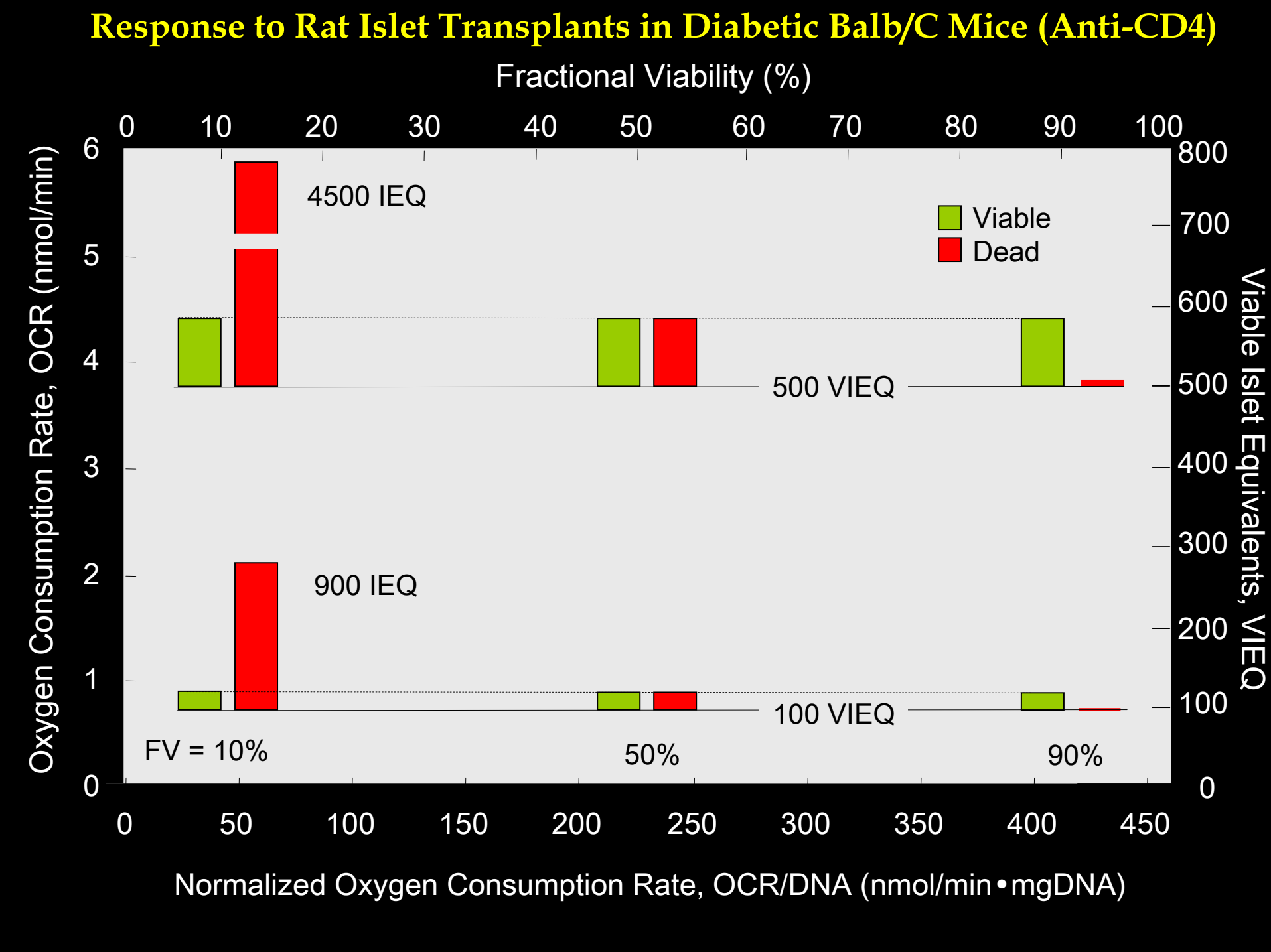
Real Time Human Islet Potency Assay Based on Oxygen Consumption Rate

