

# Personalised Cancer Medicine Flashcards 2022



Cátedra de  
**Medicina Personalizada de Precisión**

**UAM** Universidad Autónoma  
de Madrid



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# Personalised Cancer Medicine Flashcards 2022

Lung Cancer

Breast Cancer

Colorectal Cancer

Gastric Cancer

Melanoma

Ovarian Cancer

Prostate Cancer

Pancreatic Cancer

GIST

# Personalised Cancer Medicine Flashcards 2022

## Lung Cancer



### Standard

EGFR  
ALK  
ROS1  
PDL-1  
RET

### Recommended

NTRK\*  
KRAS y MET\*  
BRAF V600  
NGS\*\*

\*in tumors lacking driver mutations  
\*\*in biopsies with little sample; Approved in the USA as accompanying diagnosis of EGFR and ALK inhibitors

### Currently not recommended

HER2  
NRG1

The **Standard** category is based on current treatment indications with approved funding by the Spanish National Health System

The **Recommended** category is based on current recommendations by EMEA and FDA

1. Garrido P, Conde E, de Castro J, et al. Updated guidelines for predictive biomarker testing in advanced non-small-cell lung cancer: a National Consensus of the Spanish Society of Pathology and the Spanish Society of Medical Oncology. Clin Transl Oncol. 2020 Jul;22(7):989-1003. doi: 10.1007/s12094-019-02218-4. .
2. Colomer R, Mondejar R, Romero-Laorden N et al., When should we order a next generation sequencing test in a patient with cancer? EClinicalMedicine. 2020 Jul 31;25:100487. doi: 10.1016/j.eclinm.2020.100487..
3. Mosele F, Remon J, Mateo J, et al. Recommendations for the use of next-generation sequencing (NGS) for patients with metastatic cancers: a report from the ESMO Precision Medicine Working Group. Ann Oncol. 2020 Nov;31(11):1491-1505. doi: 10.1016/j.annonc.2020.07.014..
4. [https://www.accessdata.fda.gov/cdrh\\_docs/pdf17/P170019S006A.pdf](https://www.accessdata.fda.gov/cdrh_docs/pdf17/P170019S006A.pdf)

# Personalised Cancer Medicine Flashcards 2022

## Breast Cancer



### Standard

Estrogen Receptor  
Progesterone Receptor

HER2

Genetic platforms: Mammaprint,  
Oncotype, Prosigna, or Endopredict\*

BRCA 1 and BRCA 2\*\*

PDL-1\*\*\*

PIK3CA\*\*\*\*

\*in early luminal breast cancer with high risk of relapsing

\*\*in advanced triple negative or luminal breast cancer

\*\*\* in advanced triple negative breast cancer

\*\*\*\* in advanced luminal breast cancer

### Recommended

NGS\*\*\*\*\*

\*\*\*\*\* Approved in US as companion diagnostics of a PI3K inhibitor

### Currently not recommended

ESR1

FGFR1

AKT1

PTEN

Liquid biopsy and circulating  
cancer cells

The **Standard** category is based on current treatment indications with approved funding by the Spanish National Health System

The **Recommended** category is based on current recommendations by EMEA and FDA

1. Colomer R, Aranda-López I, Albanell J, García-Caballero T, Ciruelos E, López-García MÁ, Cortés J, Rojo F, Martín M, Palacios-Calvo J. Biomarkers in breast cancer: A consensus statement by the Spanish Society of Medical Oncology and the Spanish Society of Pathology. Clin Transl Oncol. 2018 Jul;20(7):815-826. doi: 10.1007/s12094-017-1800-5.
2. Litton JK, Burstein HJ, Turner NC. Molecular Testing in Breast Cancer. Am Soc Clin Oncol Educ Book. 2019 Jan;39:e1-e7. doi: 10.1200/EDBK\_237715.
3. [https://www.accessdata.fda.gov/cdrh\\_docs/pdf17/P170019S006A.pdf](https://www.accessdata.fda.gov/cdrh_docs/pdf17/P170019S006A.pdf)



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## Colorectal Cancer



### Standard

Microsatellite Instability  
study\*  
KRAS, NRAS  
BRAF  
DPD

\* by IHC (MLH1, PMS2, MSH2 and MSH6) or genetic study (BAT25 and BAT26, D2S123, D5S346 and D17S250).

