Response to potential Interaction of HBO and the following chemotherapeutic agents:

1.Faslodex (Fulvestrant): This drug is indicated for ER receptor positive breast cancer most often in combination with other agents. It downregulates the expression of the ER receptor and in doing so interferes with tumor growth stimulated by the ER receptor.

It is given as an IM injection monthly.

Its toxicities include asthenia, mild nausea and vomiting, hot flashes, headaches, injection site reactions back pain and arthralgias and a flu like syndrome.

No published experience with its combination with HBO2, but mechanism of action does not appear to be dependent on O2 presence and I doubt any negative interaction of HBO2 with this drug.

2. Ixempra (Ixabepilone): This drug is a cell cycle specific agent active during the M-phase of cell division. It inhibits the dynamics of microtubules. It is given IV. Its toxicities include myelosuppression,skin rash, hypotension, flushing, fatigue and asthenia, nausea and vomiting and diarrhea, myalgias, arthralgias and other musculoskeletal pain.

Its mechanism of interaction does not appear to be oxygen dependent. No published experience of interaction with HBO2 was found on literature search.

I doubt that there would be any negative interactions with this drug.

3. Ibrance (Palbociclib): This drug is a kinase inhibitor. It interfers with enzymes that promote the activity of certain proteins especially by blocking phosphorylation.

I will append an information sheet on the drug.

No published experience is discoverable with a literature search. Its mode of action does not appea to depend on O2 availabiliity.

I doubt there would be enhanced toxicity with HBO2.

John Feldmeier

**Palbociclib**

From Wikipedia, the free encyclopedia

  (Redirected from [Ibrance](https://en.wikipedia.org/w/index.php?title=Ibrance&redirect=no))

Jump to: [navigation](https://en.wikipedia.org/wiki/Palbociclib#mw-head), [search](https://en.wikipedia.org/wiki/Palbociclib#p-search)

