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CANCER UPDATE

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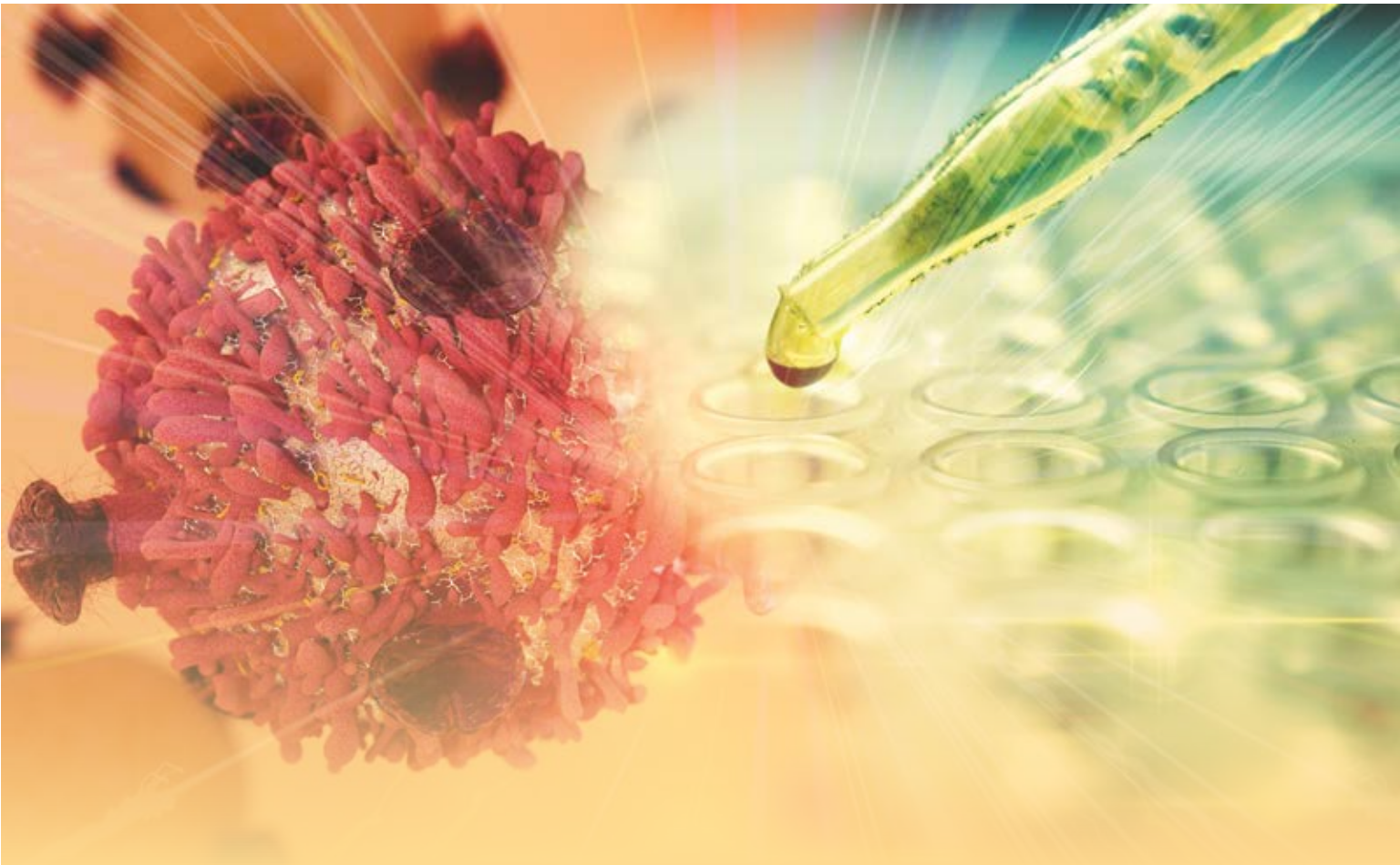

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ADVANCES IN MELANOMA TREATMENT: IMMUNOTHERAPY AND MOLECULARLY TARGETED THERAPY

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ADVANCED TREATMENT OF HEAD AND NECK CANCER

BAYLOR SCOTT & WHITE ONCOLOGY

Cancer research studies at Baylor Charles A. Sammons Cancer Center, located on the campus of Baylor University Medical Center, part of Baylor Scott & White Health, are conducted through Baylor Scott & White Research Institute, Texas Oncology and The US Oncology Network.

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Cover photo: Gene therapy for cancer therapy with T-cell and pipette. ©Adobe Stock

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FROM THE MEDICAL

DIRECTOR

Technological advances and next-generation immunotherapeutic strategies are revolutionizing the treatment of melanoma, genitourinary, and head and neck cancers.

Progress has clearly been made in the war on cancer. This is reflected in the number of US cancer survivors, nearly 17 million in 2019, with numbers increasing to over 22 million by 2030. This increase in survival is due to advances in screening and surgical skills, but it is also due to the major innovations in radiation and medical therapy. A key breakthrough has been the development of immunotherapeutic strategies that can harness the inherent cancer fighting ability of a patient's own immune system to target and destroy cancer cells. In this issue of Cancer Update, we will highlight three areas of cancer—melanoma, genitourinary, and head and neck cancers—where research at the Baylor Charles A. Sammons Cancer Center is leading to impressive results and changing the field both nationally and internationally.

Strides in immunotherapeutic treatment, such as the development of immune checkpoint inhibitors, have dramatically improved overall survival for patients with malignant melanoma with approximately 50% of patients alive at five years. C. Lance Cowey, MD, medical director of the Skin Malignancy Research and Treatment Center at Baylor Dallas, has been instrumental in helping to develop new treatments for melanoma as a member of the Stand Up To Cancer Melanoma Dream Team. Moreover, the use of immunotherapy combined with targeted drugs for use in patients with an activating mutation, such as BRAFV600E, also has made substantial improvements in survival for melanoma patients, as well as other cancers with this mutation. Current findings, combined with research on how to best identify the sentinel lymph node, will continue to allow us to make inroads in the treatment of melanoma. Ongoing clinical trials at Baylor Dallas include testing the effectiveness of an antibody (relatlimab) that targets the LAG-3 protein expressed on tumor-infiltrating lymphocytes with or without nivolumab in patients with melanoma and other solid tumors as well as the study of a hedgehog inhibitor, CX-4945, in treatment of patients with basal cell carcinoma.

Thomas Hutson, DO, PharmD, FACP, co-medical director of the Genitourinary Cancer Research and Treatment Center at Baylor Dallas, is an international leader in developing novel immunotherapeutic and targeted therapies for use in prostate, bladder and kidney cancers. Currently, he is on the steering committee for a number of international clinical trials in Renal Cell Cancer (RCC), including the CLEAR study, a 3-arm Phase III trial comparing lenvatinib plus everolimus and lenvatinib plus pembrolizumab versus sunitinib monotherapy for first-line treatment of advanced RCC, and the Phase IV Checkmate 920 Trial, evaluating the safety of nivolumab and ipilimumab in patients with untreated advanced or metastatic RCC. The results of both trials are highly anticipated. Even though the rate of various urologic cancers has been increasing for decades, with the advent of better screening and these new treatment paradigms, the rate of deaths from these cancers has decreased dramatically or stabilized.

Eric Nadler, MD, MPP, oncologist on the medical staff at Baylor Dallas and a renowned clinical researcher, is pioneering advanced trials for head and neck cancer patients in North Texas. One such study, which only has seven sites in the US, is an adoptive T-cell immunotherapy approach where a patient's T-cells are used to create an EBV-specific cytotoxic T lymphocyte cell line that can recognize and kill EBV-positive advanced nasopharyngeal cancer cells. Even though this is a rare cancer in the US, it is a significant problem in patients of Asian or Pacific Islander descent. In addition to this study, researchers at the Baylor Institute for Immunology Research are creating a vaccine for use against HPV-positive oropharyngeal cancer. Due to the complexity of treating head and neck patients, it is vital to improve comprehensive patient care. Currently, Baylor Dallas has a surgical team that performs transoral microsurgery, along with minimally invasive robotic surgery and traditional resection with free-flap reconstruction for treatment of head and neck cancer patients. These types of surgical approaches are important for maintaining function in head and neck cancer patients.

