Introduction:
Extra corporeal life support (ECLS) continues to be associated with high mortality rates. Our ability to predict outcome prior to initiation ECLS remains limited. Here we take a single cell RNASEq approach in an effort to identify novel immune cell types that are associated with—and may contribute to—survival on ECLS.

Methods:
Whole genome transcriptomic profiles were generated from ~40,000 peripheral blood monocytes obtained from 38 patients at the time of cannulation for veno-arterial ECLS (VA-ECLS). Within each subpopulation, differential gene expression analysis was performed to identify new markers associated with survival. Findings were validated in a additional cohorts by flow cytometry.

Results:
Surviving patients had significantly higher proportions of CD8+ NKT cells (CD3+/CD8+/CD19−/CD56+) that were CD52+ (p = 0.001, FDR < 0.05). To validate this observation, we performed FC analysis of a second cohort of 20 patients. For each patient, we quantified the proportion of CD8+ NKT cells that were CD52+. Using the median proportion as the cutoff, we again found that a high proportion of CD52+ cells among CD8+ NKT cells was predictive of 48 hour survival (p=0.024). We noted that while high levels of CD52+ cells among the CD8+ NKT cells was protective in this cohort of VA-ECLS patients, this relationship did not hold for patients with sepsis. As only a few the VA-ECLS patients were septic, we analyzed a third cohort of septic ECLS patients. We observed that high levels of CD52+ cells among the CD8+ NKT populations was not protective in this population.

Conclusion:
The proportion of CD8+ NKT cells that are positive for CD52 is predictive of survival among patients undergoing VA-ECLS for non-infection related indications.

Image:

72 h survival