hendrickx**
Lead Principal Investigator
Pediatric Precision Oncology Program

**Dr. Ayman Saleh**
Division Chief
Oncology and Hematology Division

We are delighted to present the 2022 "Pediatric Cancer and Precision Oncology in Qatar" report; a joint update from the pediatric precision oncology program and the oncology and hematology division at Sidra Medicine.

Since opening its main hospital in 2018, Sidra Medicine has become the country's sole healthcare provider for the care and treatment of children and young people with cancer. To support our personalized medicine strategy, we initiated the Sidra Medicine Pediatric Precision Oncology Program, which works closely with our pediatric cancer services. This close synergy between our clinical and research divisions grants us a comprehensive understanding of our patients' characteristics and epidemiology.

Our clinical and research collaboration also saw the birth of two important assets - the Pediatric Cancer Registry and The Sidra Pediatric Cancer Biorepository (SPCB). The former collects comprehensive clinical data, while the latter seeks consent from patients to donate materials no longer needed for diagnosis, thus enabling pertinent research for our local population.

Our programs, which are built on the expertise we have acquired over the years, have now become our springboard to precision oncology.

Worldwide, the incidence rates of childhood cancer range between 50 and 200 per million children. In Qatar, according to 2019 data, the pediatric cancer rate is 126 per million children. Our patient population at Sidra Medicine primarily consists of individuals of Arab and Asian descent, making up 70 percent and 25 percent of our patients, respectively. The most prevalent diagnoses are Leukemia (39%), Central Nervous System malignancies (14%), followed by Lymphoma, Germ cell tumors, Neuroblastoma, and Sarcomas.

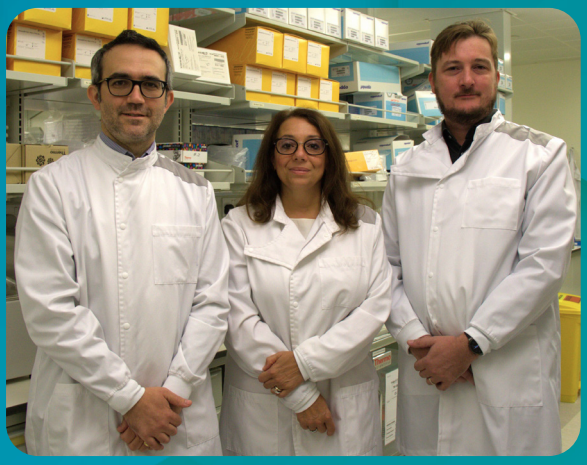
As we improve the timing and rate of consent acquisition, we edge closer to providing molecular profiling at the point of diagnosis. This wealth of data - which surpasses current clinical requirements - is the result of our strategy to align people and technologies; ensuring harmony between pathology, research, and clinical care. This has been an equally challenging and rewarding endeavor.

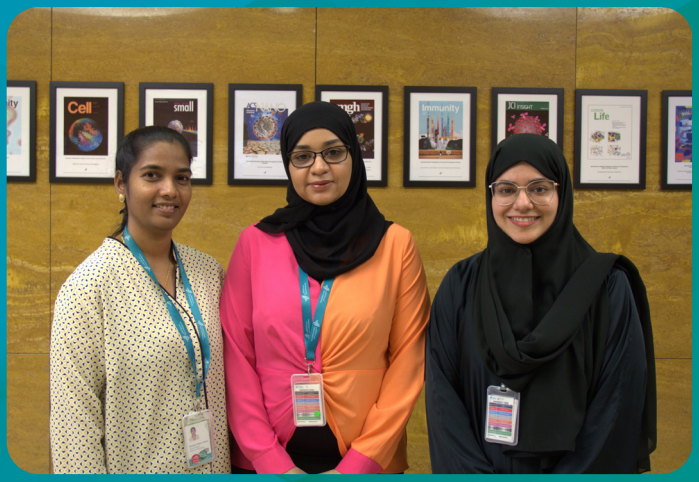
We firmly believe that our programs will empower pediatric patients to benefit from the seismic shift in cancer treatment, led by targeted and immunotherapy trials. This deeper understanding of patients' tumors - exploring genetic determinants, immune phenotypes, mutational load, or intratumoral heterogeneity - gives us insights into adapting groundbreaking therapies for our pediatric patients.

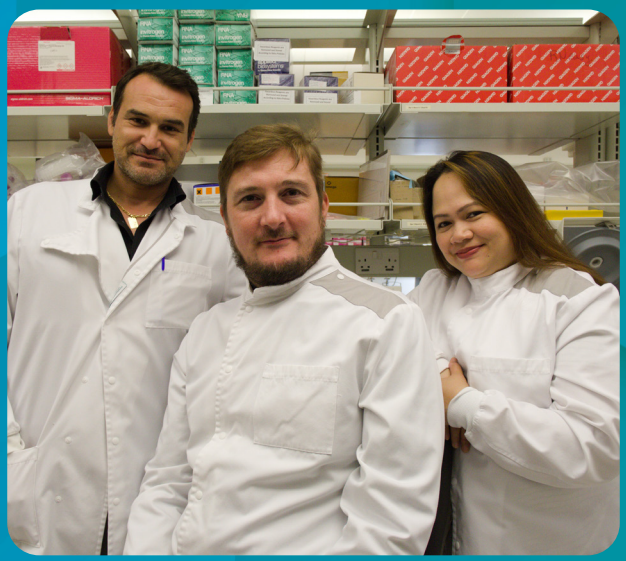
Through this report, we aim to share the rich data repository that guides our clinicians in identifying rare targetable somatic mutations, and in facilitating patient enrollment in worldwide clinical trials. The data allow us to spotlight novel molecular targets in specific patient subgroups, paving the way for new biomarkers and therapeutic strategies.

This work is at the forefront of personalizing precision medicine for every pediatric cancer patient in Qatar. It is our hope that this shared knowledge will enhance understanding and contribute to improved cancer care outcomes.

# MEET THE TEAM

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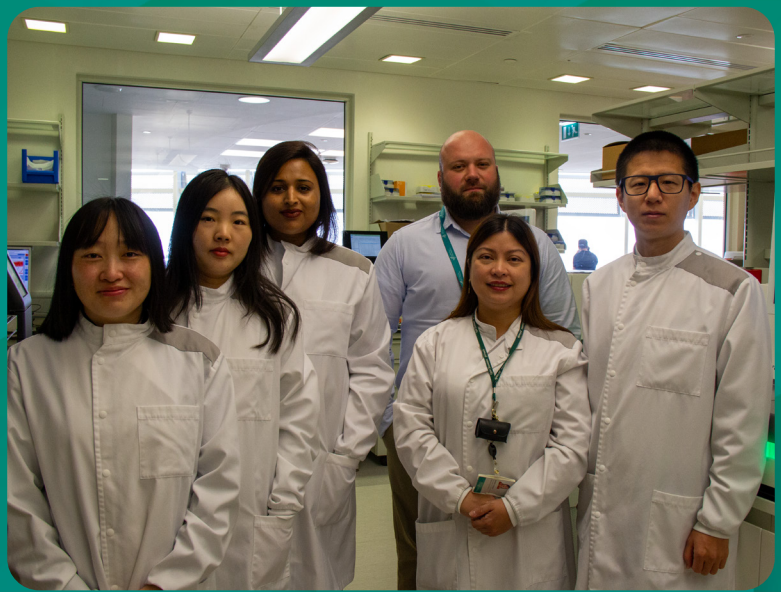


# MEET THE TEAM

## CANCER RESEARCH INVESTIGATORS

Dr. Chiara Cugno, Dr. Wouter Hendrickx

Dr. Cristina Maccalli, Dr. William Mifsud, Dr. Sara Deola

## NEUROSURGERY TEAM

Dr. Khalid Al-Kharazi, Dr. Ian Pople

## PATHOLOGY TEAM

Dr. William Mifsud,  Dr. Erdener Ozer, Dr. Gordan Vujanic

## ONCOLOGY HEMATOLOGY TEAM

Dr. Ayman Saleh, Dr. Ata Maaz, Dr. Naima Al Mulla

Dr. Chiara Cugno, Dr. Tayseer Al saad, Dr. Wafaa Abdelghani

## RESEARCH LAB TEAM

Dr. Christophe Raynaud, Dr. Sathiya Narayanan, Apryl Sanchez

## NURSING TEAM

Mohammed Anas, Rachel Park

## PRECISION RESEARCH INFORMATION MANAGEMENT ENVIRONMENT (PRIME) TEAM

Shafqat Baig, Mehshad Hamza

Mohammedhusen Khatib

## GENOMICS CORE TEAM

Lisa Sara Mathew, Li Liu, Kun Wang,

Guishuang Wang, Li Wang, Dr. Oleksandr Soloviov

## CLINICAL RESEARCH COORDINATION

Blessing Dason, Aisha Khalifa, Asma Jamil

## BIOINFORMATICS TEAM

Dr. Shimaa Sherif, Fazulur Vempalli,

Dr. Tariq Masoodi, Dr. Abdul Rahman Salhab,

## LEAD PI OF THE PEDIATRIC PRECISION ONCOLOGY PROGRAM

Dr. Wouter Hendrickx

# SPOTLIGHT: ROLE OF RESEARCH NURSES

Blessing has played a crucial role in setting up the database underpinning Sidra Medicine's Pediatric Cancer Biorepository and Pediatric Cancer Registry.

**Blessing Dason**
Research Nurse and Clinical Informatics Specialist
Sidra Medicine

"With my dual background in nursing and research, embarking on this Clinical informatics project was a unique and fascinating journey. I was constantly learning new codes, testing the database or the application, identifying required modifications, making the necessary changes, and then retesting. It's been an engaging cycle of innovation and improvement. This is a process that I have deeply enjoyed, as it draws upon my interest and expertise in both medical science and technology.

I began my journey with the Biorepository in November 2019 and have continued to work here since then, contributing to this groundbreaking endeavor in pediatric cancer care.

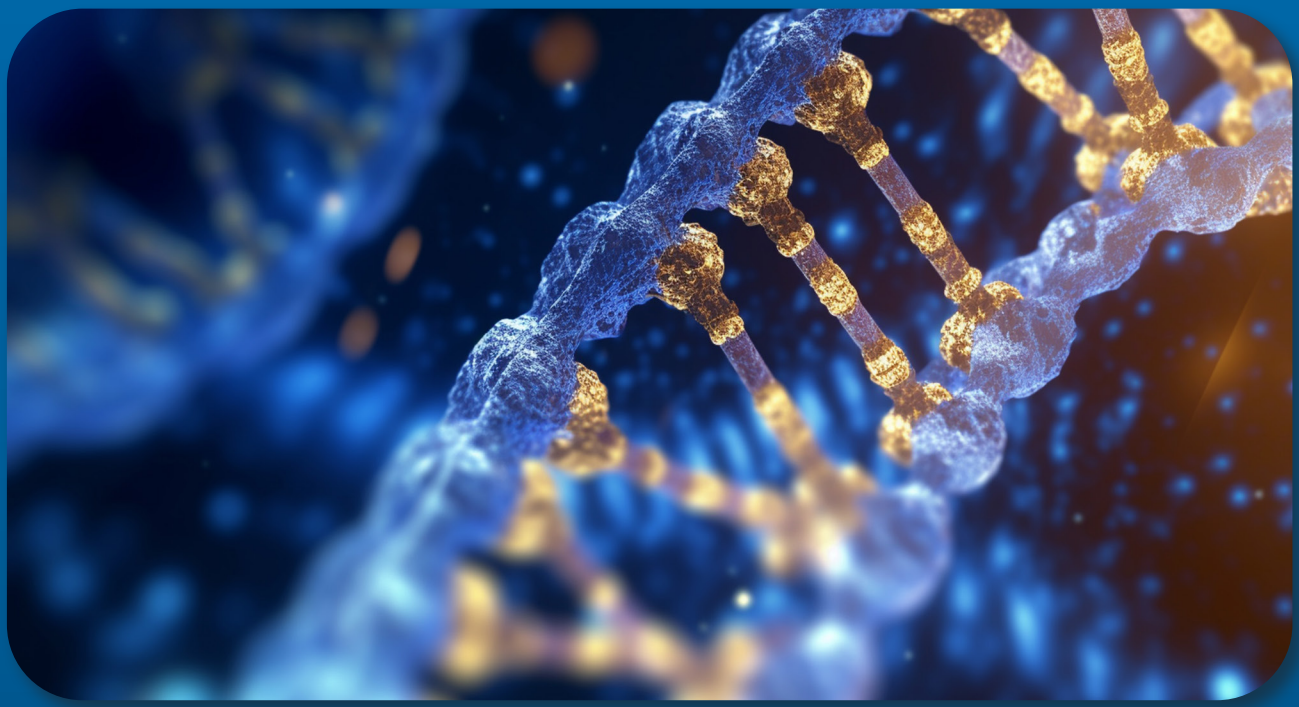
Setting up the Pediatric Biobank presented some interesting challenges, primarily because it was built from the ground up. The most significant challenge lay in validating the database. Identifying and rectifying each minor modification was a task that required intense focus and precision.

Once the database was finalized, we encountered

another hurdle: extracting data from Cerner. The data wasn't always directly accessible in Cerner, necessitating a complex extraction process. Additionally, I had to familiarize myself with various medical codes, such as ICD-10, ICD-O3, and HPO - which was a steep learning curve but critical for accurately interpreting and organizing our data.

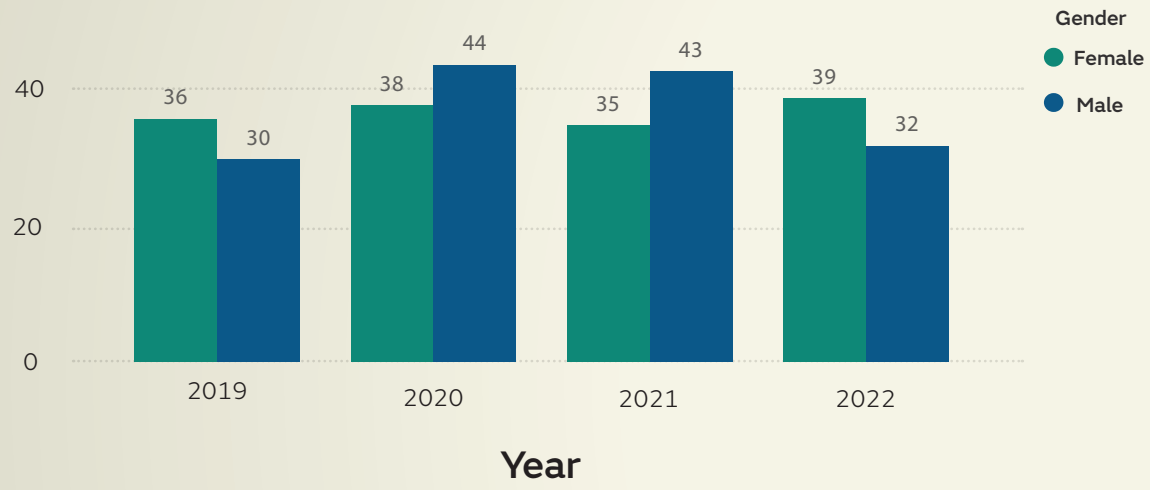
Research nurses occupy a unique position, particularly when armed with a dual skill set like mine. Given my nursing background, I am well versed in medical terminologies and have a solid understanding of patient treatments and outcomes. This equips me to scrutinize patient data in a meaningful way for our research. We contribute significantly to clinical research in several ways. We assist clinicians in obtaining informed consents; collecting research samples; entering patient data into the database; and validating this data. These tasks are particularly critical when dealing with oncology patients, as comprehending and extracting correct data can be quite challenging. Having research nurses in the team makes this process more manageable.

