

CLINICAL DEVELOPMENT PROGRAM

The safety and efficacy of the agents under investigation have not been established. There is no guarantee that the agents will receive regulatory approval and become commercially available for the uses being investigated.

This document was commissioned by Lilly Medical and is intended to be used by HCPs for medical, scientific, and educational purposes.

FOR MORE THAN 50 YEARS

Loxo@Lilly aims to create medicines that make life better for all those affected by cancer around the world. Bringing together the focus and spirit of a biotech with the scale, resources, and heritage of Lilly, our team is focused on rapidly delivering impactful new medicines for people with cancer. Our approach centers on creating oncology medicines that show early signs of clinical activity and will matter to patients.

To learn more about Loxo@Lilly's commitment to people with cancer, please visit [LillyLoxoOncologyPipeline.com](https://www.lilly.com/LoxoOncologyPipeline.com).

Loxo@Lilly is committed to the development of patient-tailored therapeutics that integrate disease and target biology with drug characteristics in order to optimize treatments for patients. Our multidisciplinary approach allows for the translation of molecular and cellular discoveries into clinically meaningful outcomes. Key to this approach is Lilly's extensive and growing catalog of biomarkers.

Loxo@Lilly is dedicated to developing and delivering innovative new medicines that will make a meaningful difference to cancer patients. Building on our work in cancer treatment, we are developing new medicines as fast as possible to help people living with cancer fight their disease. For us this means putting an intense focus on the latest scientific advances and collaborating with doctors, other researchers, advocates, and payers to ensure our medicines bring value to people living with cancer.

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PHASE 3








BTK INHIBITOR

PIRTOBRUTINIB

-  BRUIN CLL-321, NCT04666038
CLL/SLL
-  BRUIN MCL-321, NCT04662255
MCL
-  BRUIN CLL-322, NCT04965493
CLL/SLL
-  BRUIN CLL-313, NCT05023980
CLL/SLL
-  BRUIN CLL-314, NCT05254743
CLL/SLL




CDK4 & 6 INHIBITOR

ABEMACICLIB

-  MONARCH 2, NCT02107703
Breast Cancer
-  MONARCH 3, NCT02246621
Breast Cancer
-  MONARCH plus, NCT02763566
Breast Cancer
-  monarchE, NCT03155997
Breast Cancer
-  CYCLONE 2, NCT03706365
Prostate Cancer
-  CYCLONE 3, NCT05288166
Prostate Cancer
-  postMONARCH, NCT05169567
Breast Cancer



RET INHIBITOR

SELPERCATINIB

-  LIBRETTO-531, NCT04211337
MTC
-  LIBRETTO-431, NCT04194944
NSCLC
-  LIBRETTO-432, NCT04819100
NSCLC


SELECTIVE ER DEGRADER

IMLUNESTRANT

-  EMBER-3, NCT04975308
Breast Cancer
-  EMBER-4, NCT05514054
Breast Cancer

VEGF RECEPTOR-2 ANTAGONIST

RAMUCIRUMAB

-  RELAY, NCT02411448
NSCLC

PHASE 2





BTK INHIBITOR

PIRTOBRUTINIB

-  BRUIN, NCT03740529
CLL/SLL or NHL



CDK4 & 6 INHIBITOR

ABEMACICLIB

-  monarchHER, NCT02675231
Breast Cancer
-  Next MONARCH 1, NCT02747004
Breast Cancer
-  NCT03703466
Breast Cancer
-  CAMPFIRE, NCT05440786
Sarcoma Cancer

RET INHIBITOR

SELPERCATINIB

-  LIBRETTO-001, NCT03157128
NSCLC, MTC, PTC, or
Other Advanced Solid Tumors
-  LIBRETTO-121, NCT03899792
Pediatric Cancer

