

CellCarta's immuno-MRM assays, based on immunoaffinity enrichment of peptides coupled to liquid chromatography-targeted multiple reaction monitoring (LC-MRM), allow for sensitive and precise protein quantification. We offer panels validated following the CPTAC guidelines to investigate DNA damage response (DDR1, 2, 3), immuno-oncology (IO-1, 2, 3), Ras-MAPK signaling pathway (Ras-MAPK1, 2), and human epidermal growth factor receptor 2 (HER2) expression. Our team continually develops new panels, combining up to 50 targets (listed below), for your specific needs. With CAP-accredited and CLIA-certified sites, we provide the highest standard of quality. Contact us for any custom development.

DDR1 Panel		
Target	Protein Name	Modification Site
ATM	Ataxia telangiectasia mutated, serine protein kinase	pS2996, pS367
ATR	ATR, serine/threonine-protein kinase	pT1989
ATRIP	ATR interacting protein	pS518, pS224
BRCA1	Breast cancer gene 1	pS1524
BRCA2	Breast cancer gene 2	pS1680
BRIP1/FANCI	BRCA1 interacting helicase 1/Fanconi anemia group J protein	pS930, pS1032
FAAP100	FA core complex associated protein 100	pS667
CHEK1	Serine/threonine-protein kinase Chk1	pS317
CLU	Clusterin	
FANCA	Fanconi anemia group A protein	pS1449
FANCD2	Fanconi anemia, complementation group D2	uK561
FANCI	Fanconi anemia group I protein	pS730
FEN1	Flap structure-specific endonuclease 1	
GAPDH	Glyceraldehyde-3-phosphate dehydrogenase	
GSTP1	Glutathione S-transferase pi	
H2AFX	H2A histone family, member X	pS140
JUN	Jun oncogene	pS243, pS63
MDC1	Mediator of DNA-damage checkpoint 1	pS329
NBN	Nibrin	pT434, pS432, pS343
PALB2	Partner and localizer of BRCA2	pS376
PARP1	Poly (ADP-ribose) polymerase 1	pS177
PCNA	Proliferating cell nuclear antigen	uK164
RAD18	E3 ubiquitin-protein ligase RAD18	pS471, pS99
RAD23B	RAD23 homolog B, nucleotide excision repair protein	
RAD50	RAD50 double-strand break repair protein	pS635
RAD51C	DNA repair protein RAD51 homolog 3	pS20
RB1	Retinoblastoma-associated protein	pS807
REV3L	DNA polymerase zeta catalytic subunit	pS1724

DDR1 Panel (continued)

Target	Protein Name	Modification Site
RIF1	Telomere-associated protein RIF1	pS1542
RRM2	Ribonucleotide reductase M2 polypeptide	
TERF2	Telomeric repeat-binding factor 2	pS323
TOPBP1	DNA topoisomerase 2-binding protein 1	pT1062, pS1138
UBE2C	Ubiquitin-conjugating enzyme E2C	
UBE2I	Ubiquitin-conjugating enzyme E2I	
UBE2T	Ubiquitin-conjugating enzyme E2T	pS184

DDR2 Panel

Target	Protein Name	Modification Site
ACT	Actins (ACTA2 ACTA1 ACTB ACTG1 ACTC1 ACTG2)	
CASC5	Cancer susceptibility candidate 5	pS767
CASP3	Caspase 3	pS26
CDC25B	Cell division cycle 25 B	pS323, pS160
CDC25C	Cell division cycle 25C	pS216
CDCA8	Cell division cycle associated 8	pT106
CDK1	Cyclin-dependent kinase 1	pT161
CDK7	Cyclin-dependent kinase 7	pT170
CHEK1	Checkpoint kinase 1	pS286
CHEK2	Checkpoint kinase 2	pT387, pS379
GAPDH	Glyceraldehyde-3-phosphate dehydrogenase	
LAT	Linker for activation of T cells	pS224
LIME1	Lck interacting transmembrane adaptor 1	pT274
LMNB1	Lamin B1	pT20; pS23
MCM6	Minichromosome maintenance complex component 6	pS762
MDM2	MDM2 proto-oncogene	pS166
MKI67	Marker of proliferation Ki-67	pT2406, pT1801
MRE11A	MRE11 homolog, double-strand break repair nuclease	pS676
NCAPH2	Chromosome-associated protein H2	pS492
NUMA1	Nuclear mitotic apparatus protein 1	pS395
PAK4	P21 (RAC1) Activated Kinase 4	pS181
PARP1	Poly (ADP-ribose) polymerase 1	pS41
POLQ	DNA polymerase theta	