Finally, another part of our multidisciplinary team approach that differentiates us from other cancer centers is the incorporation of the staff in the Baylor Scott & White Institute for Rehabilitation. This therapy team is dedicated to treating cancer patients through their ReVital™ Cancer Rehabilitation Program providing a one-stop shop for patients located in our Dallas cancer center. Baylor Scott & White is the only system partnered with the ReVital Cancer Rehabilitation Program in the state of Texas. This unique partnership provides patients an opportunity to see physical therapists, speech pathologists, lymphedema specialists and occupational therapists all in one location. This component of the patient care team is vital for patients to become as functional as possible before, during and after treatment.

At Baylor Sammons Cancer Center at Baylor University Medical Center, we are uniquely positioned as a result of the expertise of our staff and our access to advanced technologies to continue to push the boundaries of care across all the disciplines of surgery, radiation and immunotherapy to improve outcomes for patients with cancers of the skin, urologic system, and head and neck. We are just at the start of this new era of cancer care, and by utilizing our on-site Good Manufacturing Practice (GMP) laboratory, we hope to create next-generation cellular immunotherapies to truly personalize the therapeutics that we deliver so every patient can realize the hope of long-term remission and indeed cure.

Ronan Kelly, MD, MBA
Chief of Oncology, Baylor Scott & White Health - North Texas
Director, Baylor Charles A. Sammons Cancer Center – Dallas

BAYLOR CHARLES A. SAMMONS CANCER CENTER

CURRENT CLINICAL TRIALS

Site	Study ID	Clinical Trial Number	Principal Investigator	Study Title
Breast	T01796	NCT02980341	Joyce A. O'Shaughnessy, MD	Phase 1/2, Multicenter, Open-label, Multiple-Dose First-in-human Study of U3-1402, in Subjects With HER3 Positive Metastatic Breast Cancer
	T01754	NCT03337724	Joyce A. O'Shaughnessy, MD	A Study of Ipatasertib in Combination With Paclitaxel as a Treatment for Participants With PIK3CA/AKT1/PTEN-Altered, Locally Advanced or Metastatic, Triple-Negative Breast Cancer or Hormone Receptor-Positive, HER2-Negative Breast Cancer (IPATunity130)
	14059	NCT03379428	Carlos H.R. Becerra, MD	Phase I/II Trial of Ibrutinib Plus Trastuzumab in HER2-amplified Metastatic Breast Cancer
	18167	NCT03674112	Joyce A. O'Shaughnessy, MD	A Randomized, Multicenter, Open-Label Cross-Over Study to Evaluate Patient Preference and Satisfaction of Subcutaneous Administration of the Fixed-Dose Combination of Pertuzumab and Trastuzumab in Patients With HER2-Positive Early Breast Cancer
	18232	NCT03719326	Carlos H.R. Becerra, MD	A Phase 1/1b Study to Evaluate the Safety and Tolerability of Immunotherapy Combinations in Participants With Breast and Gynecologic Malignancies
	T01754	NCT03858972	Joyce A. O'Shaughnessy, MD	Multinational, Multicenter, Phase 2 Study of Tesetaxel Plus a Reduced Dose of Capecitabine in Patients With HER2 Negative, Hormone Receptor Positive, Locally Advanced or Metastatic Breast Cancer Who Have Not Previously Received a Taxane
Chest	T01873	NCT03794544	Kartik Konduri, MD	A Phase 2 Open-label, Multicenter, Randomized, Multidrug Platform Study of Neoadjuvant Durvalumab Alone or in Combination With Novel Agents in Subjects With Resectable, Early-stage (I [> 2 cm] to IIIA) Non-small Cell Lung Cancer (NeoCOAST)
	19018	NCT03906071	Kartik Konduri, MD	A Randomized Phase 3 Study of Sitravatinib in Combination With Nivolumab Versus Docetaxel in Patients With Advanced Non-Squamous Non-Small Cell Lung Cancer With Disease Progression On or After Platinum-Based Chemotherapy in Combination With Checkpoint Inhibitor Therapy
	18234	NCT03846310	Carlos H.R. Becerra, MD	A Phase 1/1b Study to Evaluate the Safety and Tolerability of Immunotherapy Combinations in Participants With Lung Cancer

Site	Study ID	Clinical Trial Number	Principal Investigator	Study Title
GI	018-597	NCT03439462	Carlos H.R. Becerra, MD	A phase 1/2 multi-center investigation of ABI-009 (nab-rapamycin) in combination with FOLFOX and bevacizumab as first-line therapy in patients with advanced or metastatic colorectal cancer
	019-038	NCT03656536	A. Scott Paulson, MD	A Phase 3, Open-Label, Randomized, Active-Controlled, Multicenter Study to Evaluate the Efficacy and Safety of Pemigatinib (INCB054828) Versus Gemcitabine Plus Cisplatin Chemotherapy in First-Line Treatment of Participants With Unresectable or Metastatic Cholangiocarcinoma With FGFR2 Rearrangement - (FIGHT-302)
	17154	NCT03673501	A. Scott Paulson, MD	A Phase 3, Interventional, Randomized, Multicenter, Open-Label Study of DCC-2618 vs Sunitinib in Patients With Advanced Gastrointestinal Stromal Tumors After Treatment With Imatinib
	18134 STAR	NCT03597295	A. Scott Paulson, MD	A Phase 2 Study of INCMGA00012 in Participants With Squamous Carcinoma of the Anal Canal Who Have Progressed Following Platinum-Based Chemotherapy (POD1UM-202)
	18233	NCT03720678	Carlos H.R. Becerra, MD	A Phase 1/1b Study to Evaluate the Safety and Tolerability of Immunotherapy Combinations in Participants With Gastrointestinal Malignancies
GU	17005	NCT03219333	Thomas E. Hutson, DO, PharmD	A Single-arm, Open-label, Multicenter Study of Enfortumab Vedotin (ASG-22CE) for Treatment of Patients With Locally Advanced or Metastatic Urothelial Cancer Who Previously Received Immune Checkpoint Inhibitor (CPI) Therapy
GYN	019-089	NCT03657043	Carlos H.R. Becerra, MD	Open Label Phase 2 Study of Tisotumab Vedotin for Patients with Platinum-Resistant Ovarian Cancer with a Safety Run-in of a Dose-Dense Regimen
	18232	NCT03719326	Carlos H.R. Becerra, MD	A Phase 1/1b Study to Evaluate the Safety and Tolerability of Immunotherapy Combinations in Participants With Breast and Gynecologic Malignancies
Hematologic Malignancies	018-035	NCT03266692	Houston Holmes, MD	(ACTR087) A Phase 1 Study of ACTR087, an Autologous T Cell Product, in Combination with SEA-BCMA, a Monoclonal Antibody, in Subjects with Relapsed or Refractory Multiple Myeloma
	018-154	NCT03416179	M. Yair Levy, MD	A Randomized (1:1), Double-blind, Multi-center, Placebo Controlled Study Evaluating Intensive Chemotherapy With or Without Glasdegib (PF-0444913) or Azacitidine With or Without Glasdegib in Patients With Previously Untreated Acute Myeloid Leukemia
	018-503	NCT03435848	Micah Burch, MD	A Phase 2b Open Label, Single Arm, Multi-Center Study to Assess the Efficacy and Safety of BST-236 as a Single Agent for the Treatment of Adult Patients with Newly Diagnosed Acute Myeloid Leukemia (AML), not Eligible for Standard Induction Therapy
	018-604	NCT03422627	Luis Pineiro, MD	A Phase 1b/2 Open-label Study Evaluating the Safety, Tolerability, Pharmacokinetics, Pharmacodynamics and Efficacy of AMG 592 in Adult Subjects with Steroid Refractory Chronic Graft versus Host Disease
	018-617	NCT03575351	Houston Holmes, MD	A Global Randomized Multicenter Phase 3 Trial of JCAR017 Compared to Standard of Care in Adult Subjects With High-risk, Second-line, Transplant-eligible Relapsed or Refractory Aggressive B-cell Non-Hodgkin Lymphomas (TRANSFORM).

