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Identification of Metabolic Biomarkers predictive of the severity of COVID-19 in hospitalized patients

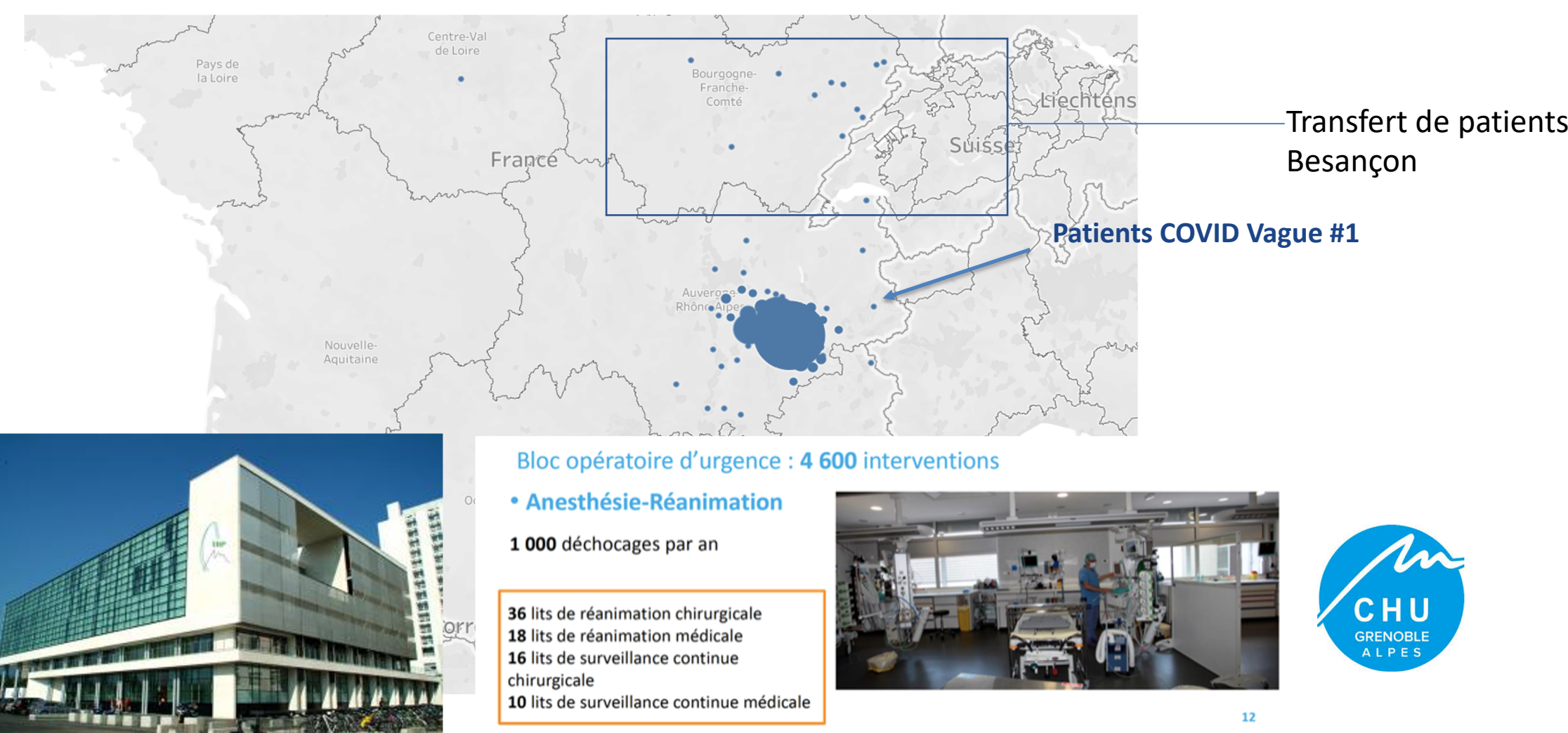
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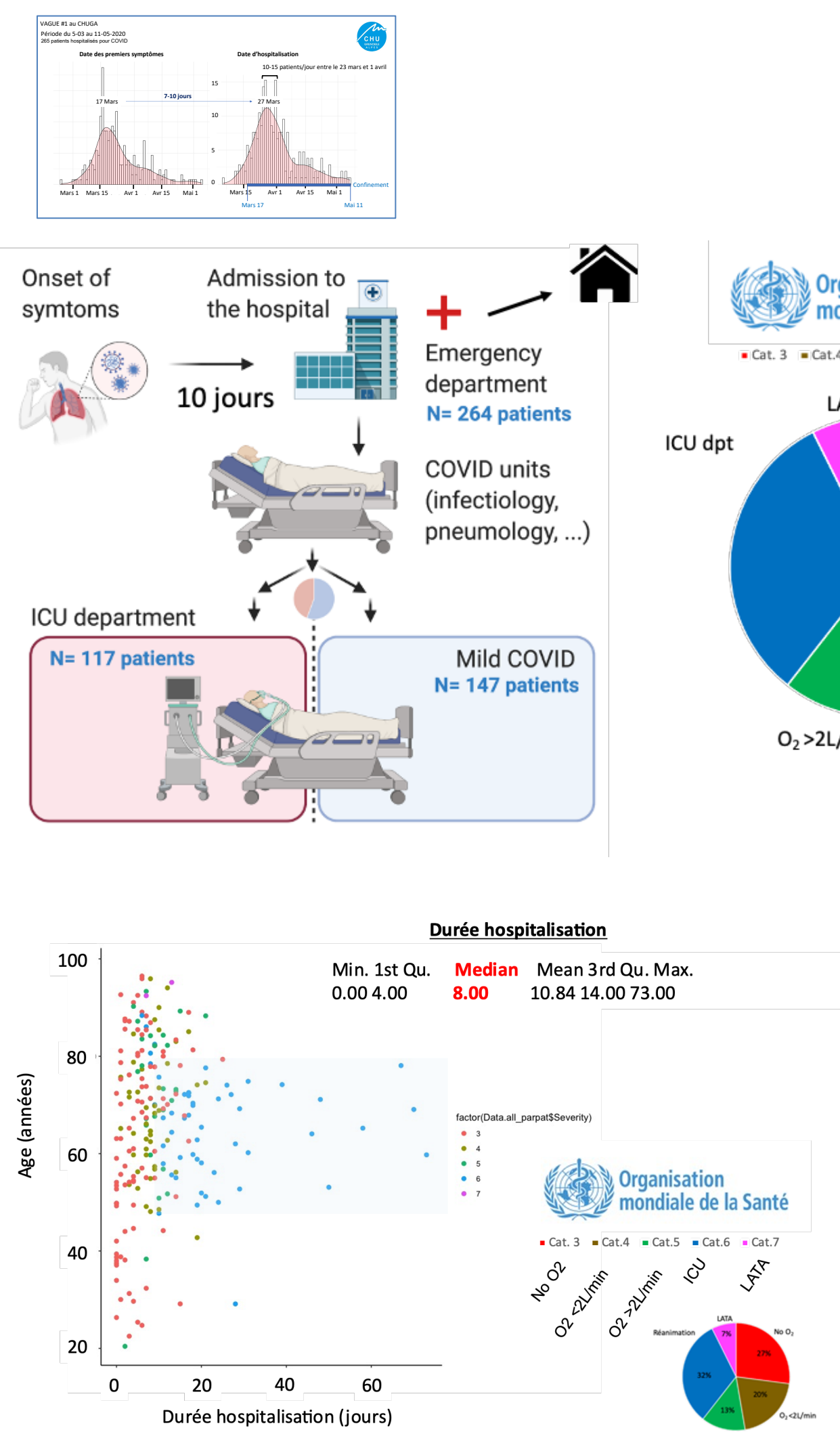
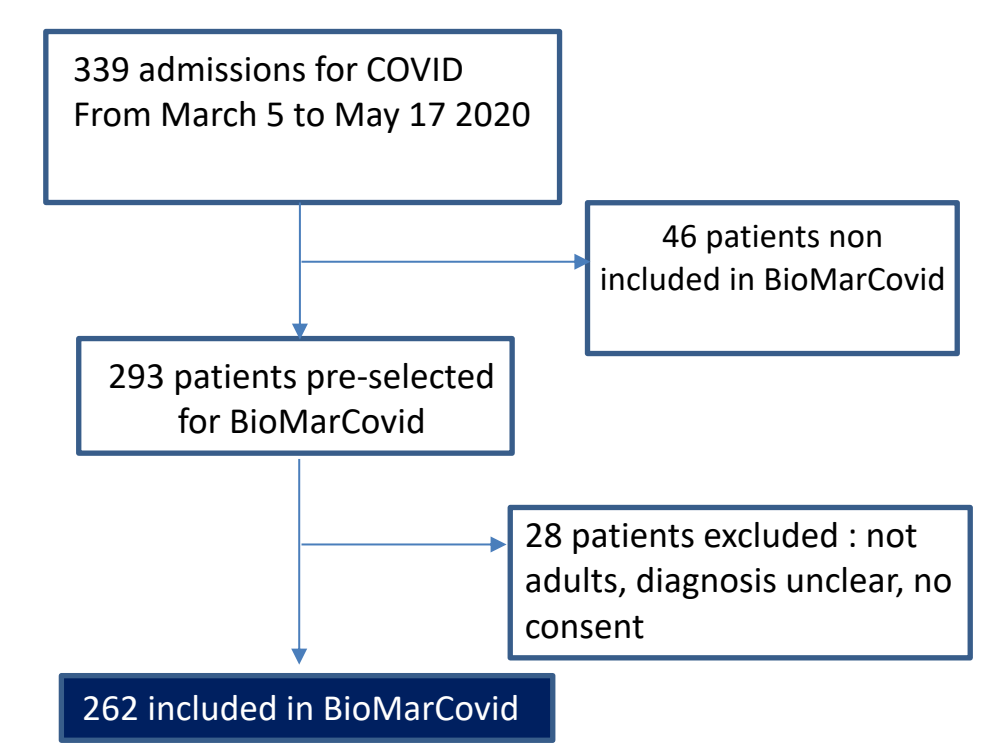
Context