VEGF RECEPTOR-2 ANTAGONIST





RAMUCIRUMAB

-  CAMPFIRE, NCT04145349
Pediatric Cancer

PHASE 1


CDK4 & 6 INHIBITOR

ABEMACICLIB

-  NCT02057133*
Breast Cancer
-  NCT04238819
Pediatric Cancer
-  NCT02779751
NSCLC or Breast Cancer
-  NCT05999968
Prostate Cancer

FGFR3 INHIBITOR

LOXO-435

-  NCT05614739
Urothelial Cancer or Other
Advanced Solid Tumors

KRAS G12C INHIBITOR

LY3537982

-  NCT04956640*
NSCLC, CRC, or Other Advanced Solid Tumors

NEXT-GENERATION RET INHIBITOR

LOXO-260

-  NCT05241834
Advanced Solid Tumors

PI3K α INHIBITOR

LOXO-783




-  PIKASSO-01, NCT05307705
Breast Cancer or Other Advanced Solid Tumors

SELECTIVE ER DEGRADER

IMLUNESTRANT

-  EMBER, NCT04188548*
Breast Cancer or Endometrial Cancer

CANCER TYPE

-  Advanced Solid Tumors
-  Hematologic
-  Breast
-  Lung
-  Gastrointestinal
-  Neurologic
-  Genitourinary
-  Sarcoma
-  Gynecologic
-  Thyroid

* This clinical trial is being conducted with one or more additional investigational molecules in the pipeline.

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CDK4 & 6 INHIBITOR | ABEMACICLIB

Many human tumors acquire alterations which can lead to the activation of cyclin-dependent kinases (CDKs). These alterations include mutations that directly activate CDK4 & 6 gene amplifications, which increase expression of various protein activators such as D-type cyclins; as well as genetic losses, which reduce expression of protein inhibitors such as p16. These various mechanisms as well as loss of retinoblastoma (Rb) can lead to an enhanced proliferative potential by decreasing dependency on external growth factors and mitogenic signaling pathways, which are required to stimulate growth under normal conditions.^{1,2}

Abemaciclib has been shown in vitro to be a selective ATP-competitive inhibitor of CDK4 & 6 kinase activity that prevents the phosphorylation and subsequent inactivation of the Rb tumor suppressor protein, thereby inducing G1 cell-cycle arrest and inhibition of cell proliferation.^{3,4}



ABEMACICLIB is being investigated in clinical trials in patients with breast cancer, non-small cell lung cancer, pediatric cancers, prostate cancer, or sarcoma.

RET INHIBITOR | SELPERCATINIB

Rearranged during transfection (*RET*) fusions have been identified in approximately 2% of non-small cell lung cancer,^{5,6} approximately 10% of papillary thyroid cancer,^{7,8} and less than 1% in other solid tumors including pancreatic and colorectal cancer.⁹⁻¹¹ *RET* point mutations account for approximately 60% of medullary thyroid cancer.¹²⁻¹⁴ Cancers that harbor activating *RET* fusions or *RET* mutations depend primarily on this single constitutively activated kinase for their proliferation and survival. This dependency renders such tumors highly susceptible to small-molecule inhibitors targeting *RET*.

Selpercatinib is a selective, potent, CNS-active small-molecule inhibitor of *RET*. Selpercatinib possesses nanomolar potency against diverse *RET* alterations, including *RET* fusions, activating *RET* point mutations, and acquired resistance mutations. Selpercatinib has been shown in vitro and in vivo to exhibit specificity for *RET*, with limited activity against other tyrosine kinases.^{15,16}



SELPERCATINIB is being investigated in clinical trials in patients with *RET*-associated medullary thyroid cancer, non-small cell lung cancer, papillary thyroid carcinoma, pediatric cancers, and other advanced solid tumors.

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SELECTIVE ER DEGRADER | IMLUNESTRANT

Estrogen signaling plays an important role in organ development and growth. In certain cancers, abnormal estrogen signaling via the estrogen receptor is a component of tumor growth.¹⁷ Disruption of estrogen signaling by selective estrogen receptor degraders (SERDs) is one of the treatment options for patients with estrogen-receptor-positive (ER+) cancers.