### Recommended

NTRK\*\*  
HER2\*\*\*

\*\* in tumors with microsatellite instability, M1G1 hypermethylation and RAS wild type (IHC + FISH, NGS, RT-PCR, NanoString)  
\*\*\* (IHC or FISH or NGS) en RAS y BRAF WT

### Currently not recommended

Inmunoscore  
CMS classification  
MET  
EGFR  
FGFR  
PI3K

The **Standard** category is based on current treatment indications with approved funding by the Spanish National Health System

The **Recommended** category is based on current recommendations by EMEA and FDA

1. García-Alfonso P, García-Carbonero R, García-Foncillas J, et al. Update of the recommendations for the determination of biomarkers in colorectal carcinoma: National Consensus of the Spanish Society of Medical Oncology and the Spanish Society of Pathology. Clin Transl Oncol. 2020 Nov;22(11):1976-1991. doi: 10.1007/s12094-020-02357-z.
2. Kolenčik D, Shishido SN, Pitule P, et al. Liquid Biopsy in Colorectal Carcinoma: Clinical Applications and Challenges. Cancers (Basel). 2020 May 27;12(6):1376. doi: 10.3390/cancers12061376.
3. Garrido P, Hladun R, de Álava E, et al. Multidisciplinary consensus on optimising the detection of NTRK gene alterations in tumours. Clin Transl Oncol. 2021 Feb 23. doi: 10.1007/s12094-021-02558-0



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## Gastric Cancer



Standard

HER2

Recommended

Microsatellite Instability\*  
PDL-1

Currently  
not recommended

VEGFR  
EGFR  
MET  
EBV

\*by either IHQ (MLH1, PMS2, MSH2 and MSH6) or by Genomic studies (BAT25 and BAT26, D2S123, D5S346 and D17S250).

The **Standard** category is based on current treatment indications with approved funding by the Spanish National Health System  
The **Recommended** category is based on current recommendations by EMEA and FDA

1. Gómez-Martín C, Concha A, Corominas JM, et al; Spanish Society of Medical Oncology; Spanish Society of Pathology. Consensus of the Spanish Society of Medical Oncology (SEOM) and Spanish Society of Pathology (SEAP) for HER2 testing in gastric carcinoma. Clin Transl Oncol. 2011 Sep;13(9):636-51. doi: 10.1007/s12094-011-0709-7.
2. Shitara K, Van Cutsem E, Bang YJ, et al. Efficacy and Safety of Pembrolizumab or Pembrolizumab Plus Chemotherapy vs Chemotherapy Alone for Patients With First-line, Advanced Gastric Cancer: The KEYNOTE-062 Phase 3 Randomized Clinical Trial. JAMA Oncol. 2020 Oct 1;6(10):1571-1580. doi: 10.1001/jamaoncol.2020.3370.



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# Personalised Cancer Medicine Flashcards 2022

## Melanoma



Standard

BRAF

Recommended

KIT\*

Currently  
not recommended

NRAS  
GNAQ/GNA11  
PTEN  
MITF  
CDKN2A  
MHC-II

Tumor mutational burden

\*in mucosal or acral melanoma or melanoma associated with sunlight

The **Standard** category is based on current treatment indications with approved funding by the Spanish National Health System  
The **Recommended** category is based on current recommendations by EMEA and FDA

1. Martín-Algarra S, Fernández-Figueras MT, López-Martín JA, et al; Spanish Society of Pathology; Spanish Society of Medical Oncology. Guidelines for biomarker testing in metastatic melanoma: a National Consensus of the Spanish Society of Pathology and the Spanish Society of Medical Oncology. Clin Transl Oncol. 2014 Apr;16(4):362-73. doi: 10.1007/s12094-013-1090-5.
2. Scherrer E, Rau R, Lorenzi M, Shui I, Townson S, Larkin J. Systematic literature review for the association of biomarkers with efficacy of anti-PD-1 inhibitors in advanced melanoma. Future Oncol. 2021 Mar 30. doi: 10.2217/fon-2021-0154.
3. Mao L, Dai J, Cao Y, et al. Palbociclib in advanced acral melanoma with genetic aberrations in the cyclin-dependent kinase 4 pathway. Eur J Cancer. 2021 Mar 23;148:297-306. doi: 10.1016/j.ejca.2021.02.021.



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# Personalised Cancer Medicine Flashcards 2022

## Ovarian Cancer



### Standard

BRCA1 and BRCA2\*  
Homologous Recombination  
Deficiency (HRD)

\*germ-line or somatic

### Recommended

NGS\*\*

\*\*approved in US as companion diagnostics for some PPAR inhibitors

### Currently not recommended

p53, PD-1/PDL-1, ATM, BARD1,  
BRIP1, CHECK1,  
CHECK2, FAM175A, MRE11A, NBN,  
PALB2, RAD51C, RAR51D.