In essence, research nurses bridge the gap between patient care and research, leveraging our medical knowledge and experience to drive better health outcomes. It's about making every bit of patient information count, and utilizing this data to facilitate advancements in pediatric healthcare."

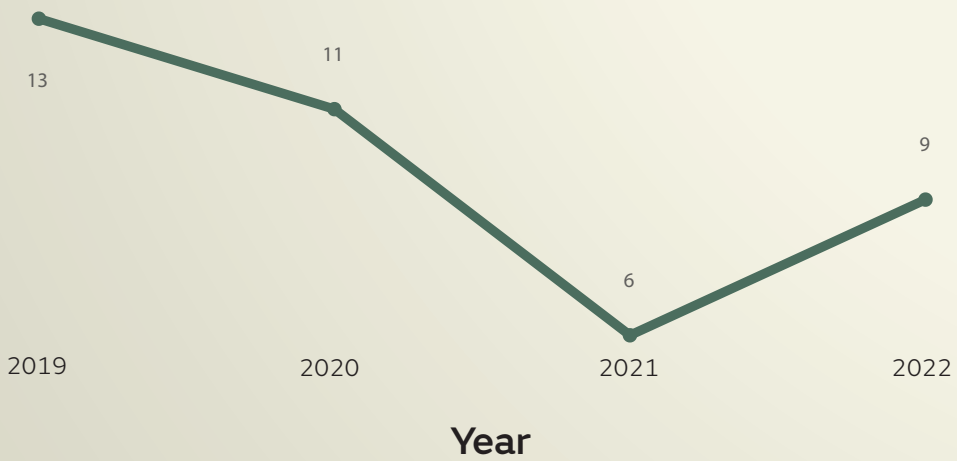


# SIDRA MEDICINE PEDIATRIC CANCER REGISTRY

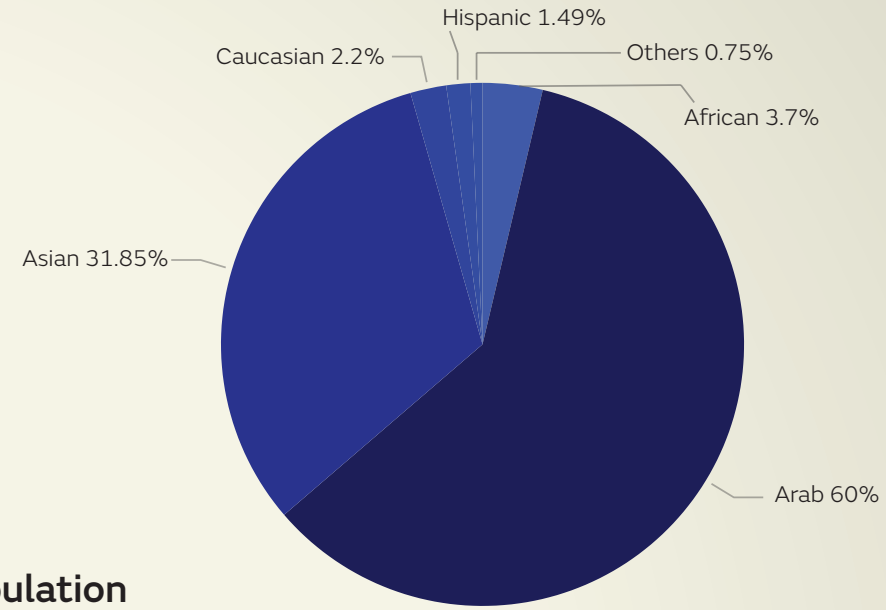
## Cancer Registry By Diagnosis Year



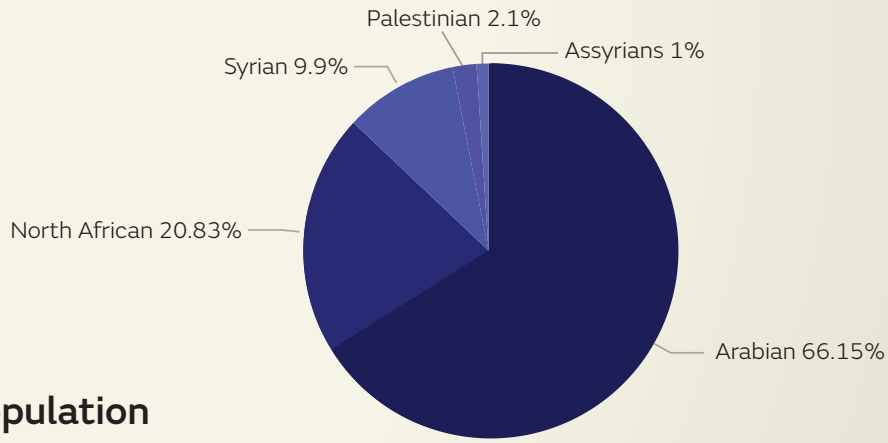

## Cancer Patients Treated Abroad By Year



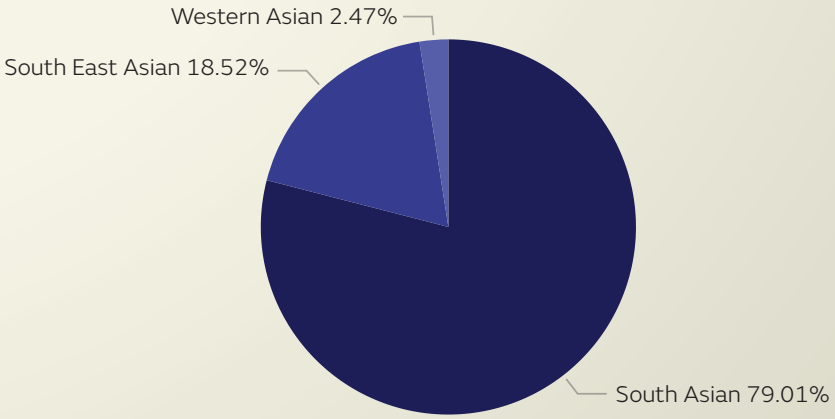
## Ethnicity Of Our Patients




## Arab Population




## Asian Population



# SPOTLIGHT: THE JOURNEY BEHIND UNDERSTANDING GENOMIC LANDSCAPE OF PEDIATRIC CANCER

## Dr. Shimaa details the genomic landscape of pediatric cancers based on her PhD studies and bioinformatics and genomic expertise:

"Computational biologists play a crucial role in enhancing patient outcomes in pediatric cancer research. By leveraging our expertise in bioinformatics and computational analysis, we can significantly contribute to the development of personalized treatment strategies and advancements in precision medicine.

We analyze large-scale genomic and clinical datasets, identifying genetic alterations, tumor subtypes, and potential therapeutic targets. Through integrative analysis, we can uncover patterns and associations that may not be readily apparent, providing valuable insights into the underlying biology of pediatric cancers.

My active involvement in research, particularly in the field of bioinformatics analysis of pediatric cancer patients, began during my PhD studies in the pediatric cancer omics lab at Sidra Medicine, where I was privileged to work under the guidance of Dr. Wouter Hendrickx.

My research focus was dedicated to understanding the immunogenomics of pediatric solid tumors and identifying potential therapeutic targets. During this journey, we built a collaborative network with clinicians, researchers, and bioinformaticians. Together, we developed and implemented computational pipelines for analyzing large-scale genomic datasets, uncovering valuable insights into the molecular underpinnings of pediatric solid tumors. Setting up the Sidra Pediatric Cancer Biobank was fraught with several challenges, particularly from the analysis perspective. One of the most significant issues was the rarity of Pediatric Cancer. Pediatric cancer is relatively rare compared to adult cancer, which makes it difficult to collect a sufficient number of samples from each tumor type. This scarcity of samples can limit the statistical power and generalizability

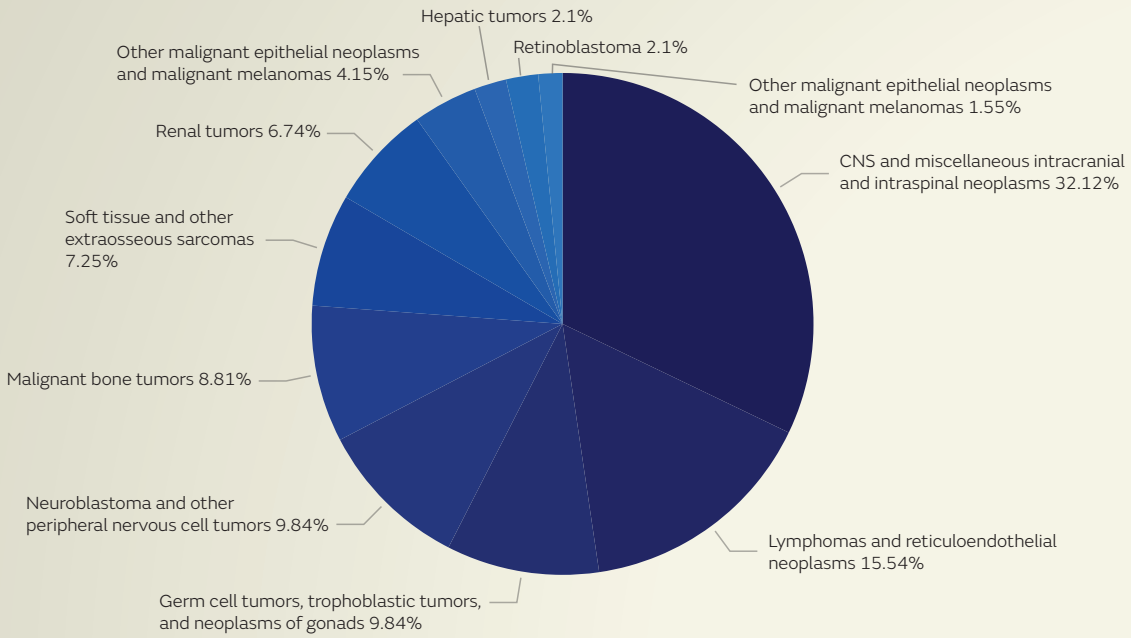
**Dr. Shimaa Sherif**
Computational Biologist
Sidra Medicine

of our research findings. Compounding the problem is the lack of large-scale, multi-omics online cohorts specific to pediatric solid tumors, which are readily available for some adult cancers.

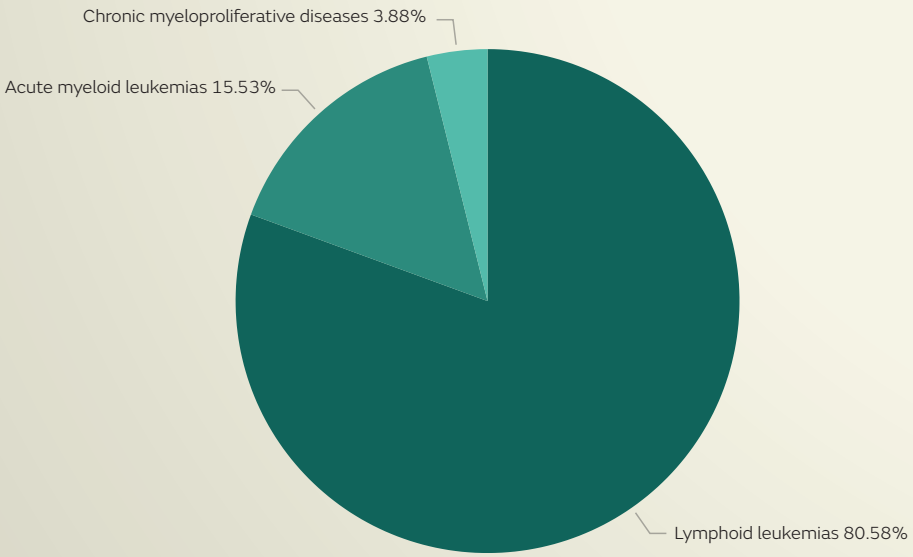
Having access to comprehensive datasets containing detailed clinical and genomic information from a significant number of pediatric cancer patients could greatly enhance our research efforts. Unfortunately, such resources are limited in the pediatric cancer field, which restricts our ability to leverage existing data for analysis. We also faced the challenge of the inherent heterogeneity of Pediatric Solid Tumors. These tumors encompass a diverse range of diseases with distinct genetic and molecular characteristics. This heterogeneity added another layer of complexity when setting up the biobank. To ensure representative sampling across various tumor types, we had to forge extensive collaborations and coordination with multiple hospitals and research centers. Moreover, sample collection was a significant issue. Ethical considerations and the need to minimize invasiveness make collecting samples from pediatric cancer patients particularly challenging. Invasive techniques required for obtaining samples from specific parts of the body may be more difficult to perform in pediatric patients. These challenges can limit the availability and diversity of samples in the biobank, potentially affecting the representation of certain tumor types.

To overcome these obstacles, we adopted a multidisciplinary approach. We collaborated with pediatric oncologists, research institutions, and relevant stakeholders, aiming to address these challenges and create a valuable resource for advancing our understanding of pediatric solid tumors and improving patient outcomes."