DDR2 Panel (continued)

Target	Protein Name	Modification Site
RAD50	RAD50 double-strand break repair protein	pS470
RAD9A	RAD9 homolog A	pS387
RTF1	RTF1 homolog, Paf1/RNA polymerase II complex component	pS655
SAAL1	Serum amyloid A-like 1	pS237
TNFRSF17	Tumor necrosis factor receptor superfamily, member 17	pS173
TP53	Tumor protein p53	pS15, pS315
TP53BP1	Tumor protein p53 binding protein 1	pT543
TUBB	Tubulin beta chain	
UTP14A	U3 small nucleolar RNA-associated protein 14 homolog A	pS453

DDR3

Target	Protein Name	Modification Site
BRCA2	Breast cancer gene 2	
GAPDH	Glyceraldehyde-3-phosphate dehydrogenase	

IO-1 Panel

Target	Protein Name	Modification Site
ADAM17	ADAM17 metalloprotease domain 17	
ANXA1	Annexin A1	
ARG2	Arginase, type II	
ATM	Ataxia telangiectasia mutated, serine protein kinase	pS2996, pS367
C10orf54	Chromosome 10 open reading frame 54	
CCL5	C-C motif chemokine ligand 5	
CD14	Monocyte differentiation antigen CD14	
CD163	M130, MM130, SCAR11	
CD274	Programmed cell death 1 ligand 1 (PDL1)	
CD33	SIGLEC3, p67	
CD40	Tumor necrosis factor receptor superfamily member 5 (TNFRSF5), p50	
CD47	IA3, OA3, MER6	
CD70	CD27L, TNFSF7, TNLG8A	
CD74	CLIP, HLA-DG, Ia-GAMMA, p33, MHC HLA-DR gamma chain	
CEACAM8	Carcinoembryonic antigen-related cell adhesion molecule 8	
CX3CL1	C-X3-C motif chemokine ligand 1	

IO-1 Panel (continued)

Target	Protein Name	Modification Site
CXCL10	C-X-C motif chemokine ligand 10	
CXCL13	Chemokine (C-X-C motif) ligand 13	
ENTPD1	Ectonucleoside triphosphate diphosphohydrolase 1	
FAS	Tumor necrosis factor receptor superfamily, member 6	pY291
GAPDH	Glyceraldehyde-3-phosphate dehydrogenase	
HAVCR2	Hepatitis A virus cellular receptor 2	
ICAM1	Intercellular adhesion molecule 1	
ICOSLG	Inducible T-cell co-stimulator ligand	
IL18	Interleukin 18	
ITGAE	Integrin subunit alpha E	
LGALS1	Galectin 1	
LIME1	Lck interacting transmembrane adaptor 1	pT274
NFKB2	Nuclear factor of kappa B subunit 2	
NT5E	5'-nucleotidase ecto	
PDCD1LG2	Programmed cell death 1 ligand 2	
PECAM1	Platelet endothelial cell adhesion molecule	
PSMA1	Proteasome 20S subunit alpha 1	
PTGS2	Prostaglandin-endoperoxide synthase 2	
PTPRC	Protein tyrosine phosphatase receptor type C	
RIF1	Telomere-associated protein RIF1	pS1542
STAT1	Signal transducer and activator of transcription 1	
STAT3	Signal transducer and activator of transcription 3	
STAT6	Signal transducer and activator of transcription 6	
TAP2	Transporter 2, ATP-binding cassette subfamily B member	
TNFRSF17	Tumor necrosis factor receptor superfamily, member 17	pS173
TNFSF9	Tumor necrosis factor superfamily member 9	
VCAM1	Vascular cell adhesion molecule 1	
VTCN1	V-set domain containing T cell activation inhibitor 1	

IO-2 Panel

Target	Protein Name	Modification Site
ALCAM	Activated leukocyte cell adhesion molecule	
ARG1	Arginase 1	

IO-2 Panel (continued)