|  |
| --- |
| **Palbociclib** |
| Palbociclib.svg |
| **Clinical data** |
| [**Trade names**](https://en.wikipedia.org/wiki/Drug_nomenclature#Trade_names) | Ibrance |
| [**AHFS**](https://en.wikipedia.org/wiki/American_Society_of_Health-System_Pharmacists)**/**[**Drugs.com**](https://en.wikipedia.org/wiki/Drugs.com) | [ibrance](https://www.drugs.com/ibrance.html) |
| [**License data**](https://en.wikipedia.org/wiki/Regulation_of_therapeutic_goods) | * EU [EMA](https://en.wikipedia.org/wiki/European_Medicines_Agency): [by Palbociclib](http://www.ema.europa.eu/ema/index.jsp?curl=%2Fpages%2Fmedicines%2Flanding%2Fepar_search.jsp&mid=&searchTab=searchByKey&alreadyLoaded=true&isNewQuery=true&status=Authorised&status=Withdrawn&status=Suspended&status=Refused&keywordSearch=Submit&searchType=inn&taxonomyPath=&treeNumber=&searchGenericType=generics&keyword=Palbociclib)
 |
| [**ATC code**](https://en.wikipedia.org/wiki/Anatomical_Therapeutic_Chemical_Classification_System) | * [L01XE33](https://en.wikipedia.org/wiki/ATC_code_L01) ([WHO](https://www.whocc.no/atc_ddd_index/?code=L01XE33))
 |
| **Legal status** |
| [**Legal status**](https://en.wikipedia.org/wiki/Regulation_of_therapeutic_goods) | * US: [℞-only](https://en.wikipedia.org/wiki/Prescription_drug)
 |
| **Identifiers** |
| [IUPAC name](https://en.wikipedia.org/wiki/IUPAC_nomenclature_of_chemistry)[[show]](https://en.wikipedia.org/wiki/Palbociclib)* 6-Acetyl-8-cyclopentyl-5-methyl-2-{[5-(1-piperazinyl)-2-pyridinyl]amino}pyrido[2,3-d]pyrimidin-7(8*H*)-one
 |
| **Synonyms** | PD-0332991 |
| [**CAS Number**](https://en.wikipedia.org/wiki/CAS_Registry_Number) | * [571190-30-2](http://www.commonchemistry.org/ChemicalDetail.aspx?ref=571190-30-2)
 |
| [**PubChem**](https://en.wikipedia.org/wiki/PubChem#CID)CID | * [5330286](https://pubchem.ncbi.nlm.nih.gov/compound/5330286)
 |
| [**ChemSpider**](https://en.wikipedia.org/wiki/ChemSpider) | * [4487437](http://www.chemspider.com/Chemical-Structure.4487437.html)
 |
| [**KEGG**](https://en.wikipedia.org/wiki/KEGG) | * [D10372](http://www.kegg.jp/entry/D10372)YesY
 |
| [**ChEBI**](https://en.wikipedia.org/wiki/ChEBI) | * [CHEBI:85993](https://www.ebi.ac.uk/chebi/searchId.do?chebiId=CHEBI:85993)YesY
 |
| [**ChEMBL**](https://en.wikipedia.org/wiki/ChEMBL) | * [CHEMBL189963](https://www.ebi.ac.uk/chembldb/index.php/compound/inspect/CHEMBL189963)
 |
| [**PDB**](https://en.wikipedia.org/wiki/Protein_Data_Bank)[**ligand**](https://en.wikipedia.org/wiki/Ligand_%28biochemistry%29) | * LQQ ([PDBe](https://www.ebi.ac.uk/pdbe-srv/PDBeXplore/ligand/?ligand=LQQ), [RCSB PDB](http://www.rcsb.org/pdb/search/smartSubquery.do?smartSearchSubtype=ChemCompIdQuery&chemCompId=LQQ&polymericType=Any))
 |
| [**ECHA InfoCard**](https://en.wikipedia.org/wiki/ECHA_InfoCard) | [100.238.221](https://echa.europa.eu/substance-information/-/substanceinfo/100.238.221) |
| **Chemical and physical data** |
| [**Formula**](https://en.wikipedia.org/wiki/Chemical_formula) | C24H29N7O2 |
| [**Molar mass**](https://en.wikipedia.org/wiki/Molar_mass) | 447.533 g/mol |
| **3D model ([Jmol](https://en.wikipedia.org/wiki/Jmol%22%20%5Co%20%22Jmol))** | * [Interactive image](https://chemapps.stolaf.edu/jmol/jmol.php?model=O%3DC2N%28c1nc%28ncc1%2FC%28%3DC2%2FC%28%3DO%29C%29C%29Nc3ncc%28cc3%29N4CCNCC4%29C5CCCC5)
 |
| [SMILES](https://en.wikipedia.org/wiki/Simplified_molecular-input_line-entry_system)[[show]](https://en.wikipedia.org/wiki/Palbociclib)* O=C2N(c1nc(ncc1/C(=C2/C(=O)C)C)Nc3ncc(cc3)N4CCNCC4)C5CCCC5
 |
| [InChI](https://en.wikipedia.org/wiki/International_Chemical_Identifier)[[show]](https://en.wikipedia.org/wiki/Palbociclib)* InChI=1S/C24H29N7O2/c1-15-19-14-27-24(28-20-8-7-18(13-26-20)30-11-9-25-10-12-30)29-22(19)31(17-5-3-4-6-17)23(33)21(15)16(2)32/h7-8,13-14,17,25H,3-6,9-12H2,1-2H3,(H,26,27,28,29)
* Key:AHJRHEGDXFFMBM-UHFFFAOYSA-N
 |

**Palbociclib** (codenamed **PD-0332991**, trade name **Ibrance**) is a drug for the treatment of ER-positive and HER2-negative [breast cancer](https://en.wikipedia.org/wiki/Breast_cancer) [developed](https://en.wikipedia.org/wiki/Drug_development) by [Pfizer](https://en.wikipedia.org/wiki/Pfizer). It is a selective [inhibitor](https://en.wikipedia.org/wiki/Enzyme_inhibitor) of the [cyclin-dependent kinases](https://en.wikipedia.org/wiki/Cyclin-dependent_kinase) [CDK4](https://en.wikipedia.org/wiki/CDK4) and [CDK6](https://en.wikipedia.org/wiki/CDK6).[[1]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-Finn2009-1)[[2]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-pmid24369047-2)

**Contents**

 [hide]

* [1 Mechanism of action](https://en.wikipedia.org/wiki/Palbociclib#Mechanism_of_action)
* [2 Approvals and indications](https://en.wikipedia.org/wiki/Palbociclib#Approvals_and_indications)
	+ [2.1 ER+ breast cancer](https://en.wikipedia.org/wiki/Palbociclib#ER.2B_breast_cancer)
* [3 Clinical trials](https://en.wikipedia.org/wiki/Palbociclib#Clinical_trials)
	+ [3.1 HR+ breast cancer](https://en.wikipedia.org/wiki/Palbociclib#HR.2B_breast_cancer)
* [4 Pricing](https://en.wikipedia.org/wiki/Palbociclib#Pricing)
* [5 References](https://en.wikipedia.org/wiki/Palbociclib#References)