Site	Study ID	Clinical Trial Number	Principal Investigator	Study Title
Hematologic Malignancies	018-634	NCT03555955	Micah Burch, MD	A Phase 1 Trial to Evaluate the Potential Impact of Renal Impairment on the Pharmacokinetics and Safety of CPX-351 (Daunorubicin and Cytarabine) Liposome for Injection Treatment in Adult Patients with Hematologic Malignancies
	019-034	NCT03685344	Houston Holmes, MD	A Phase I Open-Label Study to Evaluate the Safety and Antitumor Activity of Loncastuximab Tesirine and Durvalumab in Patients with Advanced Diffuse Large B-Cell Lymphoma, Mantle Cell Lymphoma, or Follicular Lymphoma
	019-040	NCT03589469	Jana Reynolds, MD	A Phase 2 Open-Label Single-Arm Study to Evaluate the Efficacy and Safety of Loncastuximab Tesirine in Patients With Relapsed or Refractory Diffuse Large B-Cell Lymphoma (DLBCL)
	019-101	NCT03386513	M. Yair Levy, MD	A Phase 1, Multi-center, Open-label Study of IMGN632 Administered Intravenously in Patients With Relapsed/Refractory CD123-positive Acute Myeloid Leukemia and Other CD123-positive Hematologic Malignancies
	18130	NCT03584516	Jana Reynolds, MD	GRAVITAS-309: A Phase 3 Study of Itacitinib or Placebo in Combination With Corticosteroids as Initial Treatment for Chronic Graft-Versus-Host Disease
	18155	NCT03734016	M. Yair Levy, MD	A Phase 3, Randomized Study of Zanubrutinib (BGB-3111) Compared With Ibrutinib in Patients With Relapsed/Refractory Chronic Lymphocytic Leukemia or Small Lymphocytic Lymphoma
	18281	NCT03893682	M. Yair Levy, MD	A Phase Ia/b Trial to Evaluate the Safety and Tolerability of CG-806 in Patients With CLL/SLL or Non-Hodgkin's Lymphomas
Sarcoma	T01820	NCT03544567	Robert Mennel, MD	A Pilot Study of Oraxol in Subjects With Cutaneous Angiosarcoma
Skin	T01835	NCT03897036	C. Lance Cowey, MD	Treatment Duration Increment and Pharmacodynamic Study of CX-4945 in Patients With Basal Cell Carcinoma (BCC)
	T01875	NCT03776136	C. Lance Cowey, MD	Efficacy and Safety of Lenvatinib (E7080/MK-7902) Plus Pembrolizumab (MK-3475) for Advanced Melanoma in Anti-Programmed Death-1/Programmed Death-Ligand 1 (PD-1/L1)-Exposed Participants (MK-7902-004/E7080-G000-225/LEAP-004)
Solid Tumors	T0-1761	NCT03170960	Carlos H.R. Becerra, MD	A Phase 1b Dose-Escalation Study of Cabozantinib (XL184) Administered Alone or in Combination With Atezolizumab to Subjects With Locally Advanced or Metastatic Solid Tumors
	018-740	NCT03680560	Carlos H.R. Becerra, MD	A Phase 1 Study of an Autologous ACTR T Cell Product in Combination with Trastuzumab, a Monoclonal Antibody, in Subjects with HER2-Positive Advanced Malignancies
	018-131	NCT03485209	Carlos H.R. Becerra, MD	Open Label Phase 2 Study of Tisotumab Vedotin for Locally Advanced or Metastatic Disease in Solid Tumors

Feature Article

ADVANCES IN MELANOMA TREATMENT: IMMUNOTHERAPY AND MOLECULARLY TARGETED THERAPY

The challenge of melanoma

Lance Cowey, MD

According to the American Academy of Dermatology, more than 1 million Americans are living with melanoma, and it is estimated that nearly 200,000 new cases of melanoma will be diagnosed in 2019. Half of those new cases are expected to be invasive cancer. The incidence of melanoma has more than doubled since 1982. Although the five-year survival rate for melanoma that has not spread to the lymph nodes is 99%, the survival rate for cancer that has spread to regional and distant sites is much lower (64% for regional and 23% for distant).

Physicians at the Baylor Charles A. Sammons Cancer Center – Dallas are involved in the latest research that is improving the diagnosis and treatment of melanoma. Comprehensive skin cancer treatment is available through the Skin Malignancy Research and Treatment Center at Baylor University Medical Center. The multidisciplinary team participates in screening, evaluation and treatment, as well as new research into the treatment of malignant skin conditions. This center is one of the few national programs participating in a retrospective database for skin malignancies designated by the American Academy of Dermatology.

Image: Gene therapy for cancer therapy with T-cell and pipette. ©Adobe Stock

According to Lance Cowey, MD, medical director of the Skin Malignancy Research and Treatment Center and a medical oncologist on the medical staff at Baylor Dallas, “Patients can come to one place and have their skin cancers diagnosed and treated to completion no matter the stage. Our skin malignancy center has a very high level of expertise and offers personalized care for all, no matter the level of complexity. Additionally, we participate in clinical trials to improve skin malignancy outcomes for all patients. These things truly set Baylor Sammons Cancer Center – Dallas apart from other centers for this disease.”

Checkpoint inhibitor immunotherapy in melanoma

The introduction of checkpoint inhibitor immunotherapies has greatly improved the treatment of melanoma in the last 10 years. This improvement has been seen especially in metastatic melanoma, which previously had no standard of care and a median overall survival of less than one year. In 2011, the US Food and Drug Administration (FDA) approved the first checkpoint inhibitor: ipilimumab for metastatic melanoma. Ipilimumab is a human monoclonal antibody against cytotoxic T lymphocyte-associated antigen 4 (CTLA-4). CTLA-4 is expressed on activated T-cells and sends an inhibitory signal to reduce T-cell function and prevent immune over activation. Thus, blocking CTLA-4 can alleviate immunosuppression and provoke the T-cells to attack tumor cells. Although early studies with anti-CTLA-4 therapy were promising, low efficacy and poor tolerability encouraged researchers to continue identifying new therapies.

In 2014, two checkpoint inhibitors were approved for a subset of patients with advanced or unresectable melanoma: pembrolizumab and nivolumab. These inhibitors target programmed cell death protein 1 (PD-1). Like CTLA-4, PD-1 is expressed on the surface of T-cells and negatively regulates immune responses, though PD-1 is also expressed on other immune cells. PD-1 binds the membrane protein PD-L1, which is highly expressed on cancer cells and allows the cancer cells to evade immune surveillance. Recent results from four-year follow-up with patients in the KEYNOTE-006 pembrolizumab trial, presented at the 2018 American Society of Clinical Oncology annual meeting, showed a four-year overall survival rate of 42%, compared to 36% with ipilimumab, in patients with unresectable stage III-IV melanoma. The combination of nivolumab and ipilimumab has also been approved for advanced melanoma and has further advanced clinical outcomes with recent five-year survival data showing a median overall survival greater than 60 months with this combination of agents (Larkin, et al. *N Engl J Med* 2019 Sep 28.doi: 10.1056/NEJMoa1910836).

In the last two years, FDA approvals for nivolumab and pembrolizumab have been extended to adjuvant use for certain melanoma patients with lymph node involvement or metastatic disease, following resection. In the phase III double-blind EORTC 1325/KEYNOTE-054 trial, the 12-month recurrence-free survival rate was 75.4% in the pembrolizumab group, compared to 62.6% in the placebo group. Similarly, in the CheckMate 238 trial of patients with stage IIIB/C or IV melanoma, nivolumab treatment produced a 70.5% 12-month recurrence-free survival rate, compared to 60.8% for patients receiving ipilimumab. Both studies were published in the *New England Journal of Medicine* in 2017 – 2018.

Dr. Cowey commented that although there is a lot of hope and excitement around the growing list of new therapies, there are also challenges: "There remains a large subset of patients who do not respond to treatment or receive long-term durable benefit. These patients are a high priority for new research and development."

Genetic basis of melanoma

Approximately half of metastatic melanoma patients have an oncogenic mutation in the BRAF gene, and over 90% of these patients have the BRAFV600E activating mutation. BRAF is a serine/threonine kinase that phosphorylates the MAP kinase MEK. Activation of BRAF activates and deregulates MAP kinase (ERK) and causes ERK-dependent downstream signaling events that promote proliferation and suppress apoptosis. The presence of the BRAFV600E mutation can improve treatment options for patients, including BRAF-targeted therapies. BRAF inhibitors include vemurafenib, dabrafenib and encorafenib, and these drugs are often combined with MEK inhibitors, such as trametinib, cobimetinib and binimetinib.

