参考信息主要靶向基因及药物基因名称变异适应症药物检测意义证据等级ERBB2致病突变非小细胞肺癌Ado-trastuzumab emtansine，Neratinib疗效可能↑3AERBB2基因扩增结直肠癌帕妥珠单抗 +曲妥珠单抗，拉帕替尼+曲妥珠单抗疗效可能↑2BERBB2致病突变乳腺癌Neratinib疗效可能↑3AERBB2基因扩增乳腺癌拉帕替尼+曲妥珠单抗，帕妥珠单抗 +曲妥珠单抗，Ado-trastuzumab emtansine，拉帕替尼，Neratinib，曲妥珠单抗，吡咯替尼疗效↑1ERBB2基因扩增食管胃癌曲妥珠单抗疗效↑1KITD816肥大细胞增多症Avapritinib疗效可能↑3AKITD816黑色素瘤伊马替尼疗效可能↑2AKITT670I黑色素瘤伊马替尼疗效可能↑2AKITV654A黑色素瘤伊马替尼疗效可能↑2AKIT外显子17突变黑色素瘤伊马替尼疗效可能↑2AKIT致病突变黑色素瘤伊马替尼疗效可能↑2AKITN655T胃肠道间质瘤尼洛替尼疗效可能↓R2KIT外显子17突变胃肠道间质瘤瑞戈非尼疗效↑1KITT670I胃肠道间质瘤瑞戈非尼，舒尼替尼疗效↑1KITV654A胃肠道间质瘤瑞戈非尼，舒尼替尼疗效↑1KIT致病突变胃肠道间质瘤瑞戈非尼，伊马替尼，舒尼替尼疗效↑1KITA829P胃肠道间质瘤伊马替尼疗效可能↓R2KITC809G胃肠道间质瘤伊马替尼疗效可能↓R2KITD579del胃肠道间质瘤伊马替尼疗效可能↓R2KITD716N胃肠道间质瘤伊马替尼疗效可能↓R2KITD816A胃肠道间质瘤伊马替尼疗效可能↓R2KITD816E胃肠道间质瘤伊马替尼疗效可能↓R2KITD816G胃肠道间质瘤伊马替尼疗效可能↓R2KITD816H胃肠道间质瘤伊马替尼疗效可能↓R2KITD820A胃肠道间质瘤伊马替尼疗效可能↓R2KITD820E胃肠道间质瘤伊马替尼疗效可能↓R2KITD820G胃肠道间质瘤伊马替尼疗效可能↓R2KITD820V胃肠道间质瘤伊马替尼疗效可能↓R2KITD820Y胃肠道间质瘤伊马替尼疗效可能↓R2KITK642E胃肠道间质瘤伊马替尼疗效可能↓R2KITK818\_D820delinsN胃肠道间质瘤伊马替尼疗效可能↓R2KITN680K胃肠道间质瘤伊马替尼疗效可能↓R2KITN822Y胃肠道间质瘤伊马替尼疗效可能↓R2KITS709F胃肠道间质瘤伊马替尼疗效可能↓R2KITS821F胃肠道间质瘤伊马替尼疗效可能↓R2KITT670E胃肠道间质瘤伊马替尼疗效可能↓R2KITT670I胃肠道间质瘤伊马替尼疗效可能↓R2KITV569\_Y578del胃肠道间质瘤伊马替尼疗效可能↓R2KITV654A胃肠道间质瘤伊马替尼疗效可能↓R2KITY578C胃肠道间质瘤伊马替尼疗效可能↓R2KITY823D胃肠道间质瘤伊马替尼疗效可能↓R2KITN822K胃肠道间质瘤伊马替尼，舒尼替尼疗效可能↓R2KIT外显子17突变胃肠道间质瘤伊马替尼，舒尼替尼疗效可能↓R2KIT外显子17突变胃肠道间质瘤/肝癌索拉非尼疗效可能↑2AKITD816胸腺肿瘤/肝癌舒尼替尼，索拉非尼疗效可能↑2AKITT670I胸腺肿瘤/肝癌舒尼替尼，索拉非尼疗效可能↑2AKITV654A胸腺肿瘤/肝癌舒尼替尼，索拉非尼疗效可能↑2AKIT外显子17突变胸腺肿瘤/肝癌舒尼替尼，索拉非尼疗效可能↑2AKIT致病突变胸腺肿瘤/肝癌舒尼替尼，索拉非尼疗效可能↑2AIDH1致病突变急性髓性白血病Ivosidenib疗效↑1ESR1致病突变乳腺癌AZD9496，氟维司群疗效可能↑3AESR1D538G乳腺癌内分泌治疗疗效可能↓R2ESR1L536\_D538delinsP乳腺癌内分泌治疗疗效可能↓R2ESR1L536H乳腺癌内分泌治疗疗效可能↓R2ESR1L536Q乳腺癌内分泌治疗疗效可能↓R2ESR1Y537C乳腺癌内分泌治疗疗效可能↓R2ESR1Y537N乳腺癌内分泌治疗疗效可能↓R2ESR1Y537S乳腺癌内分泌治疗疗效可能↓R2BRAFV600埃尔德海姆 - 