**Mechanism of action[**[**edit**](https://en.wikipedia.org/w/index.php?title=Palbociclib&action=edit&section=1)**]**

*Further information:* [*CDK inhibitor*](https://en.wikipedia.org/wiki/CDK_inhibitor)

It is a selective [inhibitor](https://en.wikipedia.org/wiki/Enzyme_inhibitor) of the [cyclin-dependent kinases](https://en.wikipedia.org/wiki/Cyclin-dependent_kinase) [CDK4](https://en.wikipedia.org/wiki/CDK4) and [CDK6](https://en.wikipedia.org/wiki/CDK6).[[1]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-Finn2009-1)[[2]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-pmid24369047-2)

**Approvals and indications[**[**edit**](https://en.wikipedia.org/w/index.php?title=Palbociclib&action=edit&section=2)**]**

**ER+ breast cancer[**[**edit**](https://en.wikipedia.org/w/index.php?title=Palbociclib&action=edit&section=3)**]**

The drug was reviewed and approved under the [Food and Drug Administration](https://en.wikipedia.org/wiki/Food_and_Drug_Administration)’s (FDA) accelerated [Priority Review](https://en.wikipedia.org/wiki/Priority_Review) and [Breakthrough Therapy](https://en.wikipedia.org/wiki/Breakthrough_Therapy) designation programs on February 3, 2015 as a treatment (in combination with [letrozole](https://en.wikipedia.org/wiki/Letrozole)) for patients with [estrogen receptor positive](https://en.wikipedia.org/wiki/Estrogen_receptor_positive) advanced breast cancer.[[3]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-3) This was an [accelerated approval](https://en.wikipedia.org/wiki/Accelerated_approval).[[4]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-FDA-AA-4)

In March 2017, the FDA granted regular approval to palbociclib for HER2 negative breast cancer, alongsite an aromatase inhibitor. [[5]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-5)

A phase 3 trial, PALOMA-2, was fully enrolled by February 2015 and reported positive results in April 2016.[[6]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-6) The results of PALOMA-2 trial (published November 2016) showed significantly longer progression-free survival in patients on palbociclib in combination with [letrozole](https://en.wikipedia.org/wiki/Letrozole), compared to patients on letrozole and placebo. Progression-free survival was assessed by radiologically confirmed disease progression by [RECIST criteria](https://en.wikipedia.org/wiki/RECIST) or death during the study. At the time of publication, there was insufficient data on overall survival, and a final analysis is planned after a total of 390 deaths occur per protocol and in agreement with regulatory agencies. Of note, it was noted that the addition of palbociclib caused higher rates of [myelotoxic](https://en.wikipedia.org/wiki/Myelotoxic) events in the study.[[7]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-Finn2016-7)

The drug was approved for use in the European Union in November 2016 as a treatment for hormone receptor (HR) positive, human epidermal growth factor receptor 2 (HER2) negative locally advanced or metastatic breast cancer either in combination with an [aromatase inhibitor](https://en.wikipedia.org/wiki/Aromatase_inhibitor) or, for women who have received prior endocrine therapy, in combination with [fulvestrant](https://en.wikipedia.org/wiki/Fulvestrant). In pre- or perimenopausal women, a luteinizing hormone releasing hormone agonist should also be given.[[8]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-8)

**Clinical trials[**[**edit**](https://en.wikipedia.org/w/index.php?title=Palbociclib&action=edit&section=4)**]**

**HR+ breast cancer[**[**edit**](https://en.wikipedia.org/w/index.php?title=Palbociclib&action=edit&section=5)**]**

The PALOMA-3 trial announced in April 2015 that the addition of palbociclib was superior to [fulvestrant](https://en.wikipedia.org/wiki/Fulvestrant) alone for [progression-free survival](https://en.wikipedia.org/wiki/Progression-free_survival).[[9]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-9)

In the phase 2 PALOMA-1 trial reported at the April 2014 annual meeting of the American Association for Cancer Research, the addition of palbociclib to [letrozole](https://en.wikipedia.org/wiki/Letrozole) was shown to significantly slow the progression of advanced cancer (median [progression-free survival](https://en.wikipedia.org/wiki/Progression-free_survival) increased from 10.2 months to 20.2 months), but was not shown to have a statistically significant effect on increasing patients' [overall survival](https://en.wikipedia.org/wiki/Overall_survival) times.[[10]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-10)[[11]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-11)[[12]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-12)