Stand Up To Cancer Melanoma Dream Team

Because there are fewer treatment options for BRAF-negative melanoma, there is great interest in developing novel melanoma therapies that do not depend on the BRAFV600E mutation. In 2012, Stand Up To Cancer established a "Melanoma Dream Team," composed of researchers across the country, to identify novel genetically targeted therapies for BRAF-negative melanoma. Researchers at Baylor Scott & White are part of the Dream Team project, and key collaborators include the Translational Genomics Research Institute and Yale Cancer Center.

The goal of this project, titled Genomics-Enabled Medicine for Melanoma (GEMM), was to leverage the power of next-generation sequencing on each tumor to design an individualized treatment plan. In a pilot study published in *Molecular Cancer Therapeutics* in 2015, researchers used next-generation sequencing to identify molecular defects in patient tumors and matched this mutation profile to a portfolio of candidate therapies. According to Dr. Cowey, who is also a Melanoma Dream Team investigator, "This mutation-to-drug matchmaking was done after careful tumor analysis and under the guidance of a tumor board. We expect that this work will yield a greater understanding of the genetic basis of melanoma and improve treatment options for patients."

The pilot study also led to a multicenter phase II trial for patients with BRAF-wild type metastatic melanoma, which was sponsored by Stand Up To Cancer and the Melanoma Research Alliance. For this clinical trial, researchers will compare the best overall response rate to binimetinib (MEK162), based on a personalized molecularly targeted strategy, with the historical best overall response rate of 7% in this patient population. Patient tissue and blood samples are also being used for additional molecular analysis and ex vivo testing. Baylor Dallas is one of only eight sites participating in this national clinical trial and the only site in Texas.

Immunotherapy for patients with nonmelanoma skin cancers

With the success of immunotherapy for melanoma, similar approaches are under investigation for cutaneous squamous cell carcinoma (CSCC), basal cell carcinoma and Merkel cell carcinoma (MCC).

Basal cell carcinoma and CSCC, as ultraviolet-associated cancers, are often associated with the biomarkers for potential success with PD-1 checkpoint inhibitor therapy. These biomarkers include PD-L1 positivity on the tumor, microsatellite instability and a high tumor mutation burden. Highly mutated tumors are more likely to express neoantigens that attract T-cells. In 2018, cemiplimab (anti-PD-1) was approved for patients with metastatic or locally advanced CSCC who are not candidates for curative surgery or radiation therapy. This approval was based on a combined analysis of the R2810-ONC-1423 phase I and R2810-ONC-1540 phase II study, published in the *New England Journal of Medicine* in 2018, showing overall response rates of 50% and 47%, respectively.

> Patients can come to one place and have their skin cancers diagnosed and treated to completion no matter the stage. Our skin malignancy center has a very high level of expertise and offers personalized care for all, no matter the level of complexity.
>
> **Lance Cowey, MD**
> Medical director of the Skin Malignancy Research and Treatment Center at Baylor University Medical Center

Since 2017, two immunotherapies have been approved for certain patients with metastatic MCC, avelumab (anti-PD-L1) and pembrolizumab (PD-1). In the phase II open-label single-arm JAVELIN Merkel 200 trial, published in the *Journal for ImmunoTherapy of Cancer* in 2018, avelumab-treated patients with metastatic MCC who had progressed with chemotherapy experienced a 33% objective response rate, with 74% of responses lasting for one year or longer. Approval of pembrolizumab was based on KEYNOTE-017, a phase II nonrandomized open-label trial of patients who had not received systemic therapy for advanced MCC. Results of two-year follow-up were reported in the *Journal of Clinical Oncology* in 2019. The objective response rate was 56%, with a complete response rate of 24%, and 96% of responders had response durations greater than six months. We have a number of trials ongoing for these and other cancers, such as an open-label investigational immune-therapy trial of nivolumab in cancers that are advanced or have spread (CheckMate 627; NCT02832167).

NEAR-INFRARED FLUORESCENCE FOR SENTINEL NODE BIOPSY IN MELANOMA

John T. Preskitt, MD

Evaluation of nearby lymph nodes is an essential part of disease staging for melanoma. Sentinel lymph nodes are typically detected using scintigraphy with technetium-99m or visualization with vital blue dyes. One of the newest strategies uses the near-infrared fluorescence dye indocyanine green (ICG), which has higher sensitivity than traditional methods. ICG use could also avoid problems associated with traditional detection methods, including a ~1% risk of anaphylaxis with vital blue dyes and the need for specialized handling and disposal of technetium-99m. Physicians on the medical staff at Baylor Dallas are involved in testing ICG and evaluating the best methods for sentinel lymph node biopsy.

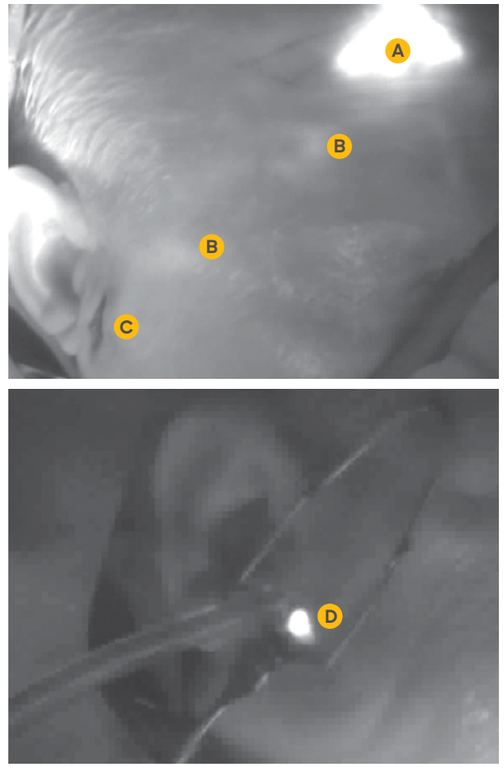
History of sentinel lymph node biopsy in melanoma

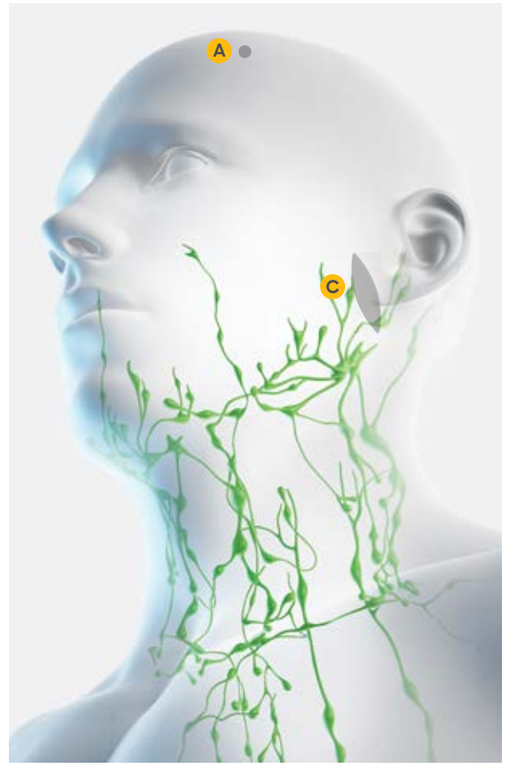
Best practices for managing regional lymph nodes in melanoma have changed dramatically in the past five years due to surprising results from key clinical trials. In the phase III multicenter selective lymphadenectomy trial (MSLT-I), published in 2014 in the *New England Journal of Medicine*, sentinel node biopsy with complete lymph node dissection improved 10-year disease-free survival among patients with intermediate and thick melanomas (intermediate: 71.3% vs. 64.7%; thick: 50.7% vs. 40.5%), compared to nodal observation. This trial indicated that sentinel lymph node biopsy provides important prognostic information about melanoma, as expected.