Klearchos Papas, PhD
University of Minnesota Medical School

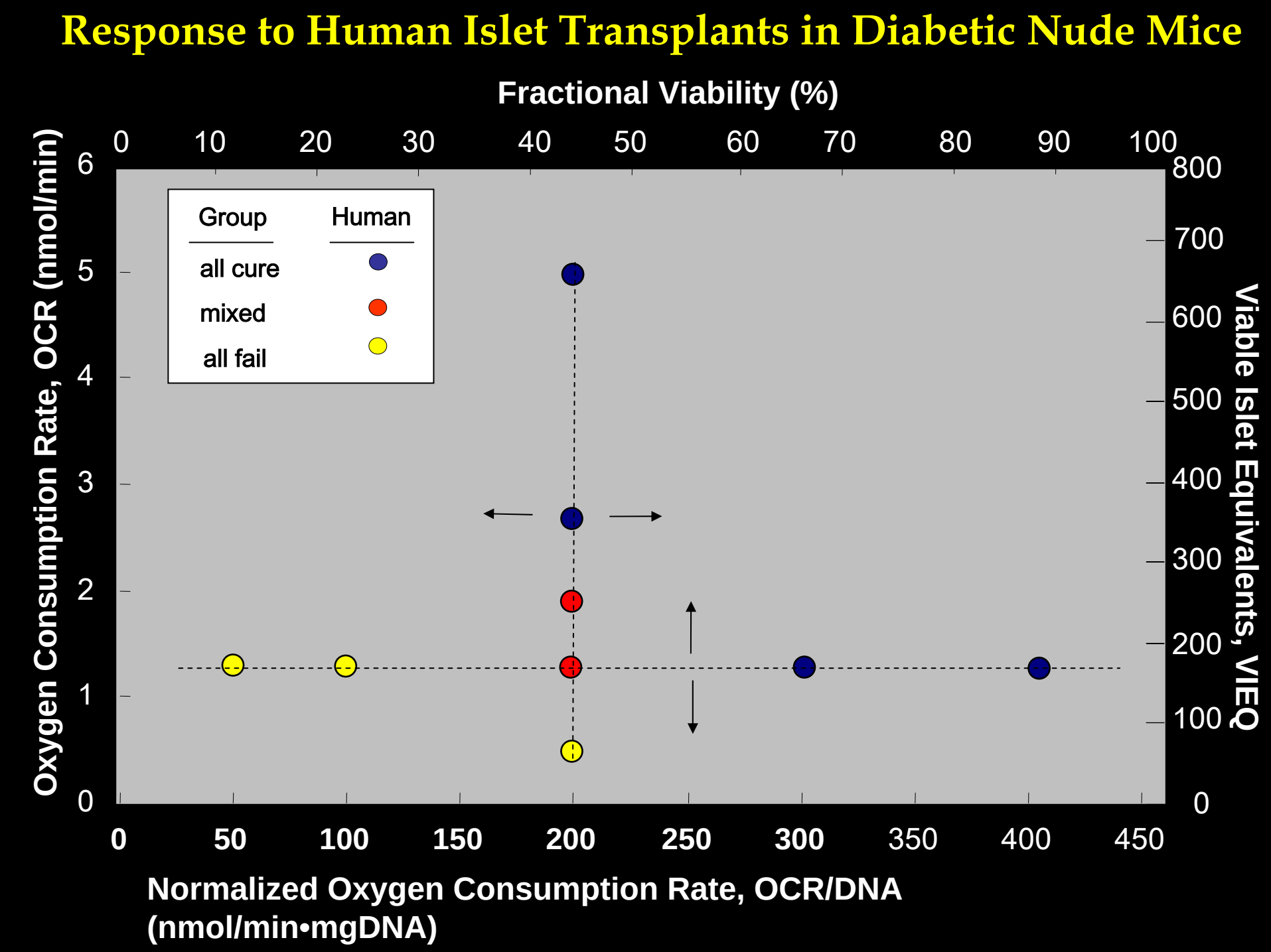
Oxygen Consumption Rate Assessment Parameters

Parameter	Proportional To	Measure of
OCR	Number of viable cells / Volume of viable tissue	Amount of good tissue
DNA	Number of cells / Total tissue volume	Total amount of tissue
$\frac{OCR}{DNA}$	$\frac{\text{Viable tissue volume}}{\text{Total tissue volume}}$	Quality of the tissue
$\frac{OCR/DNA}{(OCR/DNA)_v}$ =	Fractional viability	Quality of the tissue