**Pricing[**[**edit**](https://en.wikipedia.org/w/index.php?title=Palbociclib&action=edit&section=6)**]**

Ibrance "can be ordered through select" [specialty pharmacies](https://en.wikipedia.org/wiki/Specialty_drugs) and "sells for $9,850 for 30 days or $118,200 for a year's supply before discounts."[[13]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-dailymail-13) According to a statement by the New York–based [Pfizer](https://en.wikipedia.org/wiki/Pfizer) the price "is not the cost that most patients or payors pay" since most prescriptions are dispensed through health plans, which negotiate discounts for medicines or get government-mandated price concessions.[[13]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-dailymail-13) In the United States specialty pharmacies fill prescriptions for drugs that are usually high cost.[[14]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-Forbes_2010-14)[[15]](https://en.wikipedia.org/wiki/Palbociclib#cite_note-nytimes.com_2015_07_16-15)

**References[**[**edit**](https://en.wikipedia.org/w/index.php?title=Palbociclib&action=edit&section=7)**]**

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	5. [**Jump up ^**](https://en.wikipedia.org/wiki/Palbociclib#cite_ref-5) cite web | url=<https://www.fda.gov/Drugs/InformationOnDrugs/ApprovedDrugs/ucm549978.htm>
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| [[hide](https://en.wikipedia.org/wiki/Palbociclib)]* [**v**](https://en.wikipedia.org/wiki/Template%3ATargeted_cancer_therapeutic_agents)
* [**t**](https://en.wikipedia.org/wiki/Template_talk%3ATargeted_cancer_therapeutic_agents)
* [**e**](https://en.wikipedia.org/w/index.php?title=Template:Targeted_cancer_therapeutic_agents&action=edit)

[**Targeted cancer therapy**](https://en.wikipedia.org/wiki/Targeted_cancer_therapy) **/** [**antineoplastic agents**](https://en.wikipedia.org/wiki/Antineoplastic) **(**[**L01**](https://en.wikipedia.org/wiki/ATC_code_L01)**)** |
| [**CI**](https://en.wikipedia.org/wiki/Cancer_immunotherapy)[**monoclonal antibodies**](https://en.wikipedia.org/wiki/Monoclonal_antibody_therapy) **("-mab")** |

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| --- | --- |
| [**Receptor tyrosine kinase**](https://en.wikipedia.org/wiki/Receptor_tyrosine_kinase) | * [ErbB](https://en.wikipedia.org/wiki/ErbB): [*HER1/EGFR*](https://en.wikipedia.org/wiki/Epidermal_growth_factor_receptor) ([Cetuximab](https://en.wikipedia.org/wiki/Cetuximab)
* [Panitumumab](https://en.wikipedia.org/wiki/Panitumumab))
* [*HER2/neu*](https://en.wikipedia.org/wiki/HER2/neu) ([Trastuzumab](https://en.wikipedia.org/wiki/Trastuzumab)
* [Trastuzumab emtansine](https://en.wikipedia.org/wiki/Trastuzumab_emtansine))
 |
| **Others for solid tumors** | * [*EpCAM*](https://en.wikipedia.org/wiki/EpCAM) ([Catumaxomab](https://en.wikipedia.org/wiki/Catumaxomab)
* [Edrecolomab](https://en.wikipedia.org/wiki/Edrecolomab))
* [*VEGF-A*](https://en.wikipedia.org/wiki/Vascular_endothelial_growth_factor_A) ([Bevacizumab](https://en.wikipedia.org/wiki/Bevacizumab))
 |
| [**Leukemia**](https://en.wikipedia.org/wiki/Leukemia)**/**[**lymphoma**](https://en.wikipedia.org/wiki/Lymphoma) | * [lymphoid](https://en.wikipedia.org/wiki/Lymphatic_system): [*CD20*](https://en.wikipedia.org/wiki/CD20) ([Ibritumomab](https://en.wikipedia.org/wiki/Ibritumomab_tiuxetan)
* [Ofatumumab](https://en.wikipedia.org/wiki/Ofatumumab)
* [Rituximab](https://en.wikipedia.org/wiki/Rituximab)
* [Tositumomab](https://en.wikipedia.org/wiki/Tositumomab)), [*CD30*](https://en.wikipedia.org/wiki/CD30) ([Brentuximab](https://en.wikipedia.org/wiki/Brentuximab_vedotin)), [*CD52*](https://en.wikipedia.org/wiki/CD52) ([Alemtuzumab](https://en.wikipedia.org/wiki/Alemtuzumab))
* [myeloid](https://en.wikipedia.org/wiki/Myeloid): [*CD33*](https://en.wikipedia.org/wiki/CD33) ([Gemtuzumab](https://en.wikipedia.org/wiki/Gemtuzumab_ozogamicin%22%20%5Co%20%22Gemtuzumab%20ozogamicin))
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 |
| [**Tyrosine-kinase inhibitors**](https://en.wikipedia.org/wiki/Tyrosine-kinase_inhibitor) **("-nib")** |