However, a follow-up trial, MSLT-II, which was published in 2017 in the *New England Journal of Medicine*, changed the interpretation. The investigators randomized sentinel lymph node-positive patients to receive either complete lymph node dissection or nodal observation, and the mean three-year rate of melanoma-specific survival was similar for both groups (86% for dissection vs. 86% for observation). Overall, sentinel lymph node status remained a key prognostic indicator for melanoma, though lymph node dissection was no longer necessarily recommended. This means that the quality and accuracy of the sentinel lymph node biopsy is extremely important because it is used to guide the next treatment steps without the benefit of additional tissue from complete lymph node dissection.

Quality improvement research at Baylor Sammons Cancer Center

Given the importance of sentinel lymph node status as a predictor of melanoma outcomes, John T. Preskitt, MD, chief of surgical oncology at Baylor Dallas, and Christine Landry, MD, surgical oncologist on the medical staff at Baylor Dallas, have undertaken a study to evaluate their prognostic accuracy of a sentinel





A: Primary melanoma injection site with 2.5 mg ICG using near infrared imaging. **B:** Transdermal visualization of dermal lymphatics. **C:** Sentinel node biopsy wound. **D:** Sentinel node with afferent lymphatic; confirmed with radiotracer.

lymph node biopsy. They focused on the false negatives: cases where the sentinel lymph node did not have cancer at the time of biopsy but the patient subsequently developed cancer within two years. They measured the false negative rate, which is the number of false negative cases divided by the number of false negative and true positive cases. In an IRB-approved trial initiated in 2015 in collaboration with Baylor Scott & White Research Institute, they compared their false negative rates to those in prior trials, such as MSLT-II, which range from 5% to 13%. In a pilot study of 110 patients treated at Baylor Dallas, they found false negative rates of 7.7%. This work is part of an ongoing prospective registry to track quality of care. According to Dr. Preskitt, “That was good, but we wanted to do even better.”

In more recent work, they have implemented a protocol using indocyanine green fluorescent dye to detect sentinel lymph nodes using a near infrared fluorescent imaging system, which provides real-time visualization of the sentinel lymph node. Dr. Preskitt notes that their preliminary results with ICG are promising and may lead to even lower false negative rates.

Looking toward the future, Dr. Preskitt suggests that next steps could involve the development of biologics to target the near-infrared fluorescence signal specifically to the cancer cells in melanoma. This work is ongoing for colon cancer, where antibodies exist that specifically target the cancer cells and can guide the surgeon specifically to lymph nodes with cancer cells. “We hope that developing these technologies for melanoma will minimize unnecessary lymph node surgery and make it more accurate, allowing us to provide the best care for patients.”

IMMUNOTHERAPY FOR UROLOGIC CANCER

Thomas Hutson, DO, PharmD, FACP

In the past five years, checkpoint inhibitor immunotherapy has transformed the standard of care for urologic cancers. Urologic cancer, also known as genitourinary cancer, includes cancers that affect the urinary system and the male reproductive system. The major types of urologic cancers include bladder cancer, renal cancer, prostate cancer and testicular cancer. Improvements in detection and management of early-stage urologic cancer have reduced mortality, but the prognosis for advanced urologic cancer remains grim. According to the Surveillance, Epidemiology, and End Results (SEER) program database, the five-year survival for metastatic prostate cancer is 30.5%; for metastatic bladder cancer it is 4.6%; and for metastatic renal cancer, 12.0%.

Image: Bladder cancer ©Adobe Stock

Early immunotherapies

Prior to the development of checkpoint inhibitors for urologic cancers, a small number of immunotherapies were already in use. For renal cancer, these therapies included interleukin-2 and interferon alpha. The FDA approved interleukin-2 in 1992 based on its ability to produce durable complete responses in a small percentage of patients, but side effects posed a significant challenge. Interferon alpha presents fewer side effects but also fewer benefits. For superficial bladder cancer, the FDA approved intravesical bacillus Calmette-Guérin in 1990. This bacterium, which is also used to vaccinate against tuberculosis, attracts an immune response to the site of the early-stage cancer.

For prostate cancer, the main application of immunotherapy is sipuleucel-T, a cell-based therapeutic vaccine and the only therapeutic cancer vaccine approved in the US. For this treatment, the patient's dendritic cells are collected and incubated with a fusion protein consisting of a prostate cancer antigen (prostatic acid phosphatase) and granulocyte-macrophage colony stimulating factor, which promotes maturation of the dendritic cells. These activated immune cells are then returned to the patient and allowed to target the cancer. Sipuleucel-T was approved by the FDA in 2010 for asymptomatic metastatic androgen-independent prostate cancer. Approval was based on the IMPACT, D9901 and D9902a phase III trials, which showed approximately four months increased survival without tumor shrinkage or a change in progression.

Thomas Hutson, DO, PharmD, FACP, co-medical director of the Genitourinary Cancer Research and Treatment Center at Baylor Dallas, noted that Baylor Sammons Cancer Center – Dallas has consistently been on the forefront of treatment for urologic cancers: "The first commercial use of sipuleucel-T in Texas was at our center. In fact, one of our first patients was Harley Hotchkiss, a businessman, philanthropist and close friend of T. Boone Pickens." T. Boone Pickens has since invested in this culture of innovation with a $10 million philanthropic donation, which allowed Baylor Sammons Cancer Center to create the T. Boone Pickens Cancer Hospital as the first dedicated cancer hospital in North Texas.

Although these early immunotherapies provide substantial benefit in some patients, side effects and limited efficacy have caused researchers to search for new strategies.

Checkpoint inhibitors

Within the last 10 years, promising results for a variety of cancers have caused a radical shift toward an emphasis on the checkpoint inhibitors for cancer immunotherapy. Dr. Hutson described the way that checkpoint inhibitor immunotherapies have altered the therapeutic landscape for urologic cancer. "These immune therapies are replacing older therapies because they have greater efficacy. In some cases, they also provide a therapeutic option for patients who are ineligible for chemotherapy. It is an area of active research, and the FDA is approving multiple new checkpoint inhibitor-based therapies each year. Because we are involved in the clinical research, we are in a position to rapidly incorporate new immunotherapeutics into our cancer care strategy at Baylor Sammons Cancer Center – Dallas." The next sections describe the impact of checkpoint inhibitors in urologic cancers and new studies underway in collaboration with Baylor Scott & White Research Institute.

Bladder cancer. Urothelial carcinoma, which develops from the transitional epithelial cells, is the primary type of bladder cancer. Cisplatin chemotherapy is the standard first-line therapy for metastatic urothelial cancer with overall response rates of 60% to 70%. However, of those who do not respond to chemotherapy, only 10% to 15% respond to second-line chemotherapy. Therefore, checkpoint immunotherapies were approved in 2016 to 2018 as second-line therapies for patients with metastatic disease who have progressed on or after platinum-based chemotherapy. The response rates to checkpoint inhibitors in these bladder cancer patients ranged from 13% to 21%. The approved checkpoint inhibitors for second-line therapy include atezolizumab, durvalumab and avelumab (anti-PD-L1), as well as nivolumab and pembrolizumab (anti-PD-1).

Approximately half of patients with advanced urothelial carcinoma are ineligible for cisplatin chemotherapy, and there has been great interest in identifying first-line treatment options for these patients. Therefore, in 2017, the FDA provided accelerated approval for pembrolizumab and atezolizumab as first-line monotherapies for cisplatin-ineligible patients with locally advanced or metastatic urothelial carcinoma, based on single-arm studies. However, early analysis of two ongoing phase III trials, KEYNOTE-361 and IMvigor130, showed that patients whose tumors had low levels of PD-L1 had decreased survival compared to those receiving platinum-based chemotherapy. This prompted the FDA in 2018 to limit approval to patients who are ineligible for any platinum-containing chemotherapy or patients who are cisplatin-ineligible and who have high PD-L1 expression in their urothelial tumors. Ongoing studies are focused on testing new candidate first-line monotherapies and combination therapies for advanced urothelial cancer, and newer studies are evaluating checkpoint inhibitors as adjuvant therapies or for treating early-stage disease.

Renal cancer. Over 90% of kidney cancers are renal cell carcinoma, which originates in the lining of the proximal convoluted tubule. In 2015, nivolumab was approved as a second-line therapy for metastatic renal cell carcinoma that has failed to respond to previous therapy. Then, in 2018, nivolumab plus the CTLA-4 inhibitor ipilimumab was approved as a first-line therapy for patients with intermediate or poor-risk previously untreated renal cell carcinoma. Approximately 75% of advanced renal cell carcinoma patients are in the intermediate or poor-risk categories. The approval was based on interim results of the CheckMate 214 phase III trial, which were published in 2018 in the *New England Journal of Medicine*. The 18-month overall survival rate was 75% with the checkpoint inhibitor therapy, compared to 60% for sunitinib. Sunitinib, a vascular endothelial growth factor inhibitor, was the standard first-line therapy for advanced renal carcinoma. Notably, the immunotherapy also produced a complete response rate of 9%, compared to 1% with sunitinib.

Combination therapies that utilize regimens consisting of immunotherapies and small molecule inhibitors are also showing promise for renal cell carcinoma. In April 2019, the FDA approved pembrolizumab plus the tyrosine kinase inhibitor axitinib for first-line treatment of advanced renal cell carcinoma. This approval was based on interim analysis of the KEYNOTE-426 randomized, open-label trial, which was published in the *New England Journal of Medicine* in 2019. Median progression-free survival was 15.1 months for the combination therapy and 11.1 months for sunitinib. The combination therapy also increased overall survival and objective response rate.

Prostate cancer. The therapeutic potential of checkpoint inhibitors in prostate cancer has been less clear than for other genitourinary cancers. Prostate tumors are known to lack the typical markers that predict checkpoint inhibitor success: T-cell infiltration and high tumor mutation burden. However, the results are promising for subsets of prostate cancer patients. Pembrolizumab was approved in 2017 as a second-line therapy for patients with unresectable or metastatic solid tumors with microsatellite instability or mismatch repair deficiency. A recent study, published in *JAMA Oncology* in 2018, estimated that 3% of prostate tumors would be eligible for checkpoint inhibitor treatment by these criteria and 5 of 11 treated patients treated in that study showed a durable response up to 89 weeks. The search for biomarkers that predict response to treatment may reveal additional subsets of patients who will receive durable benefit from checkpoint inhibitor monotherapies.

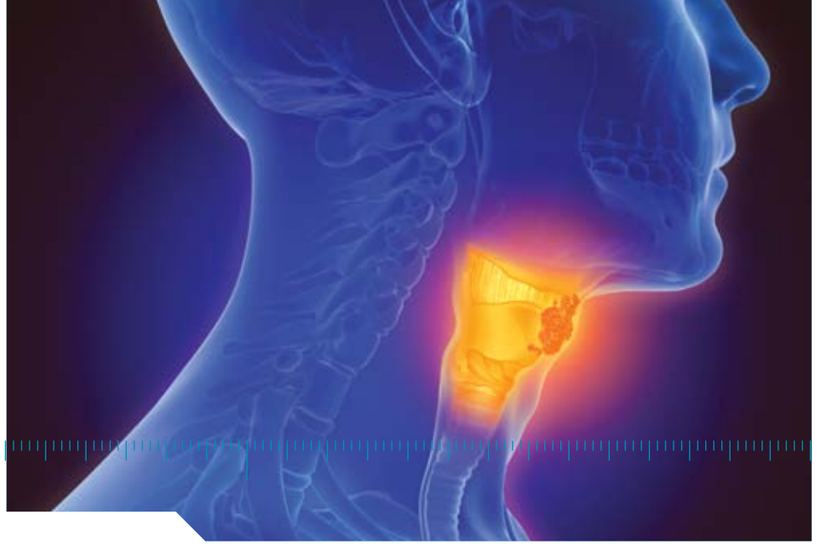
> These immune therapies are replacing older therapies because they have greater efficacy. In some cases, they also provide a therapeutic option for patients who are ineligible for chemotherapy. It is an area of active research, and the FDA is approving multiple new checkpoint inhibitor-based therapies each year. Because we are involved in the clinical research, we are in a position to rapidly incorporate new immunotherapeutics into our cancer care strategy at Baylor Sammons Cancer Center – Dallas.
>
> **Thomas Hutson, DO, PharmD, FACP**
> Co-medical director of the Genitourinary Cancer Research and Treatment Center at Baylor Dallas

Ongoing trials

Baylor Sammons Cancer Center – Dallas, in collaboration with Baylor Scott & White Research Institute, regularly participates in multicenter trials of immunotherapies for urologic cancers. Dr. Hutson noted that "our research program has been involved in the FDA regulatory approval for most of the new therapies for renal cancer, and that involvement continues with the checkpoint inhibitors."

One of these ongoing studies is the CheckMate 9ER trial, which is testing novel first-line combination therapies. In this phase III study, investigators are comparing progression-free survival in patients with advanced or metastatic renal cell carcinoma who have not received prior systemic therapy. Participants receive either nivolumab plus cabozantinib, a tyrosine kinase inhibitor, ipilimumab plus nivolumab and cabozantinib, or sunitinib alone. In another study, the KEYNOTE-564 trial, investigators are evaluating pembrolizumab as an adjuvant monotherapy coupled with nephrectomy for certain patients with renal cell carcinoma.

According to Dr. Hutson, "We are seeing durable responses, and sometimes complete responses, in patients treated with checkpoint inhibitors. It is very exciting. I think the future of treatment for urologic cancer will involve immune therapy as one arm of a multifaceted treatment regimen. As we learn more about combination therapies, we can fine-tune those treatment regimens to fit individual patients."



ADVANCED TREATMENT OF HEAD AND NECK CANCER

Head and neck cancer is a broad category that includes cancers in the oral cavity, nasal cavity, pharynx, larynx, sinuses, trachea and salivary glands and is the sixth most common form of cancer worldwide. Over 90% of head and neck cancers are squamous cell carcinomas (HNSCC) arising from the mucosal surface of the oral cavity, larynx or pharynx. The five-year overall survival rate for HNSCC is 40% to 50%, and the recurrence rate is approximately 50%.

Over 85% of head and neck cancers are linked to tobacco use, making this the largest risk factor. Other important risk factors include older age (>50), male sex and high alcohol consumption. Epstein-Barr virus (EBV) is considered a causative agent for certain head and neck cancers, such as nasopharyngeal cancer. Furthermore, human papillomavirus (HPV-16,18) is associated with oropharyngeal, laryngeal and oral cavity cancers, and tobacco use is not a major risk factor for these cancers. The incidence of HPV-associated head and neck cancer is on the rise.

Multidisciplinary head and neck cancer care at Baylor Dallas

Baylor Sammons Cancer Center – Dallas offers a multidisciplinary approach via coordinated services. The team of specialists includes cancer surgeons, medical oncologists, radiation oncologists, otolaryngologists, patient care coordinators, dentists, speech pathologists and therapists. They use advanced techniques to evaluate swallowing disorders, including fiberoptic endoscopic evaluation of swallowing and barium dysphagia analysis. Rehabilitation techniques include neuromuscular electrical stimulation, tracheoesophageal prosthesis placement, electrolarynx training, videostroboscopy and voice therapy.

For 2018 – 2019, *U.S. News & World Report* ranked Baylor University Medical Center among the top 50 hospitals nationwide in treating ear, nose and throat disease, with “excellent” ratings in patient survival, number of patients and the availability of patient services.

According to Eric Nadler, MD, MPP, a medical oncologist on the medical staff at Baylor Dallas, “The biggest advances in head and neck cancer over the past five years have been the incorporation of immunotherapies, new surgical techniques and proton therapy into our therapeutic practice patterns.” The remainder of this article highlights key advances in immunotherapy for head and neck cancer at Baylor Dallas. See page 23 in this issue to learn more about transoral microsurgery. Lastly, view page 24 to learn about our cancer-specific rehabilitation program for head and neck cancer patients, as well as all cancer patients, at Baylor Dallas.

Immunotherapy in head and neck cancer

Baylor Dallas was a pioneer in immunotherapy for head and neck cancer, participating in some of the earliest trials of checkpoint inhibitors. Baylor Sammons Cancer Center – Dallas continues to be on the leading edge of immunotherapy research with a range of new approaches that include adoptive T-cell therapy, cancer vaccine trials and combination therapies.