Target	Protein Name	Modification Site
BAX	BCL2-associated X protein	
BCL10	B-cell CLL/lymphoma 10	
BTX	Bruton agammaglobulinemia tyrosine kinase	
BTLA	B and T lymphocyte associated	
CD38	ADPRC1, CD38 antigen (P45)	
CD4	IMD79, Leu-3, OKT4D, T-cell surface glycoprotein CD4	
CD48	BCM1, BLAST1, MEM-102, SLAMF2, hCD48, Signaling lymphocytic activation molecule 2	
CSF2RA	Colony stimulating factor 2 receptor subunit alpha	
ERCC2	Excision repair cross-complementing rodent repair deficiency, complementation group 2	
FOXO1	Forkhead box O1	
GAPDH	Glyceraldehyde-3-phosphate dehydrogenase	
HLA-DRA	MHC class II antigen DRA	
HLA-E	MHC class I antigen E	
IDO1	Indoleamine 2,3-dioxygenase 1	
IFIT1	Interferon-induced protein with tetratricopeptide repeats 1	
IFIT2	Interferon-induced protein with tetratricopeptide repeats 2	
IFIT3	Interferon-induced protein with tetratricopeptide repeats 3	
IL16	Interleukin 16	
IL1A	Interleukin 1 alpha	
IL2RG	Interleukin 2 receptor subunit gamma	
IL6R	Interleukin 6 receptor	
ITGAX	Integrin subunit alpha X	
LGALS9	Galectin 9	
LY75	Lymphocyte antigen 75	
MCL1	Myeloid cell leukemia sequence 1 (BCL2-related)	
MGMT	Methylguanine-DNA methyltransferase	
MKI67	Marker of proliferation Ki-67	pT2406, pT1801
MLH1	MutL homolog 1	
MPO	Myeloperoxidase	
MSH6	MutS homolog 6	
MST1	Macrophage stimulating 1	
PMS1	PMS1 homolog 1, mismatch repair system component	

IO-2 Panel (continued)

Target	Protein Name	Modification Site
POLD1	DNA polymerase delta 1, catalytic subunit	
PVR	Poliovirus receptor	
RB1	Retinoblastoma-associated protein	pS807
SELE	E-selectin	
SIGLEC7	Sialic acid binding Ig-like lectin 7	
SPP1	Secreted phosphoprotein 1	
TAP1	Antigen peptide transporter 1	
TAPBP	TAP binding protein	
TMEM173	Transmembrane protein 173	
XRCC5	X-ray repair cross complementing 5	
ZAP70	Zeta-chain of T cell receptor associated protein kinase 70	

IO-3 Panel

Target	Protein Name	Modification Site
ADA	Adenosine deaminase	
B2M	Beta-2-microglobulin	
BAD	BCL2-associated agonist of cell death	
C10orf54	Chromosome 10 open reading frame 54	
CADM1	Cell adhesion molecule 1	
CD27	S152, LPFS2, T14, TNFRSF7, Tp55	
CD276	B7H3, B7RP-2	
CD44	CDW44, CSPG8, ECM-III, H-CAM, HCELL, HUTCH-1, Hermes-1, IN, LHR, MC56, MDU2, MDU3, MIC4, Pgp1	
CD8A	CD8alpha, Leu2, p32	
CRP	C-reactive protein	
CSF1	Colony stimulating factor 1	
CTLA4	Cytotoxic T-lymphocyte-associated protein 4	
CXCL10	C-X-C motif chemokine ligand 10	
CXCL9	C-X-C motif chemokine ligand 9	
EIF2A	Eukaryotic translation initiation factor 2A	
FAS	Tumor necrosis factor receptor superfamily, member 6)	
GAPDH	Glyceraldehyde-3-phosphate dehydrogenase	
GZMA	Granzyme A	
IFNGR1	Interferon gamma receptor 1	

IO-3 Panel (continued)

Target	Protein Name	Modification Site
IL1RN	Interleukin 1 receptor antagonist	
ITGAM	Integrin alpha-M	
JAK1	Janus kinase 1	
LIG1	DNA ligase I	
MKI67	Marker of proliferation Ki-67	
MS4A1	Membrane-spanning 4-domains A1	
MSH2	MutS homolog 2	
MSLN	Mesothelin	
MUTYH	MutY homolog	
NCAM1	Neural cell adhesion molecule 1	
PARP1	Poly (ADP-ribose) polymerase 1	pS177, pS41
PAXIP1	PAX interacting protein 1	
PCNA	Proliferating cell nuclear antigen	uK164
PDCD1	Programmed cell death 1	
PTPN2	Protein tyrosine phosphatase non-receptor type 2	
SERPINA6	Serpin family A member 6	
SIGLEC1	Sialic acid binding Ig like lectin 1	
SIGLEC9	Sialic acid binding Ig like lectin 9	
SLAMF8	SLAM family member 8	
STAT1	Signal transducer and activator of transcription 1	pY701, pS727
TGFB1	Transforming growth factor beta 1	
VEGFA	Vascular endothelial growth factor A	