Since one year and a half, hospitals have been facing waves of varying intensity of new COVID-19 patients arriving, which are putting our healthcare system at risk (overwhelmed if no action was taken). We, infectious diseases physicians and hospital biologists, urgently need **predictive biomarkers** of the health trajectory of patients arriving at hospital's emergencies to better stratify risk and improve patient management. In particular, we need to identify as early as possible which hospitalized patients are at risk of developing a severe form of COVID-19 and requiring intensive care. To date, patient management has progressed, since evidence-based immunomodulatory treatments (dexamethasone, ...), provided at the right time, decrease the fatality rate for those with a severe disease. Almost all the severe cases are due to the onset of a delayed (after 7-10 days of mild symptoms usually) acute respiratory distress syndrome; this lung damage is due to an hyperinflammatory state secondary to an hyperactivation of the immune system. Classical markers of inflammation (C-reactive protein [CRP], Interleukin-6 [IL6], for instance with good sensitivity but low specificity 79% and 62% respectively) may participate in identifying, at the hospital admission, which patients will experience a worsening of lung functions; moreover, it has been clearly demonstrated that co-morbidities linked to dysmetabolic disorders (diabetes, obesity, hypertension, etc.) are risk factors severe forms. However, a more efficient identification of the most at-risk patients is needed.

The hospital CHUGA is the reference establishment of the the **Alpine arc**, population **2 million inhabitants**

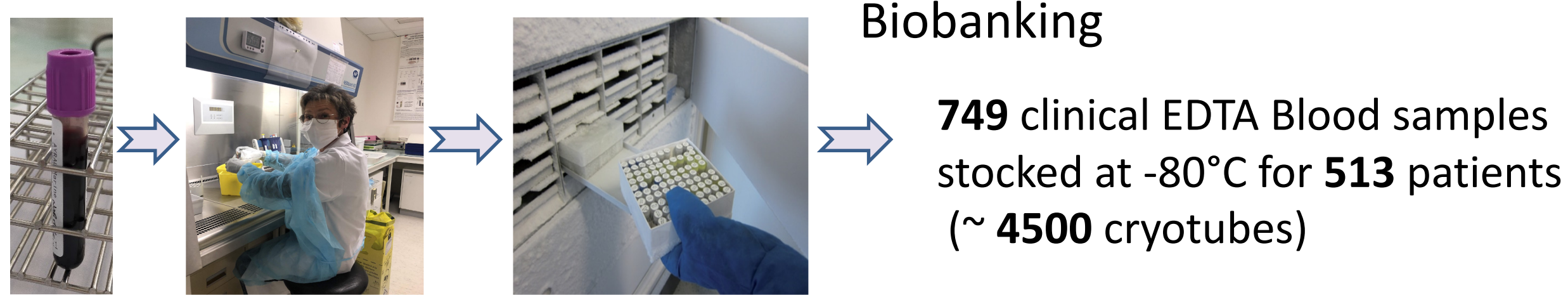


Clinical trial Biomarcovid



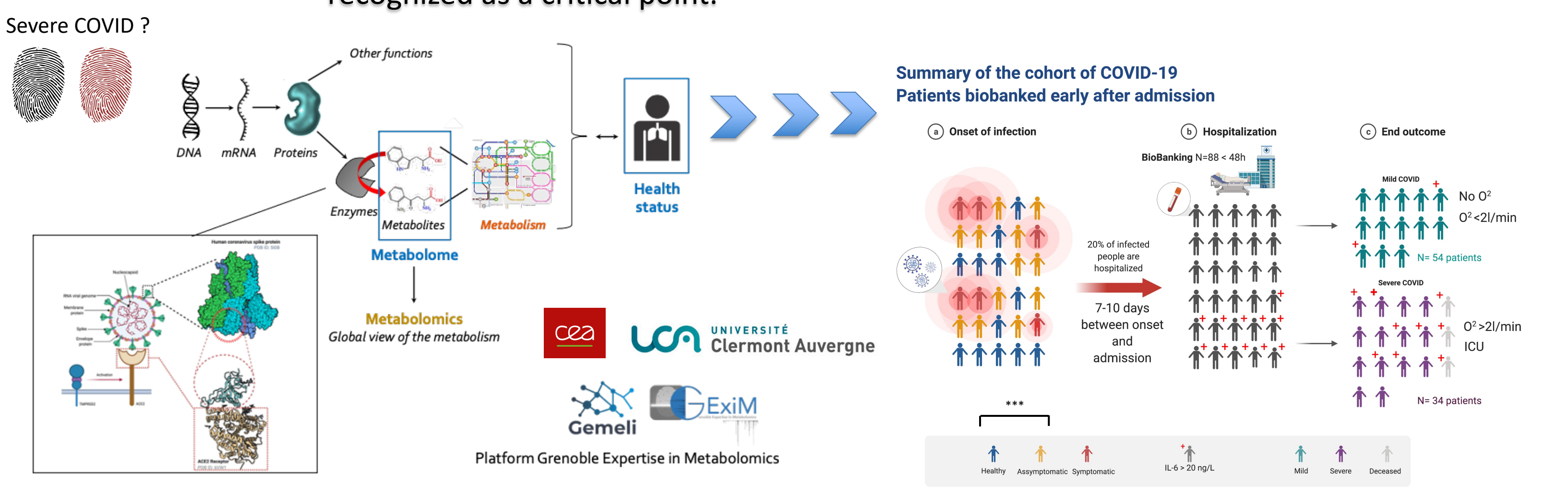
	Total (n=262)	Forme Modérée (n=139)	Forme Sévère (n=123)	p.value
Genre, Homme (H)/Femme (F) (%)	149 / 113 (H : 56.87%)	66 / 73 (H : 47.48%)	83 / 40 (H : 67.48%)	p < 0.001
Age (med)	70	68	72	.003
IMC, (med [IQR])	26.4 [23.24;30.4]	24.9 [21.6;28.1]	28 [24.91;31]	.001
Comorbidités				
Hypertension, n(%)	107 (53.23%)	44 (44.9%)	63 (61.17%)	p < 0.001
Diabète, n(%)	42 (16.03%)	17 (12.23%)	25 (20.33%)	p < 0.001
Intervalle 1 ^{er} symptômes - hospitalisation (med [IQR])	7 [4;10]	7 [4;10]	7 [4;10]	NS

Institute of Biology and Pathology



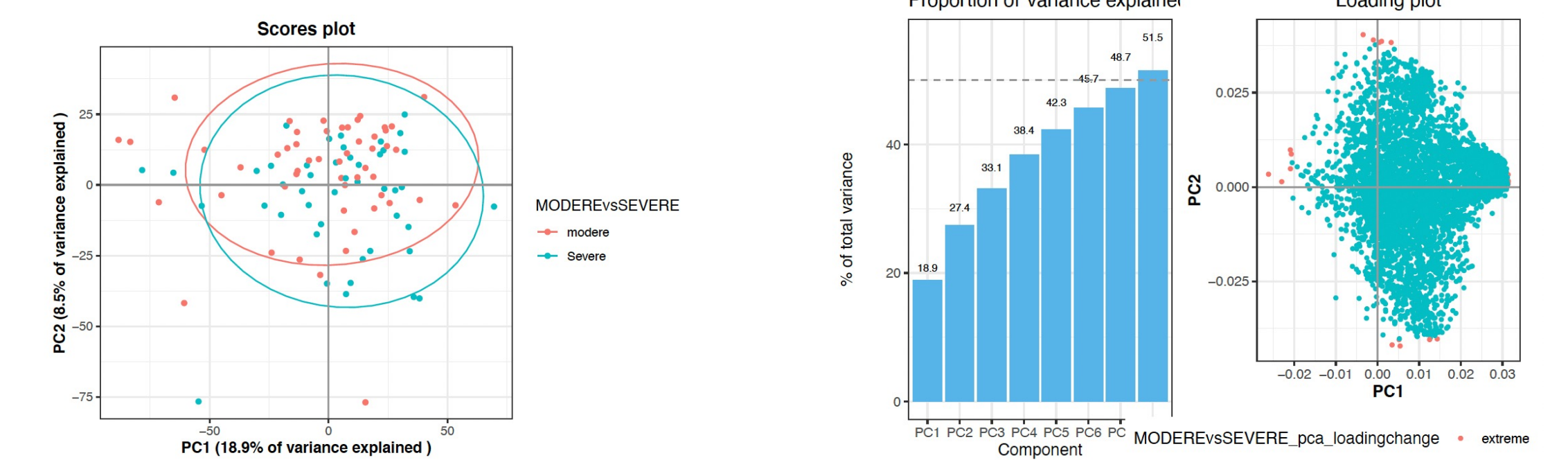
Objectives

Identify a set of clinical metabolic biomarkers for the severity of the disease, thus helping to stratify patients and anticipate the management of intensive care beds, which is now recognized as a critical point.



LC-MS/MS (HILIC Orbitrap ESI-)

PCA for factor of interest MODERE vs SEVERE



Preliminary results

LC-MS/MS (C18 Orbitrap ESI+)

Non supervised Multivariate analysis : Principal component analysis