Adoptive T-cell immunotherapy. In collaboration with Baylor Scott & White Research Institute, Baylor Dallas is one of seven sites in the US undertaking an international phase III trial for chemotherapy and adoptive T-cell immunotherapy in patients with advanced nasopharyngeal carcinoma. This landmark trial using T-cells as a first-line therapy has a total of 29 sites across the US and Asia. Nasopharyngeal cancer is rare in most parts of the world, with an annual worldwide incidence of less than 1 in 100,000 people, but it is an important cause of cancer in people of Asian or Pacific Islander ancestry. In parts of China, the incidence among males is over 20 per 100,000. Patients with metastatic nasopharyngeal cancer have a median overall survival of 11 to 22 months.

Most advanced nasopharyngeal cancers are EBV-positive, leading the researchers to select EBV antigens as the immunotherapy targets. Their approach involves isolating the patient’s T-cells and establishing an EBV-specific cytotoxic T lymphocyte cell line, which is returned to the patient. The T lymphocyte cell lines are generated by transforming the patient’s B lymphocytes with EBV. These EBV-transformed B cells present antigens to the patient-derived T-cells. This causes the T-cells to proliferate and produce CD8-positive subpopulations that recognize the EBV antigens expressed on the surface of EBV-positive tumors. When returned to the patient, these T-cells will then target and destroy the tumor cells.

According to Dr. Nadler, who is a principal investigator on the study, “This approach is similar to chimeric antigen receptor T-cell (CAR-T) therapies in that we use the patient’s own T-cells to target the cancer. However, our approach is more like a vaccine because the T-cells are exposed ex vivo to virally infected B cells.” The virus particles are killed before the T-cells are returned to the patient.

This trial, which hopes to enroll 330 patients with EBV-positive advanced nasopharyngeal cancer, will compare chemotherapy alone (gemcitabine and carboplatin) with chemotherapy plus the adoptive T-cell immunotherapy. The current trial builds on the results of a prior phase II study of 38 patients in Singapore, which was published in *Molecular Therapy* in 2013. The chemotherapy plus immunotherapy regimen was well-tolerated, and the researchers reported a median two-year overall survival rate of 62.9%, making it the largest increase in overall survival reported for this population of patients.

Cancer vaccine. Researchers at Baylor Scott & White are also developing a cancer vaccine against HPV-positive oropharyngeal cancer. HPV-positive oropharyngeal cancer is currently the most prevalent form of head and neck cancer in the US. For this work, the research team has taken advantage of the ability of dendritic cells to prime and activate immune responses by cross-presenting antigens to CD8-positive T-cells.

They created a vaccine that combines anti-human CD40 with the HPV16.E6/7 protein to mount a CD8-positive T-cell response against HPV-positive cancer cells. This dendritic cell-based strategy was used to reduce some of the concerns about safety and efficacy that have limited other attempts to create HPV-targeted cancer vaccines. In a 2016 report in *Cancer Immunology Research*, the team demonstrated that its vaccine caused both preventive and therapeutic immunity in hCD40 transgenic mice bearing TC-1 tumors. TC-1 tumor cells express the E7 oncoprotein from HPV-16, making them a useful preclinical model for studying HPV-positive tumors. They also showed that their vaccine could activate specific T-cell responses in the blood from HPV-positive head and neck cancer patients. Work is underway to bring this vaccine to human trials.

> The biggest advances in head and neck cancer over the past five years have been the incorporation of immunotherapies, new surgical techniques and proton therapy into our therapeutic practice patterns.
>
> **Eric Nadler, MD, MPP**
> Medical oncologist on the medical staff at Baylor Dallas

Checkpoint inhibitors. In 2016, the FDA approved pembrolizumab and nivolumab as second-line therapies for certain patients with advanced HNSCC. This approval was based on the KEYNOTE-012 and CheckMate 141 trials, respectively. More recently, pembrolizumab gained FDA approval as a first-line therapy for recurrent or metastatic HNSCC in combination with platinum and fluorouracil (5-FU) in all patients, or it can be given as monotherapy in tumors with a PD-L1 combined positive score (CPS) ≥1. This approval was based on the results of the KEYNOTE-48 trial, which was presented at the 2019 American Society of Clinical Oncology meeting. According to Dr. Nadler, “We typically use immunotherapies in advanced and late-stage disease. Unlike in lung cancer, where the vast majority of patients have incurable or late-stage disease, our cure rate with early-stage head and neck cancer is very high. So a smaller fraction of our patients seek immunotherapy in head and neck cancer than some other diseases, but it is an important part of treatment.”

For the future, researchers are seeking therapies that might be useful earlier in the disease course and new strategies for targeting challenging subtypes. For instance, the treatment options available to young, nonsmoking head and neck cancer patients often fall short of cure, and new therapies are needed.

TRANSORAL MICROSURGERY IN HEAD AND NECK CANCER

Transoral microsurgery is a type of minimally invasive surgery used to remove tumors from the oral cavity, larynx and pharynx with no external incisions, minimal damage to the vocal cords, and no need for reconstructive follow-up procedures. The surgeon uses a high-power microscope to view the tumor through the oral cavity and a carbon dioxide flexible laser as the cutting tool. This technique offers a rapid recovery time and reduces the likelihood of tissue damage compared to more invasive surgical methods. Transoral microsurgery is well-established for early-stage tumors of the head and neck, and it is increasingly being used for more advanced tumors.

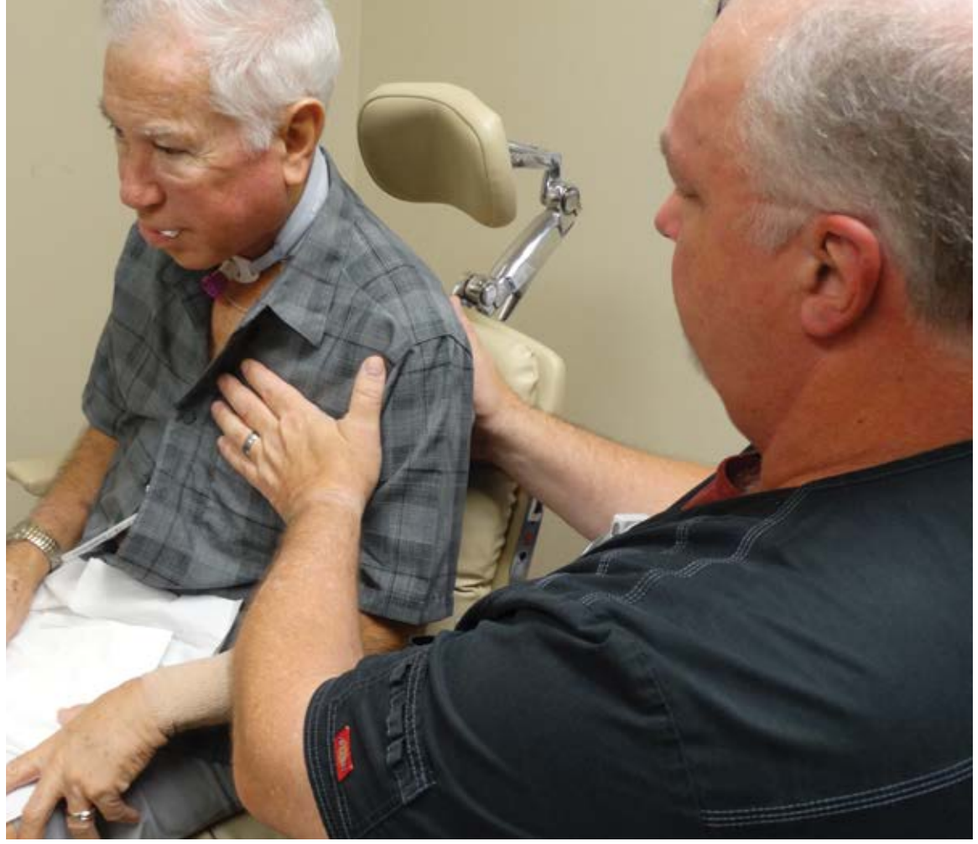
Transoral microsurgery being performed on a head and neck cancer patient at Baylor Dallas.

The team at Baylor Sammons Cancer Center – Dallas performs transoral microsurgery for head and neck cancer, along with minimally invasive robotic surgery and traditional resection with free-flap reconstruction. Dylan Lippert, MD, surgical oncologist on the medical staff at Baylor Dallas who specializes in transoral microsurgery, points out the importance of treatment at a high-volume cancer center where the entire care team has extensive experience with head and neck cancer. He mentions, “Everything that we do in head and neck cancer treatment is going to affect the way the person speaks, swallows, breathes and appears. It is such a functionally sensitive and cosmetically sensitive area, while also being very oncologically demanding.”