切斯特病维莫非尼疗效↑1BRAFL505H恶性黑色素瘤维莫非尼疗效可能↓R2BRAFV47\_D380del恶性黑色素瘤维莫非尼疗效可能↓R2BRAFV600E非小细胞肺癌达拉非尼+曲美替尼疗效↑1BRAFV600非小细胞肺癌厄洛替尼，阿法替尼，吉非替尼，埃克替尼，奥希替尼，达可替尼疗效可能↓R2BRAF融合基因黑色素瘤Cobimetinib，曲美替尼疗效可能↑3ABRAFV600K黑色素瘤达拉非尼+曲美替尼，维莫非尼+Cobimetinib，曲美替尼，Encorafenib+Binimetinib疗效↑1BRAFK601黑色素瘤曲美替尼疗效可能↑3ABRAFL597黑色素瘤曲美替尼疗效可能↑3ABRAFV600E黑色素瘤维莫非尼，达拉非尼，达拉非尼+曲美替尼，维莫非尼+Cobimetinib，曲美替尼，Encorafenib+Binimetinib疗效↑1BRAFV600E间变性甲状腺癌达拉非尼+曲美替尼疗效↑1BRAFV600结直肠癌dabrafenib+曲美替尼+（西妥昔单抗或panitumumab），Encorafenib+Binimetinib+（西妥昔单抗或panitumumab）疗效↑1BRAFV600结直肠癌panitumumab，西妥昔单抗疗效↓R1BRAFV600结直肠癌维莫非尼+panitumumab疗效可能↑3ABRAF融合基因卵巢癌Cobimetinib，曲美替尼疗效可能↑3ABRAF激活突变所有肿瘤PLX8394具有潜在疗效可能4BRAFV600E胃肠道间质瘤伊马替尼疗效可能↓R2BRAFV600转移性结直肠癌伊立替康+（西妥昔单抗或panitumumab）+维莫非尼联合用药疗效↑1EGFRExon 20 插入突变非小细胞肺癌Poziotinib疗效可能↑3AEGFRT790M非小细胞肺癌阿法替尼，厄洛替尼，吉非替尼，埃克替尼，达可替尼疗效↓R1EGFRE709\_T710delinsD非小细胞肺癌阿法替尼，厄洛替尼，吉非替尼，奥希替尼，埃克替尼，达可替尼疗效↑1EGFRExon 19 插入突变非小细胞肺癌阿法替尼，厄洛替尼，吉非替尼，奥希替尼，达可替尼，埃克替尼疗效↑1EGFRG719非小细胞肺癌阿法替尼，厄洛替尼，吉非替尼，奥希替尼，达可替尼，埃克替尼疗效↑1EGFRL861非小细胞肺癌阿法替尼，厄洛替尼，吉非替尼，奥希替尼，达可替尼，埃克替尼疗效↑1EGFRS768I非小细胞肺癌阿法替尼，厄洛替尼，吉非替尼，奥希替尼，达可替尼，埃克替尼疗效↑1EGFR激酶域重复突变非小细胞肺癌阿法替尼，厄洛替尼，吉非替尼，奥希替尼，达可替尼，埃克替尼疗效↑1EGFRC797G非小细胞肺癌奥希替尼疗效可能↓R2EGFRC797S非小细胞肺癌奥希替尼疗效可能↓R2EGFRD761Y非小细胞肺癌奥希替尼具有潜在疗效可能4EGFRG796D非小细胞肺癌奥希替尼疗效可能↓R2EGFRG796R非小细胞肺癌奥希替尼疗效可能↓R2EGFRG796S非小细胞肺癌奥希替尼疗效可能↓R2EGFRL718Q非小细胞肺癌奥希替尼疗效可能↓R2EGFRL747P非小细胞肺癌奥希替尼疗效可能↓R2EGFRL792F非小细胞肺癌奥希替尼疗效可能↓R2EGFRL792H非小细胞肺癌奥希替尼疗效可能↓R2EGFRT790M非小细胞肺癌奥希替尼疗效↑1EGFRExon 19 缺失突变非小细胞肺癌厄洛替尼，阿法替尼，奥希替尼，达可替尼，吉非替尼，埃克替尼疗效↑1EGFRL858R非小细胞肺癌厄洛替尼，阿法替尼，奥希替尼，达可替尼，吉非替尼，埃克替尼疗效↑1EGFRExon 20 插入突变非小细胞肺癌厄洛替尼，阿法替尼，吉非替尼，埃克替尼，达可替尼疗效↓R1EGFRA750P非小细胞肺癌厄洛替尼，阿法替尼，吉非替尼，奥希替尼，埃克替尼，达可替尼疗效↑1EGFRA763\_Y764insFQEA非小细胞肺癌厄洛替尼，阿法替尼，吉非替尼，奥希替尼，埃克替尼，达可替尼疗效↑1EGFRE709K非小细胞肺癌厄洛替尼，阿法替尼，吉非替尼，奥希替尼，埃克替尼，达可替尼疗效↑1EGFRL833V非小细胞肺癌厄洛替尼，阿法替尼，吉非替尼，奥希替尼，达可替尼，埃克替尼疗效↑1EGFRM277E非小细胞肺癌厄洛替尼，阿法替尼，吉非替尼，奥希替尼，达可替尼，埃克替尼疗效↑1EGFRL747P非小细胞肺癌厄洛替尼，阿法替尼，吉非替尼，达可替尼，埃克替尼疗效↑1EGFRD761Y非小细胞肺癌吉非替尼疗效可能↓R2EGFRA289V胶质瘤拉帕替尼具有潜在疗效可能4EGFRR108K胶质瘤拉帕替尼具有潜在疗效可能4EGFRT263P胶质瘤拉帕替尼具有潜在疗效可能4EGFR基因扩增胶质瘤拉帕替尼具有潜在疗效可能4PTEN致病突变所有肿瘤GSK2636771，AZD8186具有潜在疗效可能4TP53致病突变多种实体瘤（卵巢癌和头颈鳞癌）AZD1775疗效可能↑3BRCA2致病突变卵巢癌奥拉帕利，rucaparib，niraparib疗效↑1BRCA2致病突变前列腺癌奥拉帕利疗效↑1BRCA2致病突变乳腺癌奥拉帕利，talazoparib疗效可能↑2ABRCA2致病突变胰腺癌奥拉帕利疗效↑1PDGFRA融合基因骨髓增生异常，骨髓增生性肿瘤伊马替尼疗效↑1PDGFRA融合基因慢性嗜酸细胞性白血病，NOS伊马替尼疗效↑1PDGFRAD842V胃肠道间质瘤达沙替尼疗效可能↑2APDGFRAD842\_D846delinsG胃肠道间质瘤伊马替尼疗效可能↓R2PDGFRAI843\_S847delinsT胃肠道间质瘤伊马替尼疗效可能↓R2PDGFRA致病突变胃肠道间质瘤伊马替尼疗效可能↑2APDGFRAD842V胃肠道间质瘤/肝癌伊马替尼，舒尼替尼疗效↓R1RET融合基因非小细胞肺癌Cabozantinib，vandetanib，LOXO-292，BLU-667疗效可能↑2ARET融合基因非小细胞肺癌LOXO-292， BLU-667疗效可能↑3ARET致病突变甲状腺髓样癌LOXO-292，BLU-667疗效可能↑3ANF1致病突变所有实体肿瘤Cobimetinib，曲美替尼具有潜在疗效可能4阅读帮助：证据等级表示该基因靶点在该适应症中对药物反应的可信度：1：FDA认可的分子标志物，可预测本适应症中对FDA批准的药物的反应；2A：标准治疗的分子标志物，预测对该适应症中FDA批准的药物的反应；2B：在其他适应症中是标准治疗的分子标志物，预测对FDA批准的药物的反应，但在此适应症中不是标准治疗；3A：令⼈信服的临床证据⽀持⽣物标志物预测该适应症对该药物的反应；3B：令⼈信服的临床证据⽀持⽣物标志物预测其他适应症对该药物的反应；4：令⼈信服的⽣物学证据⽀持⽣物标志物预测对药物的反应；R1：标准治疗的分子标志物可预测本适应症中对FDA批准的药物的抵抗；R2：令人信服的临床证据支持分子标志物可预测对药物的抵抗。附录内容根据本检测范围内的现有指南文件和临床研究收录。随着研究的进展，可能在未来发现新的靶标或开发新的药物。本实验室将定期进行更新。参考文献NCCN Biomarkers Compendium at: http://www.nccn.org/professionals/biomarkers/content/U.S. Food and Drug Administration, Table of Pharmacogenomic Biomarkers in Drug Labeling. Available online at: http://www.fda.gov/Drugs/ScienceResearch/ResearchAreas/Pharmacogenetics/ucm083378.htmMy Cancer Genome at: http://www.mycancergenome.org/PharmGKB: The Pharmacogenomics Knowledgebase. Available online at: http://www.pharmgkb.org/index.jspSequistLV,etal.Genotypic and histological evolution of lung cancers acquiring resistance to EGFR inhibitors.SciTransl Med. 2011 Mar 23;3(75):75ra26. doi: 10.1126/scitranslmed.3002003.Lassen A,etal.Effects of AKT inhibitor therapy in response and resistance to BRAF inhibition in melanoma.Mol Cancer. 2014 Apr 16;13:83. doi: 10.1186/1476-4598-13-83.Jin G,etal.PTEN mutations and relationship to EGFR, ERBB2, KRAS, and TP53 mutations in non-small cell lung cancers.Lung Cancer. 