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| [**Receptor tyrosine kinase**](https://en.wikipedia.org/wiki/Receptor_tyrosine_kinase) | * [ErbB](https://en.wikipedia.org/wiki/ErbB): [*HER1/EGFR*](https://en.wikipedia.org/wiki/Epidermal_growth_factor_receptor) ([Brigatinib](https://en.wikipedia.org/wiki/Brigatinib%22%20%5Co%20%22Brigatinib)
* [Erlotinib](https://en.wikipedia.org/wiki/Erlotinib)
* [Gefitinib](https://en.wikipedia.org/wiki/Gefitinib)
* [Olmutinib](https://en.wikipedia.org/wiki/Olmutinib)
* [Osimertinib](https://en.wikipedia.org/wiki/Osimertinib)
* [Rociletinib](https://en.wikipedia.org/wiki/Rociletinib)
* [Vandetanib](https://en.wikipedia.org/wiki/Vandetanib))
* *HER1/EGFR and* [*HER2/neu*](https://en.wikipedia.org/wiki/HER2/neu)
	+ [Afatinib](https://en.wikipedia.org/wiki/Afatinib)
	+ [Lapatinib](https://en.wikipedia.org/wiki/Lapatinib)
	+ [Neratinib](https://en.wikipedia.org/wiki/Neratinib)
* [RTK class III](https://en.wikipedia.org/wiki/RTK_class_III): [*C-kit*](https://en.wikipedia.org/wiki/CD117) *and* [*PDGFR*](https://en.wikipedia.org/wiki/Platelet-derived_growth_factor_receptor) ([Axitinib](https://en.wikipedia.org/wiki/Axitinib%22%20%5Co%20%22Axitinib)
* [Masitinib](https://en.wikipedia.org/wiki/Masitinib)
* [Pazopanib](https://en.wikipedia.org/wiki/Pazopanib)
* [Sunitinib](https://en.wikipedia.org/wiki/Sunitinib)
* [Sorafenib](https://en.wikipedia.org/wiki/Sorafenib)
* [Toceranib](https://en.wikipedia.org/wiki/Toceranib))
* [*FLT3*](https://en.wikipedia.org/wiki/CD135) ([Lestaurtinib](https://en.wikipedia.org/wiki/Lestaurtinib%22%20%5Co%20%22Lestaurtinib))
* [*VEGFR*](https://en.wikipedia.org/wiki/VEGF_receptors)
	+ [Axitinib](https://en.wikipedia.org/wiki/Axitinib)
	+ [Cediranib](https://en.wikipedia.org/wiki/Cediranib)
	+ [Lenvatinib](https://en.wikipedia.org/wiki/Lenvatinib)
	+ [Nintedanib](https://en.wikipedia.org/wiki/Nintedanib)
	+ [Pazopanib](https://en.wikipedia.org/wiki/Pazopanib)
	+ [Regorafenib](https://en.wikipedia.org/wiki/Regorafenib)
	+ [Semaxanib](https://en.wikipedia.org/wiki/Semaxanib)
	+ [Sorafenib](https://en.wikipedia.org/wiki/Sorafenib)
	+ [Sunitinib](https://en.wikipedia.org/wiki/Sunitinib)
	+ [Tivozanib](https://en.wikipedia.org/wiki/Tivozanib)
	+ [Toceranib](https://en.wikipedia.org/wiki/Toceranib)
	+ [Vandetanib](https://en.wikipedia.org/wiki/Vandetanib)