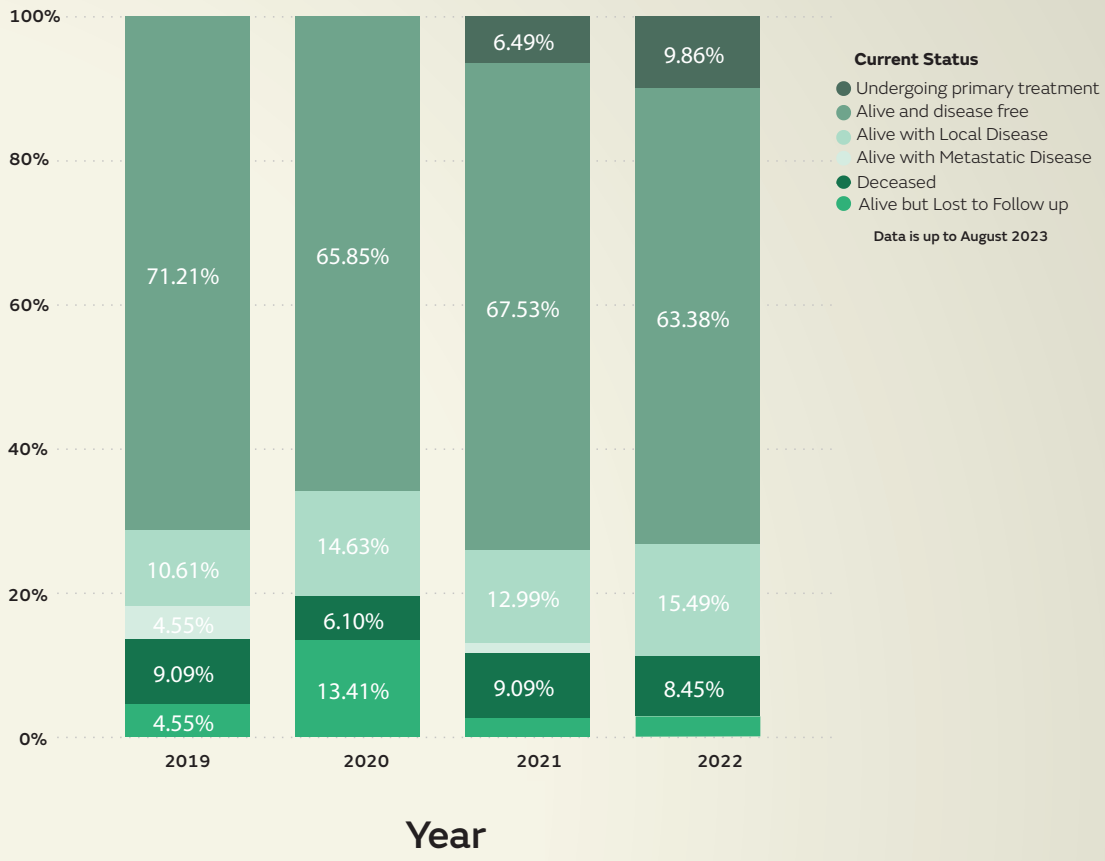
## Types of Pediatric Solid Cancer Presented at Sidra Medicine 2019 - 2022 (67%)



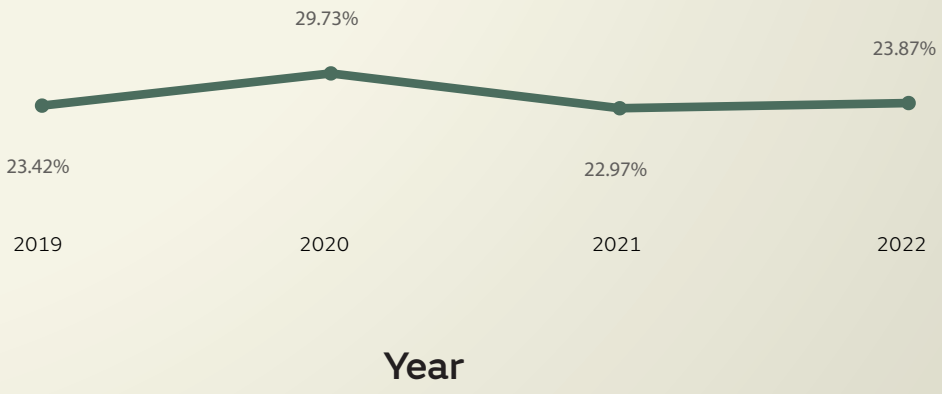

## Types of Pediatric non- Solid Cancer Presented at Sidra Medicine 2019 - 2022 (33%)



## Current Status of Pediatric Cancer Patients




## Patients with Metastasis at Diagnosis



# SPOTLIGHT: UNMASKING PEDIATRIC CANCER

## Dr. Ata Maaz, is an important member of our groundbreaking Pediatric Precision Oncology Program and discusses its impact:

"At Sidra Medicine, we see and treat a significant number of pediatric cancer cases— around 60-70 newly diagnosed children every year. In general, pediatric cancer cases have significantly better treatment outcomes compared to adult cancers. However, for a long time, we didn't fully understand the reason behind this differential. The presumption was that it might be due to our ability to deliver more intensive treatments to children and their better tolerance towards these treatments. Interestingly, with the evolution of our understanding of the genetic underpinnings of cancer, we're starting to unearth some important insights.

Pediatric cancers might actually possess biological differences from their adult counterparts—even when the anatomical and histological appearances seem very similar. This realization, though complex, opens up new avenues for research and targeted treatments. Precision Oncology studies, such as the one we're engaged in here, have the potential to not just underscore these differences but to use this knowledge to revolutionize treatment protocols and significantly improve patient outcomes.

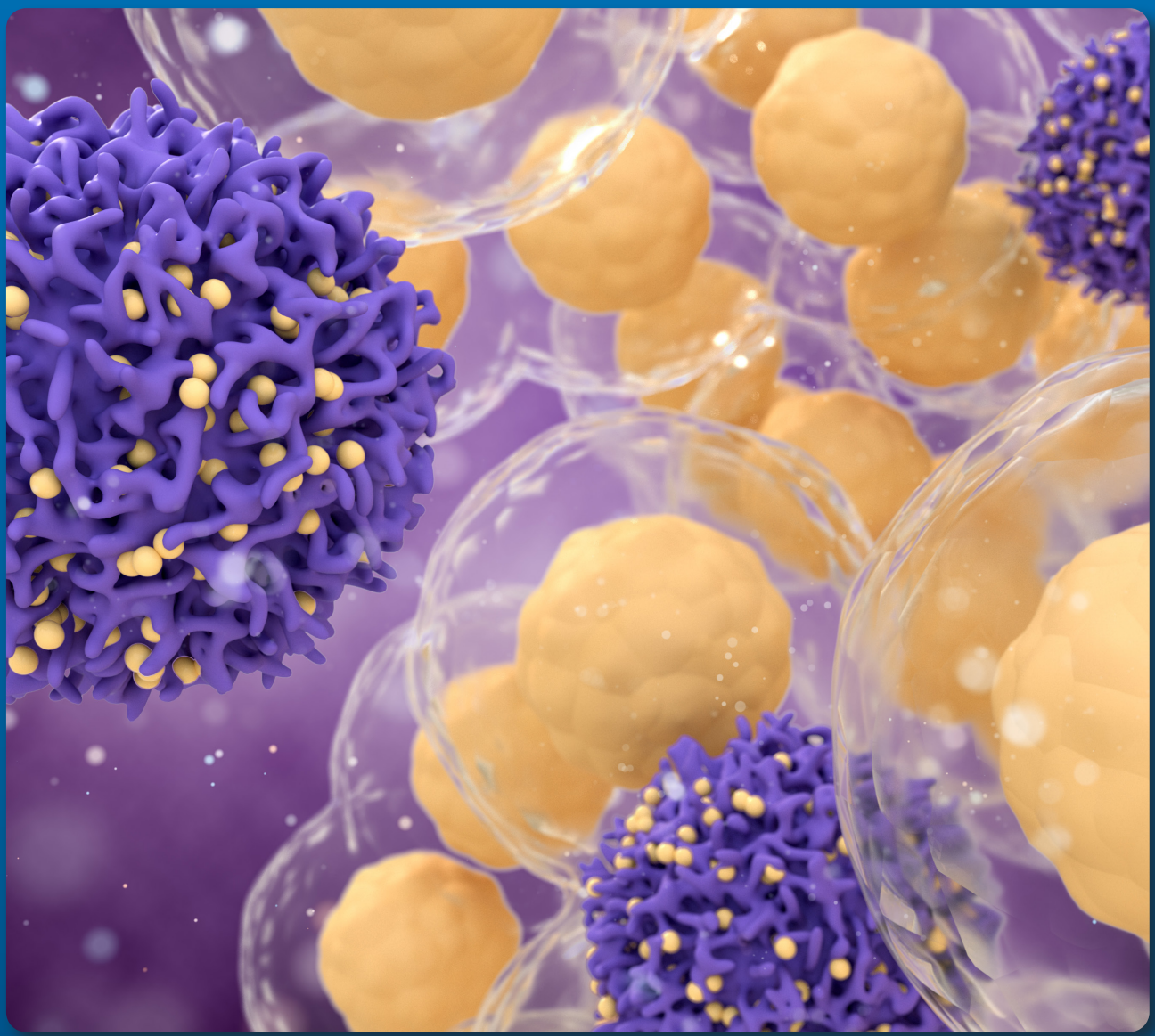
Each patient is unique and their care and case, illuminates different aspects of the scientific, personal, familial, or social facets of the battle against cancer.

One of my recent patients, a 5-year-old boy, was diagnosed with a very rare brain tumor. Technically categorized as a 'low-grade' cancer, this type of tumor can, however, have a severe impact on a patient's life—as was the case with this young boy. Diagnosis in such cases is challenging, but what's even more intricate is identifying the correct treatment modality that strikes a balance between achieving an adequate response and maintaining a good quality of life for the patient. This patient's diagnosis was facilitated by Sidra Medicine's cutting-edge neuro-radiology and neurosurgery capabilities, combined with detailed anatomical pathology studies.

**Dr. Ata Ur Maaz**
Senior Attending Physician (Oncology)
Sidra Medicine

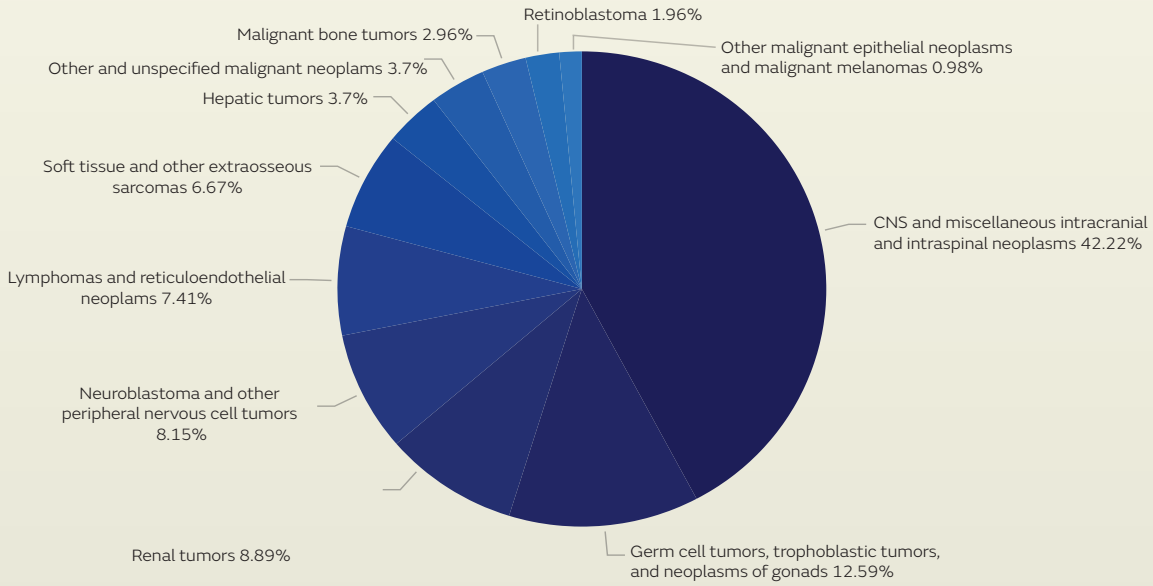
These initial findings were then validated by molecular diagnostic tests that have recently been established as part of our continual advancement in medical technology. In a wonderful turn of events, these tests not only confirmed the diagnosis but also helped us identify a 'target' against which a new class of drugs had shown efficacy. The boy is now on this targeted treatment, and we are fervently hoping for an adequate response to this approach.

It's important to mention that studies like the one we're engaged in can play a monumental role in identifying such treatment targets and contributing to the development of newer, more effective drugs and treatment protocols. This is the potential of medical research and progress in the realm of pediatric oncology which is a potential we are constantly striving to fulfill."

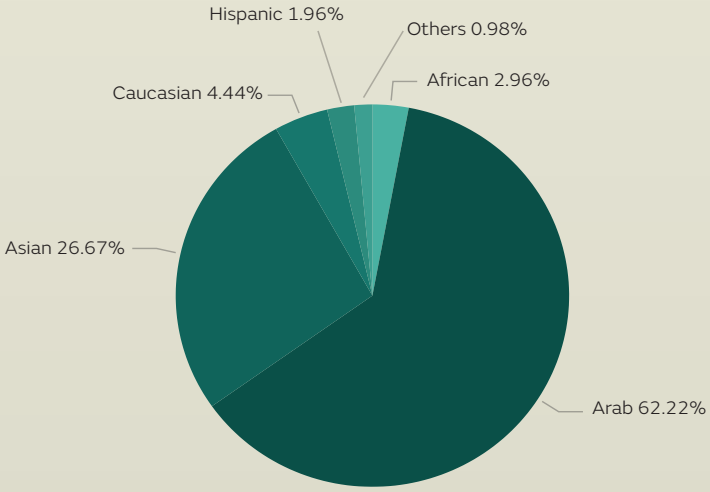


# BIOBANK DATA

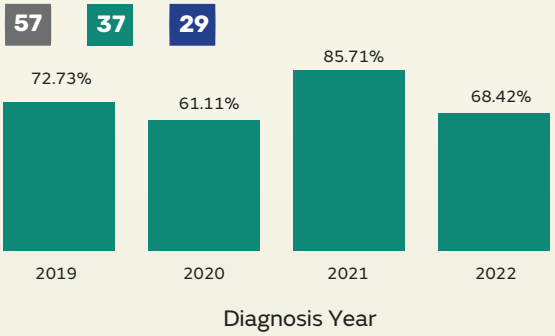
## Types of Pediatric Cancer Included in the Sidra Medicine Biobank



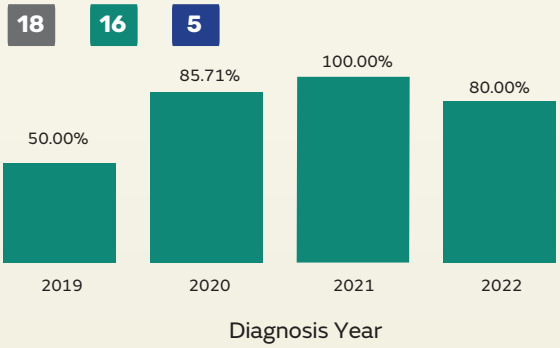

## Biobank Ethnicity



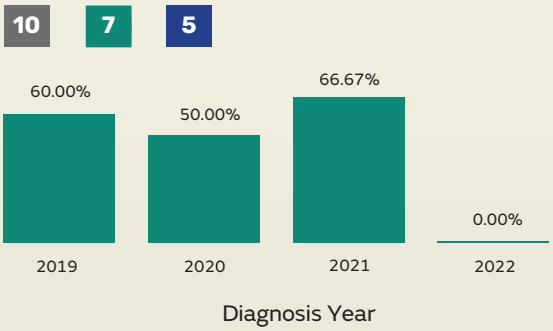
## Consent rate for CNS and intracranial and intraspinal neoplasms