Ras-MAPK1 Panel

Target	Protein Name	Modification Site
AKT1	Protein kinase B	pT308
AKT3	AKT serine/threonine kinase 3	pS472
ARAF	Serine/threonine-protein kinase A-Raf	pS299
BRAF	Serine/threonine-protein kinase B-Raf	pT401
EGFR	Epidermal growth factor receptor	pY1172, pY1092, pY1197
ERBB2	Tyrosine Kinase-Type Cell Surface Receptor HER2	pY1248
FOXO3	Forkhead box O3	pS253
GAPDH	Glyceraldehyde-3-phosphate dehydrogenase	

Ras-MAPK1 Panel (continued)

Target	Protein Name	Modification Site
GSK3B	Glycogen synthase kinase 3 beta	pS9
MAPK1	Mitogen-activated protein kinase 1	pT185/pY187
MAPK3	Mitogen-activated protein kinase 3	pT202
MAPK8	Mitogen-activated protein kinase 8	pT183/pY185
MTOR	Mechanistic target of rapamycin	pS2481, pS2448
RAF1	Proto-oncogene C-RAF	pS259

Ras-MAPK2 Panel

Target	Protein Name	Modification Site
AKT1	Protein kinase B	
AKT2	AKT serine/threonine kinase 2	
AKT3	AKT serine/threonine kinase 3	
ARAF	Serine/threonine-protein kinase A-Raf	pS299
BRAF	Serine/threonine-protein kinase B-Raf	
CCND1	Cyclin D1	
CDH1	Cadherin 1	
CDH2	Cadherin 2	
EGFR	Epidermal growth factor receptor	
ERBB2	Tyrosine Kinase-Type Cell Surface Receptor HER2	
ERBB3	Tyrosine Kinase-Type Cell Surface Receptor HER3	
FOS	Proto-oncogene C-Fos	
GAPDH	Glyceraldehyde-3-phosphate dehydrogenase	
GSK3B	Glycogen synthase kinase-3 beta	
MAP2K1	Dual specificity mitogen-activated protein kinase kinase 1	
MAPK3	Mitogen-activated protein kinase 3	
MTOR	Mechanistic target of rapamycin	
PTEN	Phosphatase and tensin homolog	
RAF1	Proto-oncogene C-RAF	
RPTOR	Regulatory associated protein of MTOR complex 1	

HER2 + Normalization Panel		
Target	Protein Name	Modification Site
ACT	Actins (ACTA2 ACTA1 ACTB ACTG1 ACTC1 ACTG2)	
BIRC5	Survivin	
DCTN2	Dynactin 2 (P50)	
EGFR	Epidermal growth factor receptor	
ERBB2	Tyrosine Kinase-Type Cell Surface Receptor HER2	
ESR1	Estrogen receptor 1	
FABP4	Fatty acid-binding protein 4	
FBN1	Fibrillin 1	
GAPDH	Glyceraldehyde-3-phosphate dehydrogenase	
HBB	Hemoglobin subunit beta	
KRT	Keratin (type II cytoskeletal 1)	
KRT5	Keratin 5	
KRT7	Keratin 7	
MKI67	Marker of proliferation Ki-67	
PCNA	Proliferating cell nuclear antigen	uK164
PECAM1	Platelet endothelial cell adhesion molecule	
PGR	Progesterone receptor	
PLIN4	Perilipin 4	
PTEN	Phosphatase and tensin homolog	
PTPRC	Protein tyrosine phosphatase receptor type C	
TUBB	Tubulin beta chain	
UNC45A	Unc-45 homolog A (C. elegans)	
VCAN	Versican core protein	

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ABOUT CELLCARTA

Leading provider of specialized precision medicine laboratory services to the biopharmaceutical industry. Leveraging its integrated analytical platforms in immunology, histopathology, proteomics and genomics, as well as related specimen collection and logistics services, CellCarta supports the entire drug development cycle, from discovery to late-stage clinical trials. The company operates globally with 9 facilities located in Canada, USA, Belgium, Australia and China.

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