2010 Sep;69(3):279-83. doi: 10.1016/j.lungcan.2009.11.012. Epub 2009 Dec 16.Kohno T,et al.KIF5B-RET fusions in lung adenocarcinoma.Nat Med. 2012 Feb 12;18(3):375-7. doi: 10.1038/nm.2644.PaezJG,etal.EGFR mutations in lung cancer: correlation with clinical response to gefitinibtherapy.Science. 2004 Jun 4;304(5676):1497-500. Epub 2004 Apr 29.SequistLV,etal.Neratinib, an irreversible pan-ErbB receptor tyrosine kinase inhibitor: results of a phase II trial in patients with advanced non-small-cell lung cancer.JClinOncol. 2010 Jun 20;28(18):3076-83. doi: 10.1200/JCO.2009.27.9414. Epub 2010 May 17.Takeuchi K,etal.RET, ROS1 and ALK fusions in lung cancer.Nat Med. 2012 Feb 12;18(3):378-81. doi: 10.1038/nm.2658.De GrèveJ,etal.Clinical activity of afatinib (BIBW 2992) in patients with lung adenocarcinoma with mutations in the kinase domain of HER2/neu.Lung Cancer. 2012 Apr;76(1):123-7. doi: 10.1016/j.lungcan.2012.01.008. Epub 2012 Feb 10.GautschiO,etal.A patient with lung adenocarcinoma and RET fusion treated with vandetanib.JThoracOncol. 2013 May;8(5):e43-4. doi: 10.1097/JTO.0b013e31828a4d07.Verhaak RG., et al., Integrated genomic analysis identifies clinically relevant subtypes of glioblastoma characterized by abnormalities in PDGFRA, IDH1, EGFR, and NF1. Cancer Cell. 2010 Jan 19;17(1):98-110. doi: 10.1016/j.ccr.2009.12.020.DrilonA,etal.Response to Cabozantinib in patients with RET fusion-positive lung adenocarcinomas.CancerDiscov. 2013 Jun;3(6):630-5. doi: 10.1158/2159-8290.CD-13-0035. Epub 2013 Mar 26.ArcilaME,etal.Prevalence, clinicopathologic associations, and molecular spectrum of ERBB2 (HER2) tyrosine kinase mutations in lung adenocarcinomas.Clin Cancer Res. 2012 Sep 15;18(18):4910-8. doi: 10.1158/1078-0432.CCR-12-0912. Epub 2012 Jul 3.ArcilaME,etal.Rebiopsy of lung cancer patients with acquired resistance to EGFR inhibitors and enhanced detection of the T790M mutation using a locked nucleic acid-based assay.Clin Cancer Res. 2011 Mar 1;17(5):1169-80. doi: 10.1158/1078-0432.CCR-10-2277. Epub 2011 Jan 19.Gandhi L,etal.Phase I study of neratinib in combination with temsirolimus in patients with human epidermal growth factor receptor 2-dependent and other solid tumors.JClinOncol. 