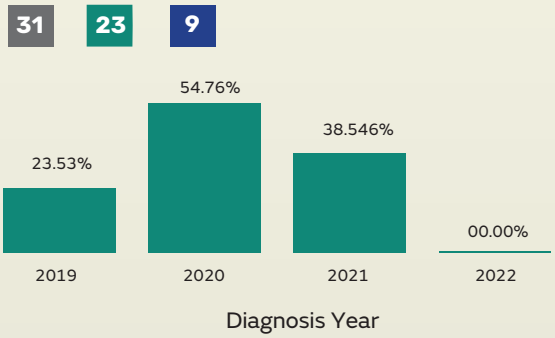

## Consent rate for Germ cell tumors, trophoblastic tumors, and neoplasms



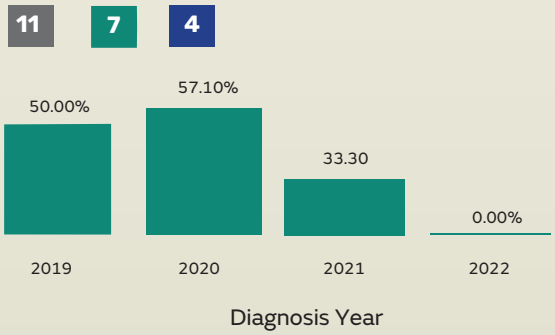

## Consent rate for Soft tissue and other extraosseous sarcomas



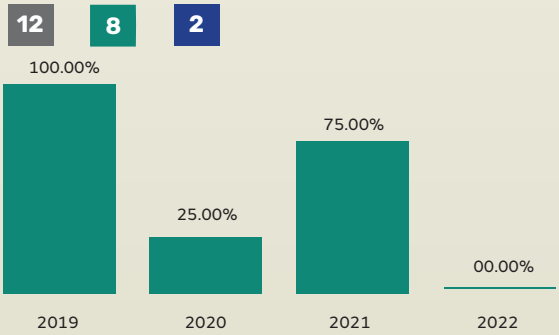

## Consent rate for Other solid tumors



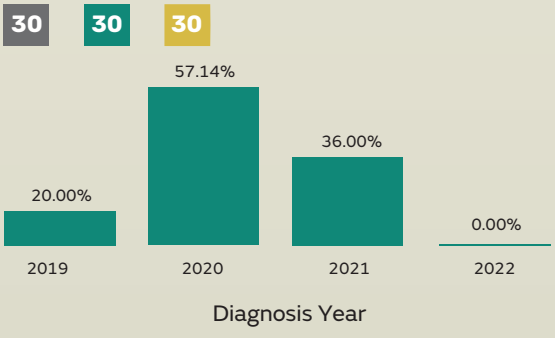

## Consent rate for Neuroblastoma and other peripheral nervous cell tumors



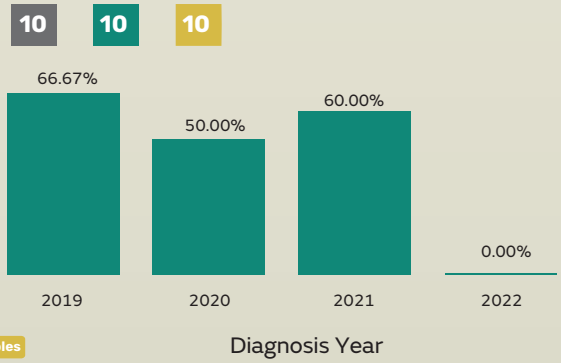

## Consent rate for renal tumors




## Consent rate for Lymphoid leukemias




## Consent rate for Acute myeloid leukemias




Total Consented Patients | Avaliable Blood Samples | Avaliable Tumour Samples | Avaliable Bone Marrow Samples

Data is up to August 2023

# SPOTLIGHT: THE ROLE OF PEDIATRIC PATHOLOGY

Dr. William Mifsud talks about the collaborative spirit at Sidra Medicine and how his role in clinical pathology and active research, can bridge scientific discoveries in the lab and their practical application at the bedside:


**Dr. William Mifsud**
Attending Physician (Anatomical Pathology)
Sidra Medicine

"The role of a pathologist is critical in the diagnostic process, especially when it comes to diseases like cancer. Most, if not all, cancer diagnoses require a tissue diagnosis made by a pathologist. This meticulous work allows us to guide the treatment that is most appropriate for each individual patient. It's this initial step that sets the course for the entire treatment journey. In a research setting, this principle extends further.

I view my role as a pediatric pathologist in a leading children's hospital like Sidra Medicine as a distinctive privilege. Here, we are surrounded by an expansive and dynamic research community, which is an integral part of our ecosystem. Over the years, I've had the opportunity to involve myself in a multitude of research projects. But those that have always piqued my interest are tied to pediatric cancer research. It's a field that is continually evolving, offering new insights into the disease, and I'm proud to contribute to this important body of knowledge.

What resonates with me the most about working at Sidra Medicine, is the powerful sense of teamwork that permeates every aspect of our work. We have

cultivated an environment where integration is key from the consultation rooms of the clinic to the technical quarters of my diagnostic laboratory, right up to the buzzing hub of the research laboratories. It's been an honor to have played a part in establishing this collaborative team along with my esteemed colleagues, all of whom are driven by a shared vision of pushing the boundaries of pediatric healthcare.

Being a part of a collaborative team is not only about understanding our research findings but to contextualize these findings within the unique clinical scenario of each patient. It's about connecting the dots between our scientific discoveries in the lab and their practical application at the bedside. But our work doesn't stop there. In the longer term, we delve into retrospective analysis, studying how our patients responded to their treatment. This isn't merely a process of review; it's a learning curve, an opportunity to glean insights on what worked, what didn't, and why. It's through this systematic evaluation that we continue to refine our strategies, paving the way for improved treatment protocols for future patients.

Thus, as a clinical research pathologist, my role becomes instrumental in the continuous cycle of learning and improving in pediatric healthcare. It's about linking research and practice, learning from every patient, every case, and leveraging this knowledge to drive better health outcomes not only for our current patients but for generations to come."

# PATIENTS' REPORTS

## 1- Personal Cancer Genome Reporter (PCGR)

Somatic mutations are changes to a person's DNA that occurs after conception to any cell that isn't a germ cell (egg or sperm cell). Somatic or acquired genomic variants are the most common cause of cancer. In the SPCB, we are generating a PCGR report for each patient that interprets both somatic SNVs/InDels and copy number aberrations. The prioritization of SNV and InDels found in the tumor sample is done according to a four-tiered structure, adopting the joint consensus recommendation by Association for Molecular Pathology and American College of Medical Genetics and Genomics.

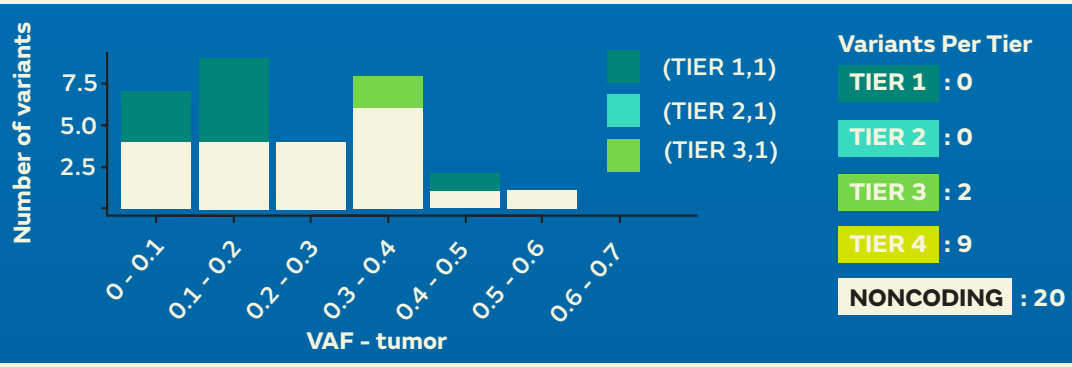
A) Tier 1: Variants of strong clinical significance - constitutes variants linked to predictive, prognostic, or diagnostic biomarkers.

B) Tier 2: Variants of potential clinical significance - constitutes other variants linked to predictive, prognostic, or diagnostic biomarkers.

C) Tier 3: Variants of uncertain clinical significance - includes other coding variants found in oncogenes or tumor suppressor genes.

D) Tier 4: includes other coding variants.

**Allelic Support Plot**




**Variants Per Tier**

- TIER 1 : 0
- TIER 2 : 0
- TIER 3 : 2
- TIER 4 : 9
- NONCODING : 20

TIER CLASSIFICATION

**Global Variant Datatable**

| | Symbol | Consequence | Protein Change | Variant Class | Tier |
|---|---|---|---|---|---|
| 1 | FGFR1 | missense_variant | p.Lys687Asn | SNV | TIER 3 |
| 2 | FGFR1 | missense_variant | p.Asn577Lys | SNV | TIER 3 |
| 3 | MYO3B | missense_variant | p.His361Asn | SNV | TIER 4 |
| 4 | SCN5A | frameshift_variant | p.Arg1362SerfsTer12 | deletion | TIER 4 |

Overview of Somatic Mutation

The PCGR include relevant ongoing or future clinical trials, focusing on studies with molecularly targeted interventions.

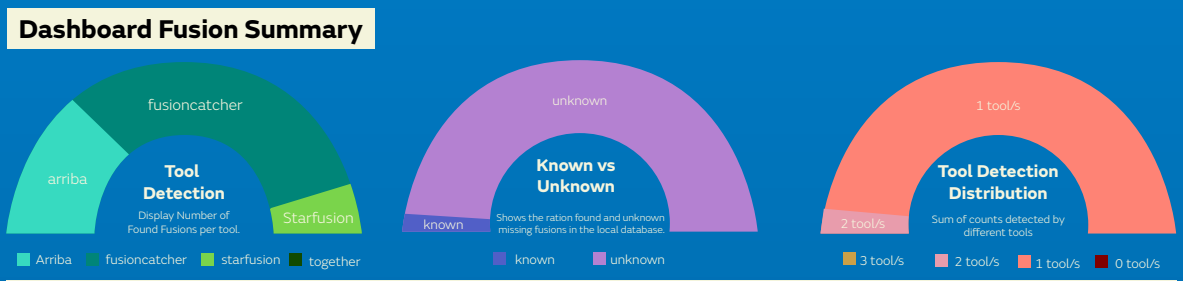
**Molecularly Targeted Trials**

| | NCT ID | TITLE | OVERALL STATUS | CONDITION | KEYWORD | INTERVENTION | PHASE |
|---|---|---|---|---|---|---|---|
| 1 | NCT02887040 | Study of Antineoplaston Therapy + Radiation vs. Radiation Only in Diffuse, Intrinsic, Brainstem Glioma | Not Yet Recruiting | Brainstem glioma | Radiotherapy | Antineoplaston A10, Antineoplaston AS2-1 | 3 |
| 2 | NCT04425798 | Connectivity Alterations After Levetiracetam Application | Not Yet Recruiting | glioma | Radiotherapy | | |
| 3 | NCT02432417 | The Addition of Chloroquine to Chemoradiation for Glioblastoma | Not Yet Recruiting | Glioblasoma | Chemoradioheraphy Immunotheraphy Radiotherapy | Chloroquine | 2 |

Clinical trials for these mutations

## 2- Fusion reports

A **fusion gene** is defined as two genes that are joined so that they are transcribed and translated as a single unit. Fusion proteins produced by this change may lead to the development of some types of cancer.
For the SPCB, we are generating a fusion report for each patient through implementing a bioinformatics analysis pipeline for RNA sequencing using list of tools for detecting and visualizing fusion genes.




**List of Detected Fusions**

| Fusion Gene | Found in DB | Arriba | Fusioncatcher | Starfusion | Tools Hits | Score |
|---|---|---|---|---|---|---|
| ARL17A--KANSL1 | FusionGDB | ✗ | ✓ | ✓ | 2 | 0.243 |
| KANSL1--ARL17A | FusionGDB | ✗ | ✓ | ✓ | 2 | 0.243 |

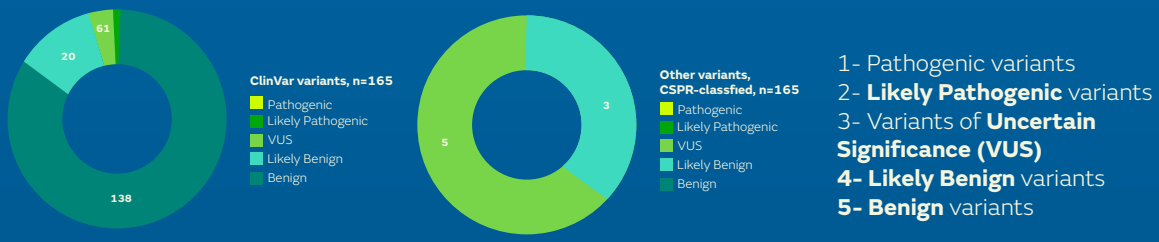
## 3- Cancer Predisposition Sequencing Reporter (CPSR)

**Cancer predisposition gene is a term** used to describe a gene that may increase a person's risk of developing some types of cancer if it has certain mutations (changes).
For the SPCB, we are generating a CPSR for each patient. The CPSR is a computational workflow that interprets and classifies germline DNA variants identified from next-generation sequencing in the context of cancer predisposition and inherited cancer syndromes.

### Variants Classification

Pathogenic variant is a genetic alteration that increases an individual's susceptibility or predisposition to a certain disease or disorder.

Variants are classified based on the pathogenicity into different classes ordered by highest pathogenicity:




1- Pathogenic variants
2- **Likely Pathogenic** variants
3- Variants of **Uncertain Significance (VUS)**
**4- Likely Benign** variants
**5- Benign** variants

**Likely Pathogenic Variant Detected in One of SPCB Patients**

| SYMBOL | CLINVAR PHENOTYPE | CONSEQUENCE | PROTEIN CHANGE | GENOTYPE |
|---|---|---|---|---|
| MUTYH | Colon cancer; Endometrial cancer; Hereditary cancer -predisposing syndrome; Neoplasm of stomach; Pilomatrixoma; Breast carinomaa; Carcinoma of colon; Small intestine carcinoid; MYH-associated polyposis; Ovarian carcinoma; Colorectal adenomatous polyposis, autosomal recessive, with pilomatricomas; not specified; not provided | missense_variant, splice_region_variant | p.Gly368Asp | heterozygous |

# SPOTLIGHT: CHAMPIONING HOPE FOR CANCER PATIENTS

**Dr. Hadi Rasheed talks about the role of Qatar Cancer Society and its collaboration with Sidra Medicine in improving the lives of children dealing with cancer:**

"Qatar Cancer Society plays a crucial and compassionate role in improving the lives of children dealing with cancer and their families. Pediatric cancer patients face unique challenges, and we tailor our programs to their needs. The financial burden of cancer treatment can be immense. Qatar Cancer Society provides vital financial aid, easing this burden and ensuring access to advanced treatments that might otherwise be out of reach. We also fund medical equipment, aids, and prosthetics, creating a more comfortable treatment environment.

We also provide a safe space for children and their families to connect with others facing similar challenges, countering the isolation often linked to the disease. Emotional well-being is vital for these young fighters. Activities like art therapy, music therapy, and play therapy offer valuable support during treatment. By collaborating with Sidra Medicine, we direct funds to research projects specifically focused on pediatric cancers, aiming to ease the challenges for both children and their families. We also advocate for increased government funding and attention toward childhood cancers.