Imlunestrant is an orally available SERD that suppresses estrogen signaling and subsequently inhibits cell proliferation in ER-expressing tumor models.^{18,19}



IMLUNESTRANT is being investigated in clinical trials in patients with ER+ breast cancer or endometrial cancer.

VEGF RECEPTOR-2 ANTAGONIST | RAMUCIRUMAB

Angiogenesis is a tightly regulated, multiple-step process, which results in the formation of new blood vessels from preexisting vasculature and is an important component in the development and progression of malignant disease. Signaling by vascular endothelial growth factor (VEGF) receptor-2 in endothelial cells plays a role in inducing normal and pathologic angiogenesis and is activated by binding of ligands VEGF-A, VEGF-C, and VEGF-D.²⁰⁻²²

Ramucirumab is a human IgG1 monoclonal antibody receptor antagonist that has been shown in vitro to bind to and block the activation of VEGF receptor-2 by preventing the binding of VEGF receptor ligands VEGF-A, VEGF-C, and VEGF-D.^{23,24}



RAMUCIRUMAB is being investigated in clinical trials in patients with non-small cell lung cancer or pediatric sarcoma.

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Loxo@Lilly was created in December 2019, combining the Lilly Research Laboratories oncology organization and Loxo, which was acquired by Lilly in early 2019.

Loxo@Lilly brings together the focus and spirit of a biotech with the scale and resources of large pharma, with the goal of rapidly delivering impactful new medicines for people with cancer. Loxo@Lilly takes the strengths from both companies, and champions promising oncology medicine that can bring proven benefit to patients.

BTK INHIBITOR | PIRTOBRUTINIB

Bruton's tyrosine kinase (BTK) is critical for the propagation of B-cell receptor signaling and is upregulated in many B-cell malignancies as compared with normal B cells. BTK inhibition, both in vitro and in vivo, decreases proliferation and survival signals.²⁵

Pirtobrutinib is an investigational, oral, highly selective (in preclinical studies, over 300-fold more selective for BTK vs 98% of 370 non-BTK-kinases), non-covalent (reversible) BTK inhibitor.^{26,27} It possesses nanomolar potency independent of BTK C481 status in enzyme and cell-based assays.²⁶⁻²⁸ Pirtobrutinib has been shown in preclinical studies to reversibly bind BTK, have high target coverage regardless of BTK turnover rate, preserve activity in the presence of the C481 acquired resistance mutations, and predominantly avoid off-target kinases.²⁶



PIRTOBRUTINIB is being investigated in clinical trials in patients with chronic lymphocytic leukemia/ small lymphocytic lymphoma, mantle cell lymphoma, and non-Hodgkin's lymphoma.

FGFR3 INHIBITOR | LOXO-435

Fibroblast growth factor (FGF) receptor 3 (FGFR3) is a member of the highly conserved FGFR family of transmembrane receptors.²⁹⁻³¹ There are four FGF receptors, FGFR1-4, that each consist of an extracellular ligand-binding domain, transmembrane domain, and an intracellular tyrosine kinase domain.^{30,31} Receptor dimerization induced upon binding of the extracellular domain with a high-affinity member of the FGF family of ligands leads to phosphorylation of the intracellular domain and phospholipase C γ , PI3K-AKT, RAS-MAPK-ERK, and STAT pathways activation, playing a critical role in several biological and developmental processes.^{29,31,32} FGFR3 aberrations act as oncogenes across tumor types and have been identified in 15% to 20% of advanced urothelial bladder cancers, ~15% of uterine carcinosarcomas, ~5% of endometrial cancers, and less frequently (<5%) in other solid tumor malignancies.^{30,31,33,34} Activating FGFR3 alterations are diverse and include point mutations, fusions, amplifications, and overexpression.²⁹⁻³² Dysregulation of FGFR3 promotes oncogenesis and tumor cell proliferation, migration, and survival.^{29-32,35} Inhibition of oncogenic FGFR3 shows clinical benefit in patients with advanced urothelial cancer; however, currently approved FGFR targeted therapies that are not specific to FGFR3 demonstrate limited efficacy, dose-limiting off-target toxicities, and susceptibility to resistance mutations.^{34,36}

