COVID-19 CLINICALLY RELEVANT COMORBIDITIES

COVID-19 (Coronavirus Disease-2019) is a respiratory disease caused by a new type of coronavirus called SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) first identified in China in 2019. Most cases of COVID-19 present with mild symptoms but around 15% develop severe symptoms that can trigger a syndrome of acute respiratory distress, which appears associated with a dysregulation of the immune response and systemic inflammation.

Scientific progress allowed the identification of genetic factors related to severe forms of COVID-19, the study of which may help the physician to adapt the clinical management of the patient in the event of COVID-19. These factors are generally related to other pathologies that the patient presents but may not have fully developed and increase the risk of complications if the individual presents a SARS-CoV-2 infection. These findings may indicate potential medical complications, allowing the specialist to anticipate patient management to reduce the morbidity and mortality associated with COVID-19.

This test allows the physician to anticipate patient management to reduce the morbidity and mortality in the event of COVID-19.

The genes analysed are related to different clinical conditions:

✓ **Underlying actionable conditions that can be exacerbated in case of COVID-19**

- Conditions associated with an increased susceptibility to medications commonly used in managing COVID-19 and respiratory failure.
- Conditions that cause reversible metabolic or thrombotic crises that are often induced by severe illnesses such as COVID-19.
- Conditions that cause reversible cardiopulmonary complications that can be exacerbated during severe illnesses such as COVID-19.

✓ **Immune system disorders related to the production of type I Interferon (IFN) that may increase the risk of severe pneumonia in case of COVID-19**

WHY IS IT IMPORTANT?

People with pathogenic variants on these genes have higher risk of medical complications, allowing the specialist to anticipate the management of the patient to reduce the morbidity and mortality in the event of COVID-19.

HOW TO ACCESS?

- Medical consultation with one of our genetic counsellors to explain the test.
- Saliva sample collection.
- Analysis of the sample in the laboratory.
- Test results are delivered at a genetic counselling session.

Underlying actionable conditions that can be exacerbated in case of COVID-19		
Class of condition	**Genetic condition**	**Genes**
Conditions associated with an increased susceptibility to medications commonly used in managing COVID-19 and respiratory failure	Long QT syndromes and catecholaminergic polymorphic VT	*CASQ2, KCNE1, KCNH2, KCNQ1, RYR2, SCN5A*
	G6PD deficiency	*G6PD*
	Malignant hyperthermia susceptibility	*CACNA1S, RYR1*
Conditions that cause reversible metabolic or thrombotic crises that are often induced by severe illnesses such as COVID-19	Urea cycle disorders	*ASL, ASS1, CPS1, NAGS, OTC, SLC25A13, SLC25A15*
	Lysinuric protein intolerance	*SLC7A7*
	Fatty acid oxidation disorders	*ACADM, ACADVL, CPT2, ETFA, ETFB, ETFDH*
	Acute porphyrias	*CPOX, HMBS, PPOX*
	Adrenal insufficiency disorders	*AAAS, ABCD1, AIRE, LHX4, PCSK1, PROP1*
	Hereditary thrombophilia	*F2, F5, PROC, PROS1, SERPINC1*
	Methylmalonic acidemia	*MMACHC, MMADHC*
	Atypical hemolytic uremic syndrome	*C3, CD46, CFB, CFH, CFI*
Conditions that cause reversible cardiopulmonary complications that can be exacerbated during severe illnesses such as COVID-19	Familial cardiomyopathies	*ABCC9, ACTC1, ACTN2, BAG3, COX15, CRYAB, CSRP3, DES, DSC2, DSG2, DSP, FHL1, FKTN, FLNC, FXN, GAA, GLA, JPH2, JUP, LAMP2, LDB3, LMNA, MYBPC3, MYH7, MYL2, MYL3, NEXN, NF1, PKP2, PLN, PRKAG2, RBM20, RYR2, SCN5A, SLC25A4, TAZ, TCAP, TGFB3, TMEM43, TNNC1, TNNI3, TNNT2, TPM1, TTN, TTR, VCL*
	Channelopathies - arrhythmias	*ABCC9, CACNA1C, CALM1, CALM2, CALM3, CASQ2, CAV3, KCNE1, KCNE2, KCNH2, KCNJ2, KCNQ1, LMNA, PRKAG2, RYR2, SCN5A, TNNI3, TNNT2, TRDN*
	Syndromes with vascular involvement	*ACTA2, COL3A1, FBN1, FBN2, LOX, MYH11, MYLK, PRKG1, SMAD3, TGFB2, TGFB3, TGFBR1, TGFBR2*
	Rasopathies	*BRAF, CBL, HRAS, KRAS, MAP2K1, MAP2K2, NRAS, PPP1CB, PTPN11, RAF1, RIT1, SHOC2, SOS1, SOS2*
	Other síndromes related to cardiac pathologies	*ABCC9, BAG3, CACNA1C, CAV3, COX15, EFEMP2, EMD, FHL1, FKTN, FXN, KCNJ2, LMNA, MYH7, NF1, TCAP, TMEM43, TTN*
	Familial hypercholesterolemia	*APOB, LDLR, LDLRAP1, PCSK9*
	Cystic fibrosis	*CFTR*
	Refsum disease	*PEX7, PHYH*
	Familial pulmonary hypertension	*BMPR2*
	Congenital myasthenic syndrome	*CHAT, CHRNA1, CHRNB1, CHRND, CHRNE, COLQ, DOK7, GFPT1, MUSK, RAPSN*
Immune system disorders related to the production of type I Interferon (IFN) that may increase the risk of severe pneumonia in case of COVID-19		
Pathologies that affect the immune response in case of severe viral infection such as SARS-CoV-2	Inborn errors related to type I IFN immunity	*IFNAR1, IFNAR2, IRF3, IRF7, IRF9, STAT1, STAT2, TBK1, TICAM1, TLR3, TRAF3, UNC93B1*