As the Scientific Advisor and Head of the Cancer Awareness and Professional Development Department, I orchestrate events, seminars, and workshops to share vital information about different cancers. This includes educating the

**Dr. Hadi Mohamad Abu Rasheed**
Head of Cancer Awareness and Professional Development Dept.
Qatar Cancer Society

ensuring access to insights and financial aid.

Our support includes providing families with resources to navigate the complexities of a cancer diagnosis. We organize outings and events to give children with cancer moments of normalcy, relaxation, and joy. We have also partnered with Uber, to provide transportation services for cancer patients, ensuring easy access to treatment centers.

We have collaborative campaigns with

Sidra Medicine, to highlight pediatric cancers, advocating for better policies, funding, and providing support at various levels. These initiatives underscore our commitment to enhancing the lives of these young fighters.

Supporting conferences, workshops, and symposiums organized by Sidra Medicine also fosters the exchange of knowledge among experts. By raising awareness about the unique research needs of childhood cancer, we aim to influence public opinion, driving policy changes and funding priorities. Our direct connection with cancer patients and their families acts as a bridge, offering invaluable real-world insights to researchers and steering their work toward addressing patients' needs.

As a result, Qatar Cancer Society has emerged as a trailblazer in advancing cancer research in recent years. Our unwavering commitment is evident through substantial funding for collaborative research ventures. These initiatives often target areas that might be overlooked or underfunded elsewhere.

Our contributions extend beyond scientific research, encompassing studies that improve quality of life and explore public perceptions of cancer. We have the power to bring together diverse researchers from different institutions, specialties, and even countries to collaborate, spurring joint efforts to propel cancer research forward.

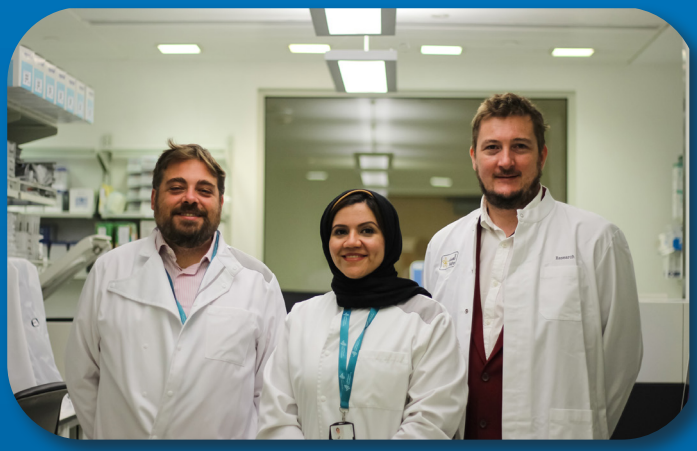
At Qatar Cancer Society, we envision a future where every cancer diagnosis is tailored meticulously to the individual, resulting in precise, effective, and compassionate treatments. We believe in multidisciplinary collaboration and the advancement of precision medicine techniques to enhance patient outcomes and experiences."

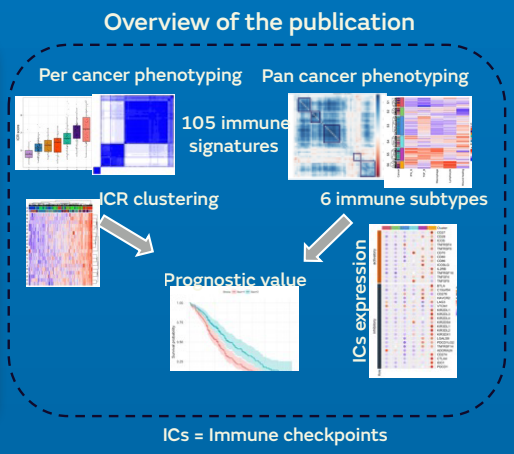
# PUBLICATION HIGHLIGHT

***In May 2022 our team published the immune landscape of solid pediatric tumors paper.***

## The Immune Landscape of Solid Pediatric Tumors

Shimaa Sherif, Jessica Roelands, William Mifsud, Eiman I. Ahmed, Christophe M. Raynaud, Darawan Rinchai, Abbirami Sathappan, Ata Maaz, Ayman Saleh, Erdener Ozer, Khalid A. Fakhro, Borbala Mifsud, Vésteinn Thorsson, Davide Bedognetti & Wouter R. L. Hendrickx






In this study, we analyzed data from pediatric tumors to understand the role of the immune system in these diseases. We focused on five types of tumors: Wilms tumor, neuroblastoma, osteosarcoma, clear cell sarcoma of the kidney, and rhabdoid tumor of the kidney.

Using advanced bioinformatics pipelines, we assessed the performance of the Immunologic Constant of Rejection (ICR), which captures the immune response against the tumor. We also analyzed the expression of genes related to the immune system and identified different immune subtypes within the tumors.

The results revealed interesting insights. In osteosarcoma and high-risk neuroblastoma cases without MYCN gene amplification, a higher ICR score was associated with better survival. However, in Wilms tumor, a higher ICR score correlated with poorer survival.

By clustering the immune traits, we identified six distinct immune subtypes among pediatric patients. The subtype with high infiltration of Th1 cells showed the best overall survival.

These findings suggest that pediatric tumors can be classified based on their immune characteristics, showing similarities to adult tumors. We propose that exploring immunological parameters could help refine diagnostic and prognostic biomarkers and identify tumors that might respond well to immune-based therapies.

This study contributes to our understanding of the immune landscape of pediatric tumors and opens up possibilities for improving treatment strategies and patient outcomes in the future.

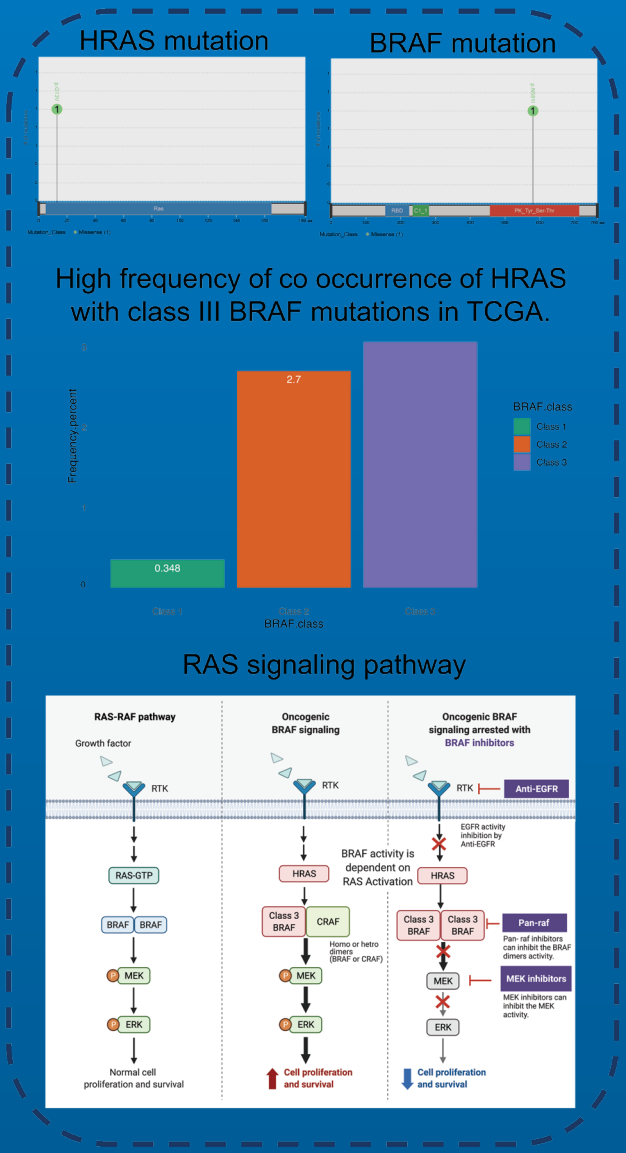
*Recent Case Report*

# Identification of unusual actionable mutations through genomic profiling in a child with an aggressive sarcoma.

Shimaa Sherif, Wouter R. L. Hendrickx, Christophe Raynaud, William Mifsud, Davide Bedognetti, Ata Maaz.

## Case presentation

A 3-year-old male child was diagnosed with embryonal rhabdomyosarcoma (ERMS) of the neck at Sidra Medicine. Initial stage-based chemotherapy resulted in tumor progression. Unexpectedly, we identified somatic mutations in two genes of the RAS/MAPK pathway (BRAF and HRAS), which are classically mutually exclusive. A clinical-grade NGS was performed that confirmed both mutations. The identified BRAF mutation (N581I) is a non-classical (Class III) hot-spot mutation, that has not been previously reported in ERMS. Class III BRAF mutations are a novel group of mutations characterized by the induction of a low tyrosine kinase activity and require coexistent mechanisms for maintaining RAS activation through feedback mechanisms. While our patient has subsequently achieved complete remission following intensified treatment, the risk of relapse remains high and this information might be considered for therapeutic decision at further relapse/ progression.




Here we are reporting for the first time to our knowledge the co-occurring of BRAF and HRAS mutations in an RMS patient. The hypothesized biological rationale of this combination is the dependence of class III BRAF mutation (Asn581Ile) on Ras activation as postulated previously. Identifying BRAF alterations in pediatric cancers is critically important as therapeutic agents targeting BRAF or MEK may be incorporated into the clinical management of these patients.

# CANCER PUBLICATIONS 2019 - 2022

## PEDIATRIC CANCER

Vujanić GM, Mifsud W, Chowdhury T, Al-Saadi R, Pritchard-Jones K; Renal Tumour Special Interest Group of the Children's Cancer and Leukaemia Group.
**Characteristics and outcomes of preoperatively treated patients with anaplastic Wilms tumors registered in the UK SIOP-WT-2001 and IMPORT study cohorts (2002-2020)**
Cancer, 2022
PMID35119702

Mifsud W, Furtwängler R, Vokuhl C, D'Hooghe E, Pritchard-Jones K, Graf N, Vujanić GM.
**Treatment of patients with stage I focal anaplastic and diffuse anaplastic Wilms tumour: A report from the SIOP-WT-2001 GPOH and UK-CCLG studies**
European Journal Of Cancer, 2022
PMID35255331

Vujanić GM, Parsons LN, D'Hooghe E, Treece AL, Collini P, Perlman EJ.
**Pathology of Wilms' tumour in International Society of Paediatric Oncology (SIOP) and Children's oncology group (COG) renal tumour studies: Similarities and differences**
Histopathology, 2022
PMID35275409

Denize T, Massa S, Valent A, Militti L, Bertolotti A, Barisella M, Rioux-Leclercq N, Malouf GG, Spreafico F, Verschuur A, van der Beek J, Tytgat L, van den Heuvel-Eibrink MM, Vujanic G, Collini P, Coulomb A.
**Renal cell carcinoma in children and adolescents: a retrospective study of a French-Italian series of 93 cases**
Histopathology, 2022
PMID35238063

Khan MR, Maaz AUR, Ashraf MS.
**Challenges in the Management of Wilms Tumor in a Developing Country: A Twenty Years' Experience From a Single Center in Pakistan**
Journal Of Pediatric Hematology Oncology, 2022
PMID35917164

Abdelhafeez AH, Reljic T, Kumar A, Banu T, Cox S, Davidoff AM, Elgendy A, Ghandour K, Gerstle JT, Karpelowsky J, Kaste SC, Kechiche N, Esiashvili N, Nasir A, Ngongola A, Marollano J, Moreno AA, Muzira A, Parkes J, Saldaña LJ, Shalkow J, Vujanić GM, Velasquez T, Lakhoo K, Mukkada S, Abib S.
**Evidence-based surgical guidelines for treating children with Wilms tumor in low-resource settings**
Pediatric Blood & Cancer, 2022
PMID35929184

Fialkowski E, Sudour-Bonnange H, Vujanic GM, Shamberger RC, Chowdhury T, Aldrink JH, Davick J, Sandberg J, Furtwaengler R, Mullen E.
**The varied spectrum of nephroblastomatosis, nephrogenic rests, and Wilms tumors: Review of current definitions and challenges of the field**
Pediatric Blood & Cancer, 2022
PMID36545945

de Aguirre-Neto JC, de Camargo B, van Tinteren H, Bergeron C, Brok J, Ramírez-Villar G, Verschuur A, Furtwängler R, Howell L, Saunders D, Olsen O, Coulomb A, Vokuhl C, Godzinski J, Smets AM, Vujanic GM, van den Heuvel-Eibrink MM, Graf N, Pritchard-Jones K.
**International Comparisons of Clinical Demographics and Outcomes in the International Society of Pediatric Oncology Wilms Tumor 2001 Trial and Study** , 2022
PMID35537105

Graf N, Bergeron C, Brok J, de Camargo B, Chowdhury T, Furtwängler R, Gessler M, Godzinski J, Pritchard-Jones K, Ramirez-Villar GL, Rübe C, Sandstedt B, Schenk JP, Spreafico F, Sudour-Bonnange H, van Tinteren H, Verschuur A, Vujanic G, van den Heuvel-Eibrink MM.
**Fifty years of clinical and research studies for childhood renal tumors within the International Society of Pediatric Oncology (SIOP)**
Annals Of Oncology, 2021
PMID34416363

Hol JA, Jongmans MCJ, Sudour-Bonnange H, Ramírez-Villar GL, Chowdhury T, Rechnitzer C, Pal N, Schleiermacher G, Karow A, Kuiper RP, de Camargo B, Avcin S, Redzic D, Wachtel A, Segers H, Vujanic GM, van Tinteren H, Bergeron C, Pritchard-Jones K, Graf N, van den Heuvel-Eibrink MM, International Society of Pediatric Oncology Renal Tumor Study Group (SIOP-RTSG).,
**Clinical characteristics and outcomes of children with WAGR syndrome and Wilms tumor and/or nephroblastomatosis: The 30-year SIOP-RTSG experience.**
Cancer Research, 2021
PMID33146894

van der Beek JN, Hol JA, Coulomb-l'Hermine A, Graf N, van Tinteren H, Pritchard-Jones K, Houwing ME, de Krijger RR, Vujanic GM, Dzhuma K, Schenk JP, Littooij AS, Ramírez-Villar GL, Murphy D, Ray S, Al-Saadi R, Gessler M, Godzinski J, Ruebe C, Collini P, Verschuur AC, Frisk T, Vokuhl C, Hulsbergen-van de Kaa CA, de Camargo B, Sandstedt B, Selle B, Tytgat GAM, van den Heuvel-Eibrink MM,
**Characteristics and outcome of pediatric renal cell carcinoma patients registered in the International Society of Pediatric Oncology (SIOP) 93-01, 2001 and UK-IMPORT database: A report of the SIOP-Renal Tumor Study Group.**
International Journal Of Cancer, 2021
PMID33460450

Dzhuma K, Powis M, Vujanic G, Watson T, Olsen O, Shelmerdine S, Oostveen M, Brok J, Irtan S, Williams R, Tugnait S, Smeulders N, Mushtaq I, Chowdhury T, Al-Saadi R, Pritchard-Jones K.
**Surgical management, staging, and outcomes of Wilms tumours with intravascular extension: Results of the IMPORT study**
Journal Of Pediatric Surgery, 2021
PMID34565577