*RET inhibitors:* [Vandetanib](https://en.wikipedia.org/wiki/Vandetanib) (also VEGFR and EGFR). [Entrectinib](https://en.wikipedia.org/wiki/Entrectinib) (ALK, ROS1, NTRK). *c-MET inhibitor:* [Cabozantinib](https://en.wikipedia.org/wiki/Cabozantinib) (also VEGFR2). |
| [**Non-receptor**](https://en.wikipedia.org/wiki/Non-receptor_tyrosine_kinase) | * [*bcr-abl*](https://en.wikipedia.org/wiki/Bcr-abl_fusion_protein)
	+ [Imatinib](https://en.wikipedia.org/wiki/Imatinib)
	+ [Dasatinib](https://en.wikipedia.org/wiki/Dasatinib)
	+ [Nilotinib](https://en.wikipedia.org/wiki/Nilotinib)
	+ [Ponatinib](https://en.wikipedia.org/wiki/Ponatinib)
	+ [Radotinib](https://en.wikipedia.org/wiki/Radotinib)
* [*Src*](https://en.wikipedia.org/wiki/Src_%28gene%29) ([Bosutinib](https://en.wikipedia.org/wiki/Bosutinib)
* [Dasatinib](https://en.wikipedia.org/wiki/Dasatinib))
* [*Janus kinase*](https://en.wikipedia.org/wiki/Janus_kinase)
	+ [Lestaurtinib](https://en.wikipedia.org/wiki/Lestaurtinib)
	+ [Momelotinib](https://en.wikipedia.org/wiki/Momelotinib)
	+ [Ruxolitinib](https://en.wikipedia.org/wiki/Ruxolitinib)
	+ [Pacritinib](https://en.wikipedia.org/wiki/Pacritinib)
* [*MAP2K*](https://en.wikipedia.org/wiki/Mitogen-activated_protein_kinase_kinase)
	+ [Cobimetinib](https://en.wikipedia.org/wiki/Cobimetinib)
	+ [Selumetinib](https://en.wikipedia.org/wiki/Selumetinib)
	+ [Trametinib](https://en.wikipedia.org/wiki/Trametinib)
	+ [Binimetinib](https://en.wikipedia.org/wiki/Binimetinib)
* [*EML4*](https://en.wikipedia.org/wiki/EML4)*-*[*ALK*](https://en.wikipedia.org/wiki/Anaplastic_lymphoma_kinase)
	+ [Alectinib](https://en.wikipedia.org/wiki/Alectinib)
	+ [Brigatinib](https://en.wikipedia.org/wiki/Brigatinib)
	+ [Ceritinib](https://en.wikipedia.org/wiki/Ceritinib)
	+ [Crizotinib](https://en.wikipedia.org/wiki/Crizotinib)
* [*Bruton's*](https://en.wikipedia.org/wiki/Bruton%27s_tyrosine_kinase) ([Ibrutinib](https://en.wikipedia.org/wiki/Ibrutinib))
 |

 |
| **Other** | * [*fusion protein*](https://en.wikipedia.org/wiki/Fusion_protein) *against* [*VEGF*](https://en.wikipedia.org/wiki/Vascular_endothelial_growth_factor) ([Aflibercept](https://en.wikipedia.org/wiki/Aflibercept))
* [*proapoptotic*](https://en.wikipedia.org/wiki/Proapoptotic) *peptide against* [*ANXA2*](https://en.wikipedia.org/wiki/ANXA2) *and* [*prohibitin*](https://en.wikipedia.org/wiki/Prohibitin) ([Adipotide](https://en.wikipedia.org/wiki/Adipotide%22%20%5Co%20%22Adipotide))
* [*exotoxin*](https://en.wikipedia.org/wiki/Exotoxin) *against* [*IL-2*](https://en.wikipedia.org/wiki/Interleukin_2) ([Denileukin diftitox](https://en.wikipedia.org/wiki/Denileukin_diftitox%22%20%5Co%20%22Denileukin%20diftitox))
* [*mTOR inhibitors*](https://en.wikipedia.org/wiki/MTOR_inhibitor)
	+ [Everolimus](https://en.wikipedia.org/wiki/Everolimus)
	+ [Temsirolimus](https://en.wikipedia.org/wiki/Temsirolimus)
* [*hedgehog*](https://en.wikipedia.org/wiki/Hedgehog_signaling_pathway) *inhibitors*
	+ [Sonidegib](https://en.wikipedia.org/wiki/Sonidegib)
	+ [Vismodegib](https://en.wikipedia.org/wiki/Vismodegib)
* [*CDK inhibitor*](https://en.wikipedia.org/wiki/CDK_inhibitor) (Palbociclib
* [Ribociclib](https://en.wikipedia.org/wiki/Ribociclib))
 |

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