LOXO-435 is an isoform-selective FGFR3 inhibitor that has shown antitumor activity across FGFR3-mutant in vivo preclinical models, with preserved potency against FGFR3 gatekeeper resistance mutants.³⁴ LOXO-435 spares FGFR1 and FGFR2 in preclinical in vivo models, with the goal of avoiding dose-limiting hyperphosphatemia and other clinical adverse events that drive chronic intolerance to pan-FGFR inhibitors.³⁴



LOXO-435 is being investigated in an open-label, multicenter, phase 1a/b study in patients with FGFR3-altered advanced urothelial carcinoma and other solid tumors.

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KRAS G12C INHIBITOR | LY3537982

KRAS is the most common oncogene across all tumor types. *KRAS G12C* represents a *KRAS* mutation in patients with non-small cell lung cancer (14%), colorectal cancer (3%), and other solid tumors (1%-3%).³⁷

LY3537982 is a selective covalent inhibitor of *KRAS G12C*; in preclinical models, it demonstrates activity as monotherapy and in combination with other anticancer therapies. It has competitive pharmacokinetic properties supporting its advancement into clinical testing. LY3537982 has been shown in vitro to target the *KRAS G12C* mutation, thereby inhibiting mutant *KRAS*-dependent signaling.³⁸


 LY3537982 is being studied in a clinical trial in patients with non-small cell lung cancer, colorectal cancer, or other advanced solid tumors.

NEXT-GENERATION RET INHIBITOR | LOXO-260

Rearranged during transfection (*RET*) fusions have been identified in approximately 2% of non-small cell lung cancer,^{5,6} approximately 10% of papillary thyroid cancer,^{7,8} and less than 1% in other solid tumors including pancreatic and colorectal cancer.⁹⁻¹¹ *RET* point mutations account for approximately 60% of medullary thyroid cancer.¹²⁻¹⁴ Cancers that harbor activating *RET* fusions or *RET* mutations depend primarily on this single constitutively activated kinase for their proliferation and survival. This dependency renders such tumors highly susceptible to small-molecule inhibitors targeting *RET*.

Recently, resistance to targeted *RET* treatment has been described in the clinic with secondary solvent front mutations or other oncogenic pathway activations emerging.³⁹⁻⁴¹


LOXO-260 is a selective small-molecule inhibitor of the *RET* receptor tyrosine kinase, developed to have activity against both solvent front and gatekeeper mutations, expressed alone or together, while maintaining the potency and selectivity of current selective *RET* inhibitors.⁴² LOXO-260 has demonstrated in vitro and in vivo activity as a selective inhibitor of both wild-type and oncogenic activated *RET*, including *RET* fusions, activating *RET* point mutations, and anticipated acquired resistant mutations.

 LOXO-260 is being investigated in a clinical trial in patients with *RET* fusion-positive solid tumors, medullary thyroid cancer, and other tumors with *RET* activation refractory to selective *RET* inhibitors.

PI3Ka INHIBITOR | LOXO-783

Phosphoinositide 3-kinase alpha (PI3Ka) H1047R mutations are activating oncogenic events that occur in ~15% of breast cancers and less commonly in other cancers.⁴³

LOXO-783 is a potent, highly mutant-selective, brain-penetrant, allosteric small molecule PI3Ka H1047R inhibitor.⁴³

 LOXO-783 is being investigated in an open-label, multicenter, phase 1a/1b study in patients with *PIK3CA* H1047R-mutant advanced breast cancer and other solid tumors.

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LOXO @Lilly

Pipeline information is current through November 2, 2023.

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