Spreafico F, Fernandez CV, Brok J, Nakata K, Vujanic G, Geller JI, Gessler M, Maschietto M, Behjati S, Polanco A, Paintsil V, Luna-Fineman S, Pritchard-Jones K.
**Wilms tumour**
Nature Reviews Disease Primers, 2021
PMID34650095

Nakata K, Williams R, Kinoshita Y, Koshinaga T, Moroz V, Al-Saadi R, Vujanic G, Oue T, Pritchard-Jones K,
**Comparative analysis of the clinical characteristics and outcomes of patients with Wilms tumor in the United Kingdom and Japan.**
Pediatric Blood & Cancer, 2021
PMID34056846

Ooms AHAG, Vujanić GM, D'Hooghe E, Collini P, L'Herminé-Coulomb A, Vokuhl C, Graf N, Heuvel-Eibrink MMVD, de Krijger RR,
**Renal Tumors of Childhood-A Histopathologic Pattern-Based Diagnostic Approach.**
Cancers (Basel), Cancers, 2020
PMID32204536

Maaz AUR, Yousif T, Saleh A, Pople I, Al-Kharazi K, Al-Rayahi J, Elkum N, Malik M,
**Presenting symptoms and time to diagnosis for Pediatric Central Nervous System Tumors in Qatar: a report from Pediatric Neuro-Oncology Service in Qatar.**
Childs Nervous System, 2020
PMID32710251

Pasqualini C, Furtwängler R, van Tinteren H, Teixeira RAP, Acha T, Howell L, Vujanic G, Godzinski J, Melchior P, Smets AM, Coulomb-L'Hermine A, Brisse H, Pritchard-Jones K, Bergeron C, de Camargo B, van den Heuvel-Eibrink MM, Graf N, Verschuur AC,
**Outcome of patients with stage IV high-risk Wilms tumour treated according to the SIOP2001 protocol: A report of the SIOP Renal Tumour Study Group.**
European Journal Of Cancer, 2020
PMID32109849

D'Hooghe E, Mifsud W, Vujanić GM.
**"Teratoid" Wilms Tumor: The Extreme End of Heterologous Element Differentiation, Not a Separate Entity.**
American Journal Of Surgical Pathology, 2019
PMID31600178

Irtan S, Van Tinteren H, Graf N, van den Heuvel-Eibrink MM, Heij H, Bergeron C, de Camargo B, Acha T, Spreafico F, Vujanic G, Powis M, Okoye B, Wilde J, Godzinski J, Pritchard-Jones K,
**Evaluation of needle biopsy as a potential risk factor for local recurrence of Wilms tumour in the SIOP WT 2001 trial.**
European Journal Of Cancer, 2019
PMID31163337

Vujanić GM, Gessler M, Ooms AHAG, Collini P, Coulomb-l'Hermine A, D'Hooghe E, de Krijger RR, Perotti D, Pritchard-Jones K, Vokuhl C, van den Heuvel-Eibrink MM, Graf N; International Society of Paediatric Oncology-Renal Tumour Study Group (SIOP-RTSG).
**Publisher Correction: The UMBRELLA SIOP-RTSG 2016 Wilms tumour pathology and molecular biology protocol**
Nature Reviews Urology, 2019
PMID31043716

Fajardo RD, van den Heuvel-Eibrink MM, van Tinteren H, Spreafico F, Acha T, Bergeron C, de Camargo B, Oldenburger F, Rübe C, Oue T, Vokuhl C, de Krijger RR, Vujanic G, Sebire N, Coulomb-L'Hermine A, Collini P, Gandola L, Pritchard-Jones K, Graf N, Janssens GO, van Grotel M.
**Is radiotherapy required in first-line treatment of stage I diffuse anaplastic Wilms tumor? A report of SIOP-RTSG, AIEOP, JWiTS, and UKCCSG.**
Pediatric Blood & Cancer, 2019
PMID31625685

Al-Rawahi GN, Al-Najjar A, McDonald R, Deyell RJ, Golding GR, Brant R, Tilley P, Thomas E, Rassekh SR, O'Gorman A, Wong P, Turnham L, Dobson S.
**Pediatric oncology and stem cell transplant patients with healthcare-associated Clostridium difficile infection were already colonized on admission.**
Pediatric Blood & Cancer, 2019
PMID30666782

Jackson TJ, Powis M, Vujanic GM, Pritchard-Jones K.
**Reply to the Letter to the Editor: Renal tumors in children older than 10 years-Should we be doing upfront nephrectomy?**
Pediatric Blood & Cancer, 2019
PMID30989781

Furlong E, Jensen J, Woodard M, Griffiths K, Knight G, Sturm M, Kerr F, Gough H, Bear N, Carter TL, Cole CH, Kotecha RS, Ramachandran S.
**Optimized peripheral blood progenitor cell mobilization for autologous hematopoietic cell transplantation in children with high-risk and refractory malignancies.**
Pediatric Transplantation, 2019
PMID31631445

Hol JA, Lopez-Yurda MI, Van Tinteren H, Van Grotel M, Godzinski J, Vujanic G, Oldenburger F, De Camargo B, Ramírez-Villar GL, Bergeron C, Pritchard-Jones K, Graf N, Van den Heuvel-Eibrink MM.
**Prognostic significance of age in 5631 patients with Wilms tumour prospectively registered in International Society of Paediatric Oncology (SIOP) 93-01 and 2001.**
Plos One, 2019
PMID31425556

## CANCER IMMUNOLOGY

Bhat AA, Nisar S, Singh M, Ashraf B, Masoodi T, Prasad CP, Sharma A, Maacha S, Karedath T, Hashem S, Yasin SB, Bagga P, Reddy R, Frennaux MP, Uddin S, Dhawan P, Haris M, Macha MA.
**Cytokine- and chemokine-induced inflammatory colorectal tumor microenvironment: Emerging avenue for targeted therapy**
Cancer Communications, 2022
PMID35791509

Bertucci F, Niziers V, de Nonneville A, Finetti P, Mescam L, Mir O, Italiano A, Le Cesne A, Blay JY, Ceccarelli M, Bedognetti D, Birnbaum D, Mamessier E.
**Immunologic constant of rejection signature is prognostic in soft-tissue sarcoma and refines the CINSARC signature**
Journal For Immunotherapy Of Cancer, 2022
PMID35017155

Shimaa Sherif , Jessica Roelands , William Mifsud , Eiman I Ahmed , Christophe M Raynaud , Darawan Rinchai , Abbirami Sathappan , Ata Maaz , Ayman Saleh , Erdener Ozer , Khalid A Fakhro , Borbala Mifsud , Vésteinn Thorsson , Davide Bedognetti , Wouter R L Hendrickx
**The immune landscape of solid pediatric tumors**
Journal Of Experimental & Clinical Cancer Research, 2022
PMID35690832

Sherif S, Mall R, Almeer H, Naik A, Al Homaid A, Thomas R, Roelands J, Narayanan S, Mohamed MG, Bedri S, Al-Bader SB, Junejo K, Bedognetti D, Hendrickx W, Decock J.
**Immune-related 3-lncRNA signature with prognostic connotation in a multi-cancer setting**
Journal Of Translational Medicine, 2022
PMID36180904

Jessica Reolands, Davide Bedognetti
**Analytic pipelines to assess the relationship between immune response and germline genetics in human tumors**
, 2022
PMID36595917

Sharma T, Gupta A, Chauhan R, Bhat AA, Nisar S, Hashem S, Akhtar S, Ahmad A, Haris M, Singh M, Uddin S.
**Cross-talk between the microbiome and chronic inflammation in esophageal cancer: potential driver of oncogenesis**
, 2022
PMID35511379

Macha MA, Wani NA, Ganai RA, Bhat AA, Hamid A, Hashem S, Haris M, Chauhan SS, Zargar MA, Batra SK.
**Recent Advances in Head and Neck Tumor Microenvironment-Based Therapy**
Advances In Experimental Medicine And Biology, 2021
PMID34185284

Turan T, Kongpachith S, Halliwill K, Roelands J, Hendrickx W, Marincola FM, Hudson TJ, Jacob HJ, Bedognetti D, Samayoa J, Ceccarelli M.
**Correction: A balance score between immune stimulatory and suppressive microenvironments identifies mediators of tumour immunity and predicts pan-cancer survival**
British Journal Of Cancer, 2021
PMID33277603

Giovanni Fucà, Francesca Ligorio, Veronica Huber, Andrea Vingiani, Darawan Rinchai, Alessandra Raimondi, Fabio Iannelli, Gianmaria Frigè, Antonino Belfiore, Luca Lalli, Claudia Chiodoni, Valeria Cancila, Federica Zanardi, Arta Ajazi, Salvatore Cortellino, Viviana Vallacchi, Paola Squarcina, Agata Cova, Samantha Pesce, Paola Frati, Raghvendra Mall, Paola Antonia Corsetto, Angela Maria Rizzo, Cristina Ferraris, Secondo Folli, Marina Chiara Garassino, Giuseppe Capri, Giulia Bianchi, Mario P. Colombo, Saverio Minucci, Marco Foiani, Valter Longo, Giovanni Apolone, Valter Torri, Giancarlo Pruneri, Davide Bedognetti, Licia Rivoltini, Filippo de Braud
**Fasting-mimicking diet is safe and reshapes metabolism and antitumor immunity in cancer patients**
Cancer Discovery, 2021
PMID34789537

Vernieri C, Fucà G, Ligorio F, Huber V, Vingiani A, Iannelli F, Raimondi A, Rinchai D, Frigè G, Belfiore A, Lalli L, Chiodoni C, Cancila V, Zanardi F, Ajazi A, Cortellino S, Vallacchi V, Squarcina P, Cova A, Pesce S, Frati P, Mall R, Corsetto PA, Rizzo AM, Ferraris C, Folli S, Garassino MC, Capri G, Bianchi G, Colombo MP, Minucci S, Foiani M, Longo VD, Apolone G, Torri V, Pruneri G, Bedognetti D, Rivoltini L, de Braud F.
**Fasting-Mimicking Diet Is Safe and Reshapes Metabolism and Antitumor Immunity in Patients with Cancer**
Cancer Discovery, 2021
PMID34789537

Mehraj U, Ganai RA, Macha MA, Hamid A, Zargar MA, Bhat AA, Nasser MW, Haris M, Batra SK, Alshehri B, Al-Baradie RS, Mir MA, Wani NA.
**The tumor microenvironment as driver of stemness and therapeutic resistance in breast cancer: New challenges and therapeutic opportunities.**
Cellular Oncology, 2021
PMID34528143

Guerrouahen B, Elnaggar M, Al-Mohannadi A, Kizhakayil D, Bonini C, Benjamin R, Brentjens R, Buchholz CJ, Casorati G, Ferrone S, Locke FL, Martin F, Schambach A, Turtle C, Veys P, van der Vliet HJ, Maccalli C; EICCI Faculty Group.
**Proceedings From the First International Workshop at Sidra Medicine: "Engineered Immune Cells in Cancer Immunotherapy (EICCI): From Discovery to Off-the-Shelf Development", 15(th)-16(th) February 2019, Doha, Qatar**
Frontiers In Immunology, 2021
PMID33584653

Nisar S, Yousuf P, Masoodi T, Wani NA, Hashem S, Singh M, Sageena G, Mishra D, Kumar R, Haris M, Bhat AA, Macha MA,
**Chemokine-Cytokine Networks in the Head and Neck Tumor Microenvironment.**
International Journal Of Molecular Sciences, 2021
PMID33925575

Winkler C, King M, Berthe J, Ferraioli D, Garuti A, Grillo F, Rodriguez-Canales J, Ferrando L, Chopin N, Ray-Coquard I, Delpuech O, Bedognetti D, Ballestrero A, Leo E, Zoppoli G,
**SLFN11 captures cancer-immunity interactions associated with platinum sensitivity in high-grade serous ovarian cancer.**
Jci Insight, 2021
PMID34549724

Naik A, Thomas R, Al-Khadairi G, Bacha R, Hendrickx W, Decock J,
**Cancer testis antigen PRAME: An anti-cancer target with immunomodulatory potential.**
Journal Of Cellular And Molecular Medicine, 2021
PMID34612587

Lévy R, Langlais D, Béziat V, Rapaport F, Rao G, Lazarov T, Bourgey M, Zhou YJ, Briand C, Moriya K, Ailal F, Avery DT, Markle J, Lim AI, Ogishi M, Yang R, Pelham S, Emam M, Migaud M, Deswarte C, Habib T, Saraiva LR, Moussa EA, Guennoun A, Boisson B, Belkaya S, Martinez-Barricarte R, Rosain J, Belkadi A, Breton S, Payne K, Benhsaien I, Plebani A, Lougaris V, Di Santo JP, Neven B, Abel L, Ma CS, Bousfiha AA, Marr N, Bustamante J, Liu K, Gros P, Geissmann F, Tangye SG, Casanova JL, Puel A,
**Inherited human c-Rel deficiency disrupts myeloid and lymphoid immunity to multiple infectious agents.**
Journal Of Clinical Investigation, 2021
PMID34623332

Lone SN, Bhat AA, Wani NA, Karedath T, Hashem S, Nisar S, Singh M, Bagga P, Das BC, Bedognetti D, Reddy R, Frenneaux MP, El-Rifai W, Siddiqi MA, Haris M, Macha MA,
**miRNAs as novel immunoregulators in cancer.**
Seminars In Cell And Developmental Biology, 2021
PMID33926791

Bhat AA, Yousuf P, Wani NA, Rizwan A, Chauhan SS, Siddiqi MA, Bedognetti D, El-Rifai W, Frenneaux MP, Batra SK, Haris M, Macha MA.
**Tumor microenvironment: an evil nexus promoting aggressive head and neck squamous cell carcinoma and avenue for targeted therapy**
Signal Transduction And Targeted Therapy, 2021
PMID33436555

Bedognetti D,
**A Multi-layer Molecular Fresco of the Immune Diversity across Hematologic Malignancies.**
Cancer Cell, 2020
PMID32931741

Parker KR, Migliorini D, Perkey E, Yost KE, Bhaduri A, Bagga P, Haris M, Wilson NE, Liu F, Gabunia K, Scholler J, Montine TJ, Bhoj VG, Reddy R, Mohan S, Maillard I, Kriegstein AR, June CH, Chang HY, Posey AD Jr, Satpathy AT,
**Single-Cell Analyses Identify Brain Mural Cells Expressing CD19 as Potential Off-Tumor Targets for CAR-T Immunotherapies.**
Cell, 2020
PMID32961131

Rovida A, Maccalli C, Scarfò L, Dellabona P, Stamatopoulos K, Ghia P,
**Exploiting B Cell Receptor Stereotypy to design Tailored Immunotherapy in Chronic Lymphocytic Leukemia.**
Clinical Cancer Research, 2020
PMID33051305

Gotti M, Defrancesco I, D'Angelo M, Basso S, Crotto L, Marinelli A, Maccalli C, Iaconianni V,
**Cancer Immunotherapy Using Chimeric Antigen Receptor Expressing T-Cells: Present and Future Needs of Clinical Cancer Centers.**
Frontiers In Immunology, 2020
PMID33193333