The **Standard** category is based on current treatment indications with approved funding by the Spanish National Health System

The **Recommended** category is based on current recommendations by EMEA and FDA

1. Oaknin A, Guarch R, Barretina P, et al. Recommendations for biomarker testing in epithelial ovarian cancer: a National Consensus Statement by the Spanish Society of Pathology and the Spanish Society of Medical Oncology. Clin Transl Oncol. 2018 Mar;20(3):274-285. doi: 10.1007/s12094-017-1719-x.



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# Personalised Cancer Medicine Flashcards 2022

## Prostate Cancer

### Standard

BRCA1 and BRCA2\*

\*germ-line or somatic

### Recommended

Microsatellite instability\*  
HRR Profound panel \* (somatic)

\* By either IHC (MLH1, PMS2, MSH2 a MSH6) or by genomic study(BAT25 and BAT26, D2S123, D5S346 and D17S250).

### Currently not recommended

Androgen receptor aberrations  
PDL1  
PTEN

The **Standard** category is based on current treatment indications with approved funding by the Spanish National Health System  
The **Recommended** category is based on current recommendations by EMEA and FDA

1. de Bono J, Mateo J, Fizazi K, et al. Olaparib for Metastatic Castration-Resistant Prostate Cancer. N Engl J Med. 2020 May 28;382(22):2091-2102. doi: 10.1056/NEJMoa1911440.
2. To SQ, Kwan EM, Fettke HC, et al. Expression of Androgen Receptor Splice Variant 7 or 9 in Whole Blood Does Not Predict Response to Androgen-Axis-targeting Agents in Metastatic Castration-resistant Prostate Cancer. Eur Urol. 2018 Jun;73(6):818-821. doi: 10.1016/j.eururo.2018.01.007.
3. Beltran H, Antonarakis ES, Morris MJ, Attard G. Emerging Molecular Biomarkers in Advanced Prostate Cancer: Translation to the Clinic. Am Soc Clin Oncol Educ Book. 2016;35:131-41. doi: 10.1200/EDBK\_159248.

# Personalised Cancer Medicine Flashcards 2022

## Pancreatic Cancer



### Standard

Germ-line BRCA 1-2  
Microsatellite Instability\*

\* By either IHC (MLH1, PMS2, MSH2 a MSH6) or by genomic study(BAT25 and BAT26, D2S123, D5S346 and D17S250).

### Recommended

NTRK

### Currently not recommended

ATM, PALB2, p53, KRAS, CDKN2,  
SMAD4, MLL3, TGFBR2, ARID1A,  
ALK, BRAF, HER2, ROS, RRG1

The **Standard** category is based on current treatment indications with approved funding by the Spanish National Health System  
The **Recommended** category is based on current recommendations by EMEA and FDA

1. Curtin NJ, Drew Y, Sharma-Saha S. Why BRCA mutations are not tumour-agnostic biomarkers for PARP inhibitor therapy. *Nat Rev Clin Oncol*. 2019 Dec;16(12):725-726. doi: 10.1038/s41571-019-0285-2.
2. de Bono J, Mateo J, Fizazi K, et al. Olaparib for Metastatic Castration-Resistant Prostate Cancer. *N Engl J Med*. 2020 May 28;382(22):2091-2102. doi: 10.1056/NEJMoa1911440.
3. Golan T, Hammel P, Reni M, Van Cutsem E, Macarulla T, et al. Maintenance Olaparib for Germline BRCA-Mutated Metastatic Pancreatic Cancer. *N Engl J Med*. 2019 Jul 25;381(4):317-327. doi: 10.1056/NEJMoa1903387.



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## GIST



### Standard

CD 117/c-kit  
CD34  
Number of mitosis/50 large fields  
KIT and PDGFR mutations

### Recommended

DOG1\*  
BRAF, SDHB, NTRK\*\*

\* CD117 negative  
\*\* GIST wild type

### Currently not recommended

NF1  
RAS  
FGFR

The **Standard** category is based on current treatment indications with approved funding by the Spanish National Health System  
The **Recommended** category is based on current recommendations by EMEA and FDA

1. Martin-Broto J, Martinez-Marín V, Serrano et al. Gastrointestinal stromal tumors (GISTs): SEAP-SEOM consensus on pathologic and molecular diagnosis. Clin Transl Oncol. 2017 May;19(5):536-545. doi: 10.1007/s12094-016-1581-2.



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