He notes that one of the key benefits of treatment at Baylor Sammons Cancer Center – Dallas is the expertise available in multiple aspects of head and neck cancer treatment and recovery. Head and neck cancers pose unique challenges to each member of the team. For instance, the speech and swallow therapy team faces complex challenges in restoring function after surgery, and the anesthesia team must manage the difficulties associated with airway damage or obstruction. Furthermore, he mentions that the highly trained pathology team can often detect small tumors that might be overlooked by a less experienced team, which means that more of the cancer can be removed at the time of surgery. “Each of these components makes a big difference for cancer care, and here at Baylor Dallas, we have a very streamlined process where complex procedures can become routine.”

The overall goal is to perform surgery early, which might reduce the amount of chemotherapy and radiation required for treatment. Dr. Lippert notes that with the increase in HPV-associated oropharyngeal cancer, which affects younger patients and has a better survival probability than other types of oropharyngeal cancer, there is a growing demand for minimally invasive surgery.

A 2011 multicenter study of transoral laser microsurgery in a patient population with a high prevalence of HPV advanced oropharyngeal cancer, published in *Head Neck*, found that the three-year overall survival was 86% and the local control rate was 97%, with 87% of patients reporting normal swallowing or episodic dysphagia. It has been proposed that transoral surgery may be superior to other techniques in functional recovery. A current multicenter randomized phase III trial is underway to compare radiotherapy to transoral surgery for preservation of swallowing function, and the results of this study will impact future work.



Brad Smith, CCC-SLP, CLT, a speech pathologist in the Baylor Scott & White Institute for Rehabilitation Outpatient Therapy - Sammons Center clinic, is shown working with one of his patients.

STAFF AT BAYLOR SCOTT & WHITE INSTITUTE FOR REHABILITATION ARE AN INTEGRAL PART OF THE HEAD AND NECK CANCER CARE TEAM

Head and neck cancer can be a truly debilitating disease as it affects the part of the body vital for social interactions important for everyday life. For many years, alcohol and tobacco use were the main risk factors for head and neck cancer. Now, infection with human papillomavirus (HPV) has become a risk for oropharyngeal cancers. In fact, the numbers of head and neck cancers associated with HPV is increasing in the US, while the incidence of those linked to more traditional causes is decreasing (American Cancer Society, Cancer Facts & Figures, 2019). The tumor itself may or may not create functional deficits, but surgical and/or radiation treatments for cancers of the oral cavity, pharynx and larynx often affect speech, voice and swallowing, as well as movements of the head, neck and shoulders. So, in addition to the oncologic surgeons, medical oncologists, radiologic oncologists and pathologists, it is important to have speech pathologists and physical therapists onboard the care team early.

This care team works with the patient dealing with the effects of their tumor, as well as to prepare and work with them on post-surgery and treatment effects. Baylor Scott & White Institute for Rehabilitation Outpatient Therapy - Sammons Center is located inside the Baylor Sammons Cancer Center. It has a unique therapy team dedicated to treating cancer patients called the ReVital™ Cancer Rehabilitation Program.

ReVital is the first nationwide comprehensive cancer rehabilitation program designed for patients and aligned to oncology practice needs. ReVital and Baylor Scott & White Institute for Rehabilitation have partnered to better treat cancer patients throughout our system, both in North and Central Texas. Baylor Scott & White is the only system partnered with the ReVital Cancer Rehabilitation Program in the state of Texas. This unique partnership allows patients to see physical therapists, speech pathologists, lymphedema specialists and occupational therapists who specialize in treating cancer patients all in one location. Brad Smith, CCC-SLP, CLT, a cancer survivor himself, is a speech pathologist and certified lymphedema specialist in the program at the cancer center. He routinely attends the multidisciplinary head and neck tumor conference, where treatment plans for head and neck cancer patients are discussed. His goal, with help from the treating physicians, is to evaluate and educate patients before surgery or other treatments are initiated to ease concerns regarding treatment and provide realistic expectations regarding their post-treatment recovery and rehabilitation. Patients may be given exercises to begin before treatment to keep them swallowing properly during and after radiation. If persistent difficulties develop with communication, compensatory strategies or alternative communication strategies may be required. For instance, intensive swallowing therapy may help the patient resume oral intake and achieve a “new normal.” The goal for many is to maximize their swallowing performance and return to a regular diet, but for some it is to eat at some level and prevent or avoid long-term use of a feeding tube. Trismus, or reduced oral opening, is another common issue after surgery and radiotherapy, related to trauma within the musculature of the jaws and oropharynx. Trismus can be addressed with manual therapy and specialized devices. Efforts are made to regain normal oral opening for improved speech, oral hygiene and mastication.

An additional concern addressed by Smith is lymphedema of the head and neck. Lymph flow in the head and neck region can be disrupted after surgery, when lymph nodes are taken for evaluation, as well as after radiation treatment. Treatment for those who develop lymphedema in the head and neck region is vital because this swelling can influence such basic functions as breathing, swallowing and all phases of communication, as well as cause cosmetic issues, which can affect a patient’s self-esteem. Smith works with head and neck cancer patients before, during and after treatment to make sure their best quality of life can be attained.

ReVital™ is the first nationwide comprehensive cancer rehabilitation program designed for patients and aligned to oncology practice needs. ReVital™ and Baylor Scott & White Institute for Rehabilitation have partnered to better treat cancer patients throughout our system, both in North and Central Texas. Baylor Scott & White is the only system partnered with the ReVital™ Cancer Rehabilitation Program in the state of Texas.

In addition to Smith, Karthik Jayaraman, PT, DPT, is another important member of the treatment team. Dr. Jayaraman, who himself is a survivor of cancer affecting the head and neck region, works with patients to restore proper shoulder and neck motion and improve resting posture and strength to reduce functional limitations during self-care and household or work related tasks.

As younger individuals continue to be diagnosed with head and neck cancer, these patients often work throughout their treatment or must be able to return to work as soon as possible and require adequate upper extremity and neck function to do so. "It is not enough for patients just to be able to swallow and speak," explains Jayaraman. "They have to be mobile enough to go back to work and do their former jobs, despite the side effects of surgery and/or radiation treatment that often can create stiffness and scarring."

It's all part of the multidisciplinary approach to treat patients with head and neck cancer at the Baylor Sammons Cancer Center: the medical staff to treat patients to remove or palliate their cancer and the concerted effort of the cancer rehabilitation team to make sure they are as functional as possible after treatment.

It is Dr. Jayaraman's mission to educate these patients on postural exercises, as well as neck and shoulder range of motion and strengthening exercises, before any surgery or treatment to maximize function and mobility. Once they have undergone treatment, he works with them to attain enough function to go back to work and resume as normal a lifestyle as possible. It's all part of the multidisciplinary approach to treat patients with head and neck cancer at the Baylor Sammons Cancer Center: the medical staff to treat patients to remove or palliate their cancer and the concerted effort of the cancer rehabilitation team to make sure they are as functional as possible after treatment.

December 2018 to May 2019

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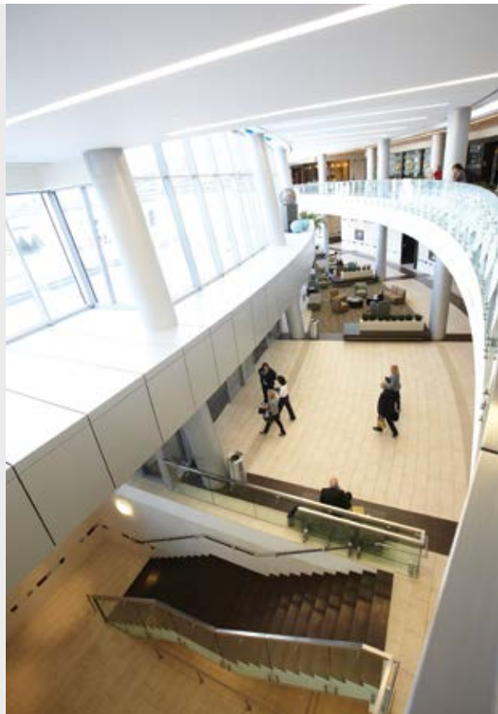

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