Nisar S, Bhat AA, Hashem S, Yadav SK, Rizwan A, Singh M, Bagga P, Macha MA, Frenneaux MP, Reddy R, Haris M,
**Non-invasive biomarkers for monitoring the immunotherapeutic response to cancer.**
Journal Of Translational Medicine, 2020
PMID33298096

Guerrouahen BS, Maccalli C, Cugno C, Rutella S, Akporiaye ET,
**Reverting Immune Suppression to Enhance Cancer Immunotherapy.**
Frontiers In Oncology, 2019
PMID32039024

Bedognetti D, Ceccarelli M, Galluzzi L, Lu R, Palucka K, Samayoa J, Spranger S, Warren S, Wong KK, Ziv E, Chowell D, Coussens LM, De Carvalho DD, DeNardo DG, Galon J, Kaufman HL, Kirchhoff T, Lotze MT, Luke JJ, Minn AJ, Politi K, Shultz LD, Simon R, Thórsson V, Weidhaas JB, Ascierto ML, Ascierto PA, Barnes JM, Barsan V, Bommareddy PK, Bot A, Church SE, Ciliberto G, De Maria A, Draganov D, Ho WS, McGee HM, Monette A, Murphy JF, Nisticò P, Park W, Patel M, Quigley M, Radvanyi L, Raftopoulos H, Rudqvist NP, Snyder A, Sweis RF, Valpione S, Zappasodi R, Butterfield LH, Disis ML, Fox BA, Cesano A, Marincola FM; Society for Immunotherapy of Cancer (SITC) Cancer Immune Responsiveness Task Force and Working Groups.
**Toward a comprehensive view of cancer immune responsiveness: a synopsis from the SITC workshop**
Journal For Immunotherapy Of Cancer, 2019
PMID31113486

## CANCER BIOLOGY

Nisar S, Masoodi T, Prabhu KS, Kuttikrishnan S, Zarif L, Khatoon S, Ali S, Uddin S, Akil AA, Singh M, Macha MA, Bhat AA.
**Natural products as chemo-radiation therapy sensitizers in cancers**
Biomedicine & Pharmacotherapy, 2022
PMID36030591

Hashem S, Ali TA, Akhtar S, Nisar S, Sageena G, Ali S, Al-Mannai S, Therachiyil L, Mir R, Elfaki I, Mir MM, Jamal F, Masoodi T, Uddin S, Singh M, Haris M, Macha M, Bhat AA.
**Targeting cancer signaling pathways by natural products: Exploring promising anti-cancer agents**
Biomedicine & Pharmacotherapy, 2022
PMID35658225

Bhat AA, Nisar S, Mukherjee S, Saha N, Yarravarapu N, Lone SN, Masoodi T, Chauhan R, Maacha S, Bagga P, Dhawan P, Akil AA, El-Rifai W, Uddin S, Reddy R, Singh M, Macha MA, Haris M.
**Integration of CRISPR/Cas9 with artificial intelligence for improved cancer therapeutics**
Journal Of Translational Medicine, 2022
PMID36401282

Lone SN, Nisar S, Masoodi T, Singh M, Rizwan A, Hashem S, El-Rifai W, Bedognetti D, Batra SK, Haris M, Bhat AA, Macha MA,
**Liquid biopsy: a step closer to transform diagnosis, prognosis and future of cancer treatments.**
Molecular Cancer, 2022
PMID35303879

Sher G, Masoodi T, Patil K, Akhtar S, Kuttikrishnan S, Ahmad A, Uddin S.
**Dysregulated FOXM1 signaling in the regulation of cancer stem cells**
Seminars In Cancer Biology, 2022
PMID35931301

Tomei S, Ibnaof O, Ravindran S, Ferrone S, Maccalli C,
**Cancer Stem Cells Are Possible Key Players in Regulating Anti-Tumor Immune Responses: The Role of Immunomodulating Molecules and MicroRNAs.**
Cancers (Basel), Cancers, 2021
PMID33918136

Sukumaran P, Nascimento Da Conceicao V, Sun Y, Ahamad N, Saraiva LR, Selvaraj S, Singh BB,
**Calcium Signaling Regulates Autophagy and Apoptosis.**
Cells, 2021
PMID34440894

Nisar S, Bhat AA, Singh M, Karedath T, Rizwan A, Hashem S, Bagga P, Reddy R, Jamal F, Uddin S, Chand G, Bedognetti D, El-Rifai W, Frenneaux MP, Macha MA, Ahmed I, Haris M.
**Insights Into the Role of CircRNAs: Biogenesis, Characterization, Functional, and Clinical Impact in Human Malignancies**
Frontiers In Cell And Developmental Biology, 2021
PMID33614648

Karedath T, Al-Dasim FM, Ahmed I, Al-Qurashi A, Raza A, Andrews SS, Ahmed AA, Ali Mohamoud Y, Dermime S, Malek JA.
**Regulation of Circular RNA CircNFATC3 in Cancer Cells Alters Proliferation, Migration, and Oxidative Phosphorylation**
Frontiers In Cell And Developmental Biology, 2021
PMID33816459

Feltrin S, Ravera F, Traversone N, Ferrando L, Bedognetti D, Ballestrero A, Zoppoli G,
**Sterol synthesis pathway inhibition as a target for cancer treatment.**
Cancer Letters, 2020
PMID32711099

Haris M, Nisar S, Hashem S, Bhat AA, Yadav S, Shanmugakonar M, Al-Naemi H, Bagga P, Uddin S, Reddy R,
**Functional In Vivo Imaging of Tumors.**
Cancer Treatment And Research, 2020
PMID32215865

Bedognetti D, Cesano A, Marincola FM, Wang E,
**The Biology of Immune-Active Cancers and Their Regulatory Mechanisms.**
Cancer Treatment And Research, 2020
PMID32215869

Nisar S, Hashem S, Macha MA, Yadav SK, Muralitharan S, Therachiyil L, Sageena G, Al-Naemi H, Haris M, Bhat AA,
**Exploring Dysregulated Signaling Pathways in Cancer.**
Current Pharmaceutical Design, 2020
PMID31939726

Siveen KS, Nizamuddin PB, Uddin S, Al-Thani M, Frenneaux MP, Janahi IA, Steinhoff M, Azizi F,
**TRPV2: A Cancer Biomarker and Potential Therapeutic Target.**
Disease Markers, 2020
PMID33376561

Bhat AA, Syed N, Therachiyil L, Nisar S, Hashem S, Macha MA, Yadav SK, Krishnankutty R, Muralitharan S, Al-Naemi H, Bagga P, Reddy R, Dhawan P, Akobeng A, Uddin S, Frenneaux MP, El-Rifai W, Haris M,
**Claudin-1, A Double-Edged Sword in Cancer.**
International Journal Of Molecular Sciences, 2020
PMID31952355

Krijgsman D, Roelands J, Hendrickx W, Bedognetti D, Kuppen PJK,
**HLA-G: A New Immune Checkpoint in Cancer?**
International Journal Of Molecular Sciences, 2020
PMID32630545

Maccalli C
**Translational cancer biology.**
Journal Of Translational Medicine, 2020
PMID32967699

Fusco L, Gazzi A, Peng G, Shin Y, Vranic S, Bedognetti D, Vitale F, Yilmazer A, Feng X, Fadeel B, Casiraghi C, Delogu LG,
**Graphene and other 2D materials: a multidisciplinary analysis to uncover the hidden potential as cancer theranostics.**
Theranostics, 2020
PMID32373222

Wang E, Bedognetti D, Marincola FM,
**Functional Genome Profiling to Understand Cancer Immune Responsiveness.**
Book: Biomarkers For Immunotherapy Of Cancer, 2019
PMID31502155

Ravindran S, Rasool S, Maccalli C.
**The Cross Talk between Cancer Stem Cells/Cancer Initiating Cells and Tumor Microenvironment: The Missing Piece of the Puzzle for the Efficient Targeting of these Cells with Immunotherapy.**
Cancer Microenvironment, 2019
PMID31758404

Zhu L, Li L, Zhang Q, Yang X, Zou Z, Hao B, Marincola FM, Liu Z, Zhong Z, Wang M, Li X, Wang Q, Li K, Gao W, Yao K, Liu Q.
**Publisher Correction: NOS1 S-nitrosylates PTEN and inhibits autophagy in nasopharyngeal carcinoma cells**
Cell Death Discovery, 2019
PMID30911068

Gazzi A, Fusco L, Khan A, Bedognetti D, Zavan B, Vitale F, Yilmazer A, Delogu LG.
**Photodynamic Therapy Based on Graphene and MXene in Cancer Theranostics. Frontiers In Bioengineering And Biotechnology, 2019**
PMID31709252

Bhat AA, Uppada S, Achkar IW, Hashem S, Yadav SK, Shanmugakonar M, Al-Naemi HA, Haris M, Uddin S.
**Tight Junction Proteins and Signaling Pathways in Cancer and Inflammation: A Functional Crosstalk.**
Frontiers In Physiology, 2019
PMID30728783

Maacha S, Bhat AA, Jimenez L, Raza A, Haris M, Uddin S, Grivel JC.
**Extracellular vesicles-mediated intercellular communication: roles in the tumor microenvironment and anti-cancer drug resistance.**
Molecular Cancer, 2019
PMID30925923

Bagga P, Wilson N, Rich L, Marincola FM, Schnall MD, Hariharan H, Haris M, Reddy R,
**Sugar alcohol provides imaging contrast in cancer detection.**
Scientific Reports, 2019
PMID31366892

## BREAST CANCER

Mehraj U, Alshehri B, Khan AA, Bhat AA, Bagga P, Wani NA, Mir MA.
**Expression Pattern and Prognostic Significance of Chemokines in Breast cancer: An Integrated Bioinformatics Analysis**
Clinical Breast Cancer, 2022
PMID35585016

Cirmena G, Ferrando L, Ravera F, Garuti A, Dameri M, Gallo M, Barbero V, Ferrando F, Del Mastro L, Garlaschi A, Friedman D, Fregatti P, Ballestrero A, Zoppoli G.
Plasma Cell-Free DNA Integrity Assessed by Automated Electrophoresis Predicts the **Achievement of Pathologic Complete Response to Neoadjuvant Chemotherapy in Patients With Breast Cancer**
Jco Precision Oncology, 2022
PMID34768233

Kannan S, Shailesh H, Mohamed H, Souchelnytskyi N, Souchelnytskyi S.
**A LONG-TERM 10G-HYPERGRAVITY EXPOSURE PROMOTES CELL-CELL CONTACTS AND REDUCES ADHESIVENESS TO A SUBSTRATE, MIGRATION, AND INVASIVENESS OF MCF-7HUMAN BREAST CANCER CELLS**
, 2022
PMID35548967

Pullikuth AK, Routh ED, Zimmerman KD, Chifman J, Chou JW, Soike MH, Jin G, Su J, Song Q, Black MA, Print C, Bedognetti D, Howard-McNatt M, O'Neill SS, Thomas A, Langefeld CD, Sigalov AB, Lu Y, Miller LD.
**Bulk and Single-Cell Profiling of Breast Tumors Identifies TREM-1 as a Dominant Immune Suppressive Marker Associated With Poor Outcomes**
Frontiers In Oncology, 2021
PMID34956864

Sher G, Salman NA, Khan AQ, Prabhu KS, Raza A, Kulinski M, Dermime S, Haris M, Junejo K, Uddin S,
**Epigenetic and breast cancer therapy: Promising diagnostic and therapeutic applications.**
Seminars In Cancer Biology, 2020
PMID32858230

Zaheer S, Shah N, Maqbool SA, Soomro NM.
**Estimates of past and future time trends in age-specific breast cancer incidence among women in Karachi, Pakistan: 2004-2025**
Bmc Public Health, 2019
PMID31345204

Isnaldi E, Ferraioli D, Ferrando L, Brohée S, Ferrando F, Fregatti P, Bedognetti D, Ballestrero A, Zoppoli G,
**Schlafen-11 expression is associated with immune signatures and basal-like phenotype in breast cancer.**
Breast Cancer Research And Treatment, 2019
PMID31222709

Shan J, Chouchane A, Mokrab Y, Saad M, Boujassoum S, Sayaman RW, Ziv E, Bouaouina N, Remadi Y, Gabbouj S, Roelands J, Ma X, Bedognetti D, Chouchane L.
**Genetic Variation in CCL5 Signaling Genes and Triple Negative Breast Cancer: Susceptibility and Prognosis Implications.**
Frontiers In Oncology, 2019
PMID31921621

Azad GK, Siddique M, Taylor B, Green A, O'Doherty J, Gariani J, Blake GM, Mansi J, Goh V, Cook GJR.
**Is Response Assessment of Breast Cancer Bone Metastases Better with Measurement of (18)F-Fluoride Metabolic Flux Than with Measurement of (18) F-Fluoride PET/CT SUV?**
Journal Of Nuclear Medicine, 2019
PMID30042160

Kulkarni RP, Elmi A, Alcantara-Adap E, Hubrack S, Nader N, Yu F, Dib M, Ramachandran V, Najafi Shoushtari H, Machaca K.
**miRNA-dependent regulation of STIM1 expression in breast cancer.**
Scientific Reports, 2019
PMID31506588

Brown A, Zamanpoor M, Love DR, Prosser DO.
**Determination of Pathogenicity of Breast Cancer 1 Gene Variants using the American College of Medical Genetics and Genomics and the Association for Molecular Pathology Guidelines.**
Sultan Qaboos University Medical Journal [Squmj], 2019
PMID31897316

Razzouk K, Humbert P, Borens B, Gozzi M, Al Khori N, Pasquier J, Rafii Tabrizi A.
**Skin trophicity improvement by mechanotherapy for lipofilling-based breast reconstruction postradiation therapy.**
The Breast Journal, Breast Journal, 2019
PMID31659819

## OVARIAN, ENDOMETRIAL, AND CERVICAL CANCER:

Therachiyil L, Anand A, Azmi A, Bhat A, Korashy HM, Uddin S.
**Role of RAS signaling in ovarian cancer**
F100 Research, F1000 Research, 2022
PMID36451660

Al-Farsi H, Al-Azwani I, Malek JA, Chouchane L, Rafii A, Halabi NM.
**Discovery of new therapeutic targets in ovarian cancer through identifying significantly non-mutated genes**
Journal Of Translational Medicine, 2022
PMID35619151

Tarang Sharma , Sabah Nisar , Tariq Masoodi , Muzafar A Macha , Shahab Uddin , Ammira Al-Shabeeb Akil , Tej K Pandita , Mayank Singh , Ajaz A Bhat
**Current and emerging biomarkers in ovarian cancer diagnosis; CA125 and beyond**
, 2022
PMID36707207

De Sanctis V, Ahmed S, Soliman A, Alyafei F, Alaaraj N, Al Maadheed M, Clelland C.
**A rare case of Ovarian Juvenile Granulosa Cell Tumor in an Infant with Isosexual Pseudo Puberty and a Revision of Literature**
Acta Biomedica, 2021
PMID34487069