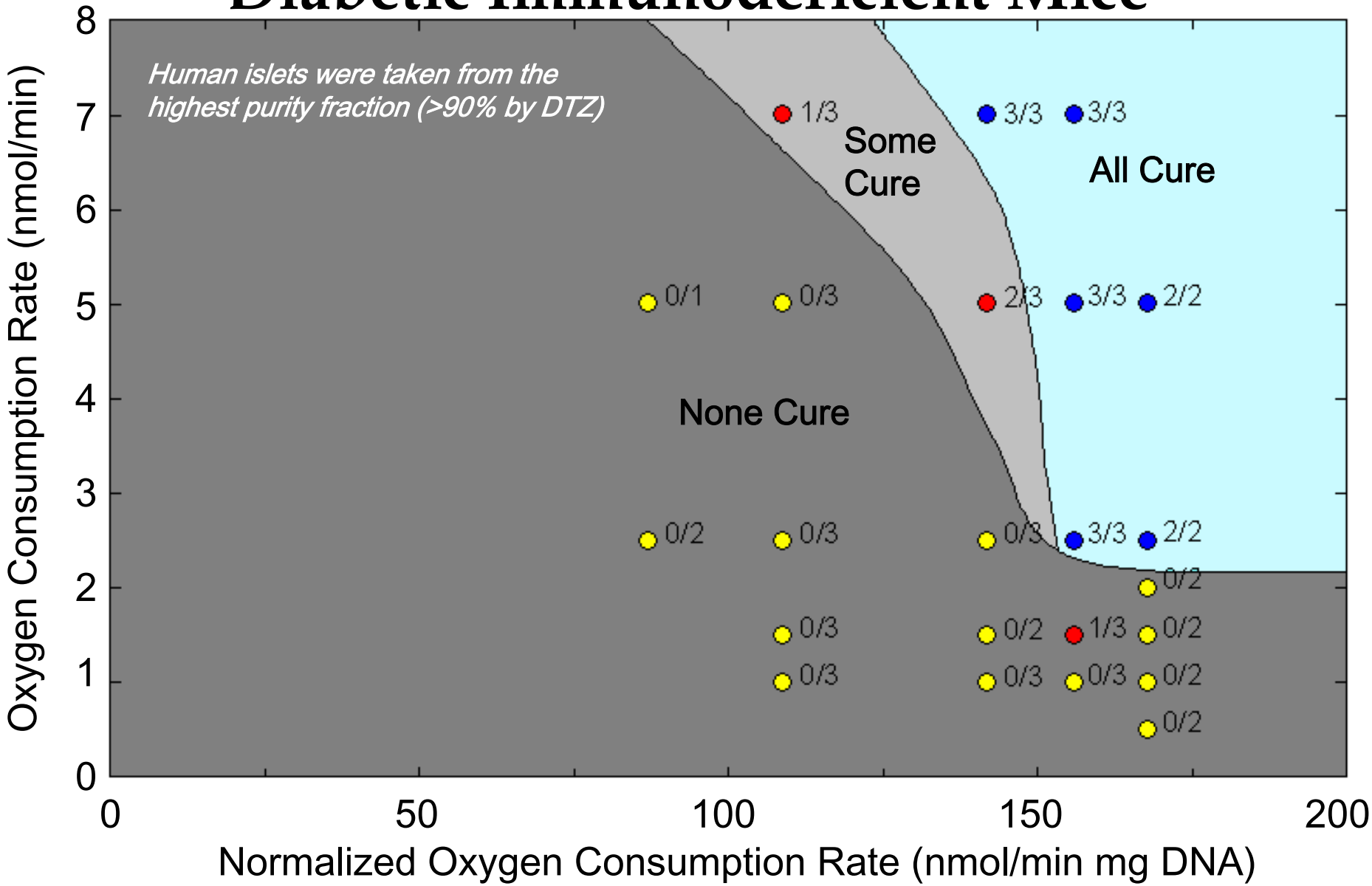
Response to Rat Islet Transplants in Diabetic Balb/C Mice (Anti-CD4)



Response to Human Islet Transplants in Diabetic Nude Mice

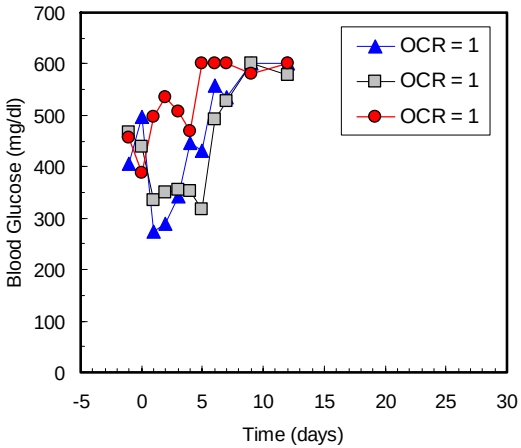


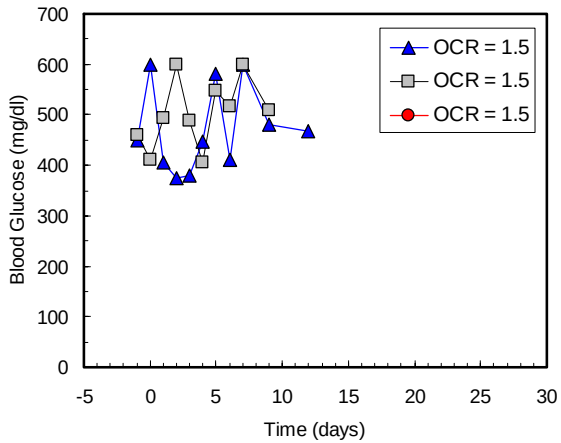
Response to Human Islet Transplants in Diabetic Immunodeficient Mice

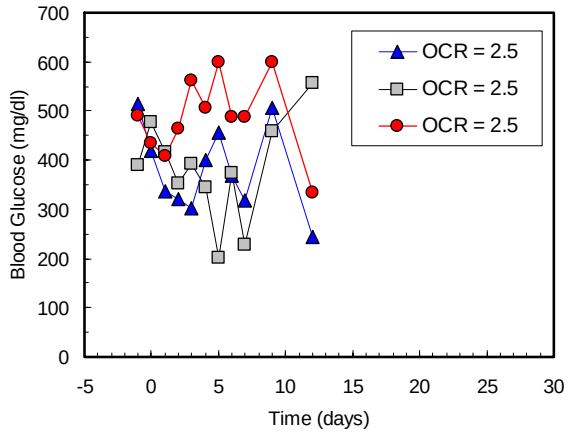


