**Supplementary Figure S1**

**Gating strategy used for the analysis of neutrophil populations by flow cytometry.** (**A**) After debris and doublet exclusion, CD15+CD14− cells were selected. Eosinophils were excluded through side scatter (SSC) or forward scatter (FSC) parameters and the expression of CRTH2. The proportion of immature neutrophils was evaluated through the expression of CD10 and CD64. (**B**) One representative uninfected donor (#B66), COVID-19 non-ICU patient (#H92), and COVID-19 ICU patient (#60) are shown as an example. (**C**) Representative expression of LOX-1 and CD123 on CD10−CD64+ neutrophils.

**Supplementary Figure S2**

(**A**) Principal component analysis (PCA) using LOX-1+, PD-L1, CD123+, and CD10−CD64+ neutrophil abundance and Simplified Acute Physiology Score (SAPS) II variables on sample size: ICU = 24 (dark red circles) and non-ICU = 14 (gray circles). Percent contribution of each variable is indicated in color gradient black–red of the arrows. (**B**) PCA using serum cytokines and Sequential Organ Failure Assessment (SOFA) score variables on ICU patient sample size: high SOFA score (*n* = 11) and low SOFA score (*n* = 10) (SOFA <8 = gray circles; SOFA ≥8 = red circles). (**C**) Box plots (min to max distribution) of the abundance of CD10−CD64+ neutrophil subsets among total neutrophils of group samples of discharged (*n* = 33) and deceased (*n* = 5) patients.

**Supplementary Figure S3**

**Expression of neutrophil markers on a rainbow heat scale on the Opt-SNE map of the concatenated files of all clusters.** The color gradient indicates high expression (red) to low expression (blue) of indicated Z markers.

**Supplementary Figure S4**

**Box plots (min to max distribution) of the abundance of CD10−CD64+ neutrophil subsets among patients requiring or not requiring invasive mechanical ventilation (no IMV: *n* = 60; IMV: *n* = 28).** Nonparametric Mann–Whitney test was used to compare differences in cellular abundance of neutrophil subsets between groups, with significance defined by a *p*-value of \*\*\* for *p* < 0.001 and \*\*\*\* for *p* < 0.0001.