Ayakannu T, Taylor AH, Konje JC,
**Selection of Endogenous Control Reference Genes for Studies on Type 1 or Type 2 Endometrial Cancer.**
Scientific Reports, 2020
PMID32439920

Ortashi O, Abdalla D.
**Colposcopic and Histological Outcome of Atypical Squamous Cells of Undetermined Significance and Atypical Squamous Cell of Undetermined Significance Cannot Exclude High-Grade in Women Screened for Cervical Cancer.**
Asian Pacific Journal Of Cancer Prevention, 2019
PMID31554348

Ayakannu T, Taylor AH, Bari M, Mastrangelo N, Maccarrone M, Konje JC,
**Expression and Function of the Endocannabinoid Modulating Enzymes Fatty Acid Amide Hydrolase and N-Acylphosphatidylethanolamine-Specific Phospholipase D in Endometrial Carcinoma.**
Frontiers In Oncology, 2019
PMID31921630

Ayakannu T, Taylor AH, Marczylo TH, Maccarrone M, Konje JC,
**Identification of Novel Predictive Biomarkers for Endometrial Malignancies: N-Acylethanolamines.**
Frontiers In Oncology, 2019
PMID31245282

Elgendy H, Nafady-Hego H, Abd Elmoneim HM, Youssef T, Alzahrani A.
**Perioperative management and postoperative outcome of patients undergoing cytoreduction surgery with hyperthermic intraperitoneal chemotherapy.**
Indian Journal Of Anaesthesia, 2019
PMID31649392

Al Ameri W, Ahmed I, Al-Dasim FM, Ali Mohamoud Y, Al-Azwani IK, Malek JA, Karedath T,
**Cell Type-Specific TGF-β Mediated EMT in 3D and 2D Models and Its Reversal by TGF-β Receptor Kinase Inhibitor in Ovarian Cancer Cell Lines.**
International Journal Of Molecular Sciences, 2019
PMID31336560

## OTHER CANCERS:

Apollo A, Ortenzi V, Scatena C, Zavaglia K, Aretini P, Lessi F, Franceschi S, Tomei S, Sepich CA, Viacava P, Mazzanti CM, Naccarato AG.
**Molecular characterization of low grade and high grade bladder cancer.**
Plos One, 2019
PMID30650148

Ravi Chauhan, Ashna Gupta, Lakshay Malhotra , Ajaz A Bhat, Raj K Pandita , Tariq Masoodi, Gunjan Dagar, Hana Q Sadida , Sara K Al-Marzooqi , Atul Batra , Sameer Bakhshi , Mehar Chand Sharma, Pranay Tanwar, Shah Alam Khan, Ethayathulla Abdul Samath, Shahab Uddin, Ammira S Al-Shabeeb Akil, Mohammad Haris, Muzafar A Macha, Tej K Pandita , Mayank Singh
**Ubiquitin specific peptidase 37 and PCNA interaction promotes osteosarcoma pathogenesis by modulating replication fork progression**
Journal Of Translational Medicine, 2023
PMID37118828

Kuttikrishnan S, Bhat AA, Mateo JM, Ahmad F, Alali FQ, El-Elimat T, Oberlies NH, Pearce CJ, Uddin S.
**Anticancer activity of Neosetophomone B by targeting AKT/SKP2/MTH1 axis in leukemic cells**
Biochemical And Biophysical Research Communications, 2022
PMID35228122

Gritti I, Basso V, Rinchai D, Corigliano F, Pivetti S, Gaviraghi M, Rosano D, Mazza D, Barozzi S, Roncador M, Parmigiani G, Legube G, Parazzoli D, Cittaro D, Bedognetti D, Mondino A, Segalla S, Tonon G.
**Loss of ribonuclease DIS3 hampers genome integrity in myeloma by disrupting DNA:RNA hybrid metabolism**
Embo Journal, 2022
PMID36215697

Kuttikrishnan S, Masoodi T, Sher G, Bhat AA, Patil K, El-Elimat T, Oberlies NH, Pearce CJ, Haris M, Ahmad A, Alali FQ, Uddin S.
**Bioinformatics Analysis Reveals FOXM1/BUB1B Signaling Pathway as a Key Target of Neosetophomone B in Human Leukemic Cells: A Gene Network-Based Microarray Analysis**
Frontiers In Oncology, 2022
PMID35847923

Akhtar S, Ali TA, Faiyaz A, Khan OS, Raza SS, Kulinski M, Omri HE, Bhat AA, Uddin S,
**Cytokine-Mediated Dysregulation of Signaling Pathways in the Pathogenesis of Multiple Myeloma.**
International Journal Of Molecular Sciences, 2020
PMID32679860

Bhat AA, Younes SN, Raza SS, Zarif L, Nisar S, Ahmed I, Mir R, Kumar S, Sharawat SK, Hashem S, Elfaki I, Kulinski M, Kuttikrishnan S, Prabhu KS, Khan AQ, Yadav SK, El-Rifai W, Zargar MA, Zayed H, Haris M, Uddin S,
**Role of non-coding RNA networks in leukemia progression, metastasis and drug resistance.**
Molecular Cancer, 2020
PMID32164715

Chawla S, Bukhari S, Afridi OM, Wang S, Yadav SK, Akbari H, Verma G, Nath K, Haris M, Bagley S, Davatzikos C, Loevner LA, Mohan S.
**Metabolic and physiologic magnetic resonance imaging in distinguishing true progression from pseudoprogression in patients with glioblastoma**
Nmr In Biomedicine, 2022
PMID35233862

Tomei S, Volontè A, Ravindran S, Mazzoleni S, Wang E, Galli R, Maccalli C,
**MicroRNA Expression Profile Distinguishes Glioblastoma Stem Cells from Differentiated Tumor Cells.**
Journal Of Personalized Medicine, 2021
PMID33916317

Caruso FP, Garofano L, D'Angelo F, Yu K, Tang F, Yuan J, Zhang J, Cerulo L, Pagnotta SM, Bedognetti D, Sims PA, Suvà M, Su XD, Lasorella A, Iavarone A, Ceccarelli M,
**A map of tumor-host interactions in glioma at single-cell resolution**.
Gigascience, 2020
PMID33155039

van de Weerd S, Smit MA, Roelands J, Mesker WE, Bedognetti D, Kuppen PJK, Putter H, Tollenaar RAEM, Roodhart JML, Hendrickx W, Medema JP, van Krieken JHJM.
**Correlation of Immunological and Histopathological Features with Gene Expression-Based Classifiers in Colon Cancer Patients**
International Journal Of Molecular Sciences, 2022
PMID36293565

Khanna M, Abualruz AR, Yadav SK, Mafraji M, Al-Rumaihi K, Al-Bozom I, Kumar D, Tsili AC, Schieda N,
**Diagnostic performance of multi-parametric MRI to differentiate benign sex cord stromal tumors from malignant (non-stromal and stromal) testicular neoplasms.**
Abdominal Radiology, 2020
PMID32572513

Soutto M, Chen Z, Bhat AA, Wang L, Zhu S, Gomaa A, Bates A, Bhat NS, Peng D, Belkhiri A, Piazuelo MB, Washington MK, Steven XC, Peek R Jr, El-Rifai W,
**Activation of STAT3 signaling is mediated by TFF1 silencing in gastric neoplasia.**
Nature Communications, 2019
PMID31292446

Siveen KS, Prabhu KS, Parray AS, Merhi M, Arredouani A, Chikri M, Uddin S, Dermime S, Mohammad RM, Steinhoff M, Janahi IA, Azizi F.
**Evaluation of cationic channel TRPV2 as a novel biomarker and therapeutic target in Leukemia-Implications concerning the resolution of pulmonary inflammation.**
Scientific Reports, 2019
PMID30733502

Jackson TJ, Brisse HJ, Pritchard-Jones K, Nakata K, Morosi C, Oue T, Irtan S, Vujanic G, van den Heuvel-Eibrink MM, Graf N, Chowdhury T; SIOP RTSG Biopsy Working Group.
**How we approach paediatric renal tumour core needle biopsy in the setting of preoperative chemotherapy: A Review from the SIOP Renal Tumour Study Group**
Pediatric Blood & Cancer, 2022
PMID35587187

Farzaneh M, Ghasemian M, Ghaedrahmati F, Poodineh J, Najafi S, Masoodi T, Kurniawan D, Uddin S, Azizidoost S.
**Functional roles of lncRNA-TUG1 in hepatocellular carcinoma**
, 2022
PMID36126725

Asghar S, Waqar W, Umar M, Manzoor S.
**Tumor educated platelets, a promising source for early detection of hepatocellular carcinoma: Liquid biopsy an alternative approach to tissue biopsy**
Clinics And Research In Hepatology And Gastroenterology, 2020
PMID32312598

Seng MS, Berry B, Karpelowsky J, Thomas G, Mews C, Stormon M, Shun A, Cole C.
**Successful treatment of a metastatic hepatocellular malignant neoplasm, not otherwise specified with chemotherapy and liver transplantation.**
Pediatric Blood & Cancer, 2019
PMID30609257

Djekidel M, Syed G, Kanbour A.
**Imaging Biomarkers in Lung Cancer with (68)Ga-DOTATATE, (18)F-Fluoride, and (18)F-FDG PET-CT Scans and The Theranostics Paradigm**
Journal Of Nuclear Medicine, 2021
PMID33722922

McKeage MJ, Tin Tin S, Khwaounjoo P, Sheath K, Dixon-McIver A, Ng D, Sullivan R, Cameron L, Shepherd P, Laking GR, Kingston N, Strauss M, Lewis C, Elwood M, Love DR,
**Screening for anaplastic lymphoma kinase (ALK) gene rearrangements in non-small-cell lung cancer in New Zealand.**
Journal Of Internal Medicine, 2020
PMID31318119

Xing Y, Chand G, Liu C, Cook GJR, O'Doherty J, Zhao L, Wong NCL, Meszaros LK, Ting HH, Zhao J.
**Early phase I study of a 99mTc labeled anti-PD-L1 single domain antibody in SPECT/CT assessment of programmed death ligand-1 expression in non-small cell lung cancer.**
Journal Of Nuclear Medicine, 2019
PMID30796165

Chauhan R, Bhat AA, Masoodi T, Bagga P, Reddy R, Gupta A, Sheikh ZA, Macha MA, Haris M, Singh M.
**Ubiquitin-specific peptidase 37: an important cog in the oncogenic machinery of cancerous cells**
Journal Of Experimental & Clinical Cancer Research, 2021
PMID34758854

Prabhu KS, Raza A, Karedath T, Raza SS, Fathima H, Ahmed EI, Kuttikrishnan S, Therachiyil L, Kulinski M, Dermime S, Junejo K, Steinhoff M, Uddin S,
**Non-Coding RNAs as Regulators and Markers for Targeting of Breast Cancer and Cancer Stem Cells.**
Cancers (Basel), Cancers, 2020
PMID32033146

Roelands J, Hendrickx W, Zoppoli G, Mall R, Saad M, Halliwill K, Curigliano G, Rinchai D, Decock J, Delogu LG, Turan T, Samayoa J, Chouchane L, Ballestrero A, Wang E, Finetti P, Bertucci F, Miller LD, Galon J, Marincola FM, Kuppen PJK, Ceccarelli M, Bedognetti D,
**Oncogenic states dictate the prognostic and predictive connotations of intratumoral immune response.**
Journal For Immunotherapy Of Cancer, 2020
PMID32376723

Thorsson V, Gibbs DL, Brown SD, Wolf D, Bortone DS, Ou Yang TH, Porta-Pardo E, Gao GF, Plaisier CL, Eddy JA, Ziv E, Culhane AC, Paull EO, Sivakumar IKA, Gentles AJ, Malhotra R, Farshidfar F, Colaprico A, Parker JS, Mose LE, Vo NS, Liu J, Liu Y, Rader J, Dhankani V, Reynolds SM, Bowlby R, Califano A, Cherniack AD, Anastassiou D, Bedognetti D, Mokrab Y, Newman AM, Rao A, Chen K, Krasnitz A, Hu H, Malta TM, Noushmehr H, Pedamallu CS, Bullman S, Ojesina AI, Lamb A, Zhou W, Shen H, Choueiri TK, Weinstein JN, Guinney J, Saltz J, Holt RA, Rabkin CS; Cancer Genome Atlas Research Network, Lazar AJ, Serody JS, Demicco EG, Disis ML, Vincent BG, Shmulevich I.
**The Immune Landscape of Cancer.**
Immunity, 2019
PMID31433971

Polanczyk MJ, Walker E, Haley D, Guerrouahen BS, Akporiaye ET,
**Blockade of TGF-β signaling to enhance the antitumor response is accompanied by dysregulation of the functional activity of CD4<sup>+</sup>CD25<sup>+</sup>Foxp3<sup>+</sup> and CD4<sup>+</sup>CD25<sup>-</sup>Foxp3<sup>+</sup> T cells.**
Journal Of Translational Medicine, 2019
PMID31288845

Srirangam Nadhamuni V, Iacovazzo D, Evanson J, Sahdev A, Trouillas J, McAndrew L, R Kurzawinski T, Bryant D, Hussain K, Bhattacharya S, Korbonits M.
**GHRH secretion from a pancreatic neuroendocrine tumor causing gigantism in a patient with MEN1**
Endocrinology, Diabetes & Metabolism Case Reports, 2021
PMID34156350

Singh HM, Leber MF, Bossow S, Engeland CE, Dessila J, Grossardt C, Zaoui K, Bell JC, Jäger D, von Kalle C, Ungerechts G,
**MicroRNA-sensitive oncolytic measles virus for chemovirotherapy of pancreatic cancer.**
Molecular Therapy Oncolytics, 2021
PMID34141871

Scatena C, Murtas D, Tomei S,
**Cutaneous Melanoma Classification: The Importance of High-Throughput Genomic Technologies.**
Frontiers In Oncology, 2021
PMID34123788

Pilla L, Alberti A, Di Mauro P, Gemelli M, Cogliati V, Cazzaniga ME, Bidoli P, Maccalli C,
**Molecular and Immune Biomarkers for Cutaneous Melanoma: Current Status and Future Prospects.**
Cancers (Basel), Cancers, 2020
PMID33233603

Al Hashmi M, Sastry KS, Silcock L, Chouchane L, Mattei V, James N, Mathew R, Bedognetti D, De Giorgi V, Murtas D, Liu W, Chouchane A, Temanni R, Seliger B, Wang E, Marincola FM, Tomei S,
**Differential responsiveness to BRAF inhibitors of melanoma cell lines BRAF V600E-mutated.**
Journal Of Translational Medicine, 2020
PMID32393282

Strudel M, Festino L, Vanella V, Beretta M, Marincola FM, Ascierto PA.
**Melanoma: prognostic factors and factors predictive of response to therapy.**
Current Medicinal Chemistry, 2019
PMID31804158

Silcock L, Almabrazi H, Mokrab Y, Jithesh P, Al-Hashmi M, James N, Mathew R, Mattei V, Bedognetti D, Lessi F, Temanni R, Seliger B, Al-Ali R, Marincola FM, Wang E, Tomei S.
**Monoallelic expression in melanoma.**
Journal Of Translational Medicine, 2019
PMID30953523

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