2014 Jan 10;32(2):68-75. doi: 10.1200/JCO.2012.47.2787. Epub 2013 Dec 9.Hanting Zhu, et al. A subset of esophageal squamous cell carcinoma patient-derived xenografts respond to cetuximab, which is predicted by high EGFR expression and amplification.J Thorac Dis. 2018 Sep; 10(9): 5328–5338.doi: 10.21037/jtd.2018.09.18. PMID: 30416780Beadling C, KIT gene mutations and copy number in melanoma subtypes. Clin Cancer Res. 2008 Nov 1;14(21):6821-8. doi: 10.1158/1078-0432.CCR-08-0575. J Clin Oncol. 2006 Sep 10;24(26):4340-6. Epub 2006 Aug 14.Somatic activation of KIT in distinct subtypes of melanoma.Curtin JASosML,etal.PTEN loss contributes to erlotinib resistance in EGFR-mutant lung cancer by activation of Akt and EGFR.Cancer Res. 2009 Apr 15;69(8):3256-61. doi: 10.1158/0008-5472.CAN-08-4055. Epub 2009 Apr 7.BRCA2 Mutations and Triple-Negative Breast Cancer Peter Meyer1\*, Katharina Landgraf1, Bernhard Ho ̈gel2, Wolfgang Eiermann3, Beyhan Ataseven3| www.plosone.orgMay 2012 | Volume 7 | Issue 5 | e38361MitsudomiT,etal.Epidermal growth factor receptor in relation to tumor development: EGFR gene and cancer.FEBS J. 2010 Jan;277(2):301-8. doi: 10.1111/j.1742-4658.2009.07448.x. Epub 2009 Nov 18.Chen HJ,etal.Clinicopathologic and molecular features of epidermal growth factor receptor T790M mutation and c-MET amplification in tyrosine kinase inhibitor-resistant Chinese non-small cell lung cancer.PatholOncol Res. 2009 Dec;15(4):651-8. doi: 10.1007/s12253-009-9167-8. Epub 2009 Apr 21.SenB,etal.Kinase-impaired BRAF mutations in lung cancer confer sensitivity to dasatinib.SciTransl Med. 2012 May 30;4(136):136ra70. doi: 10.1126/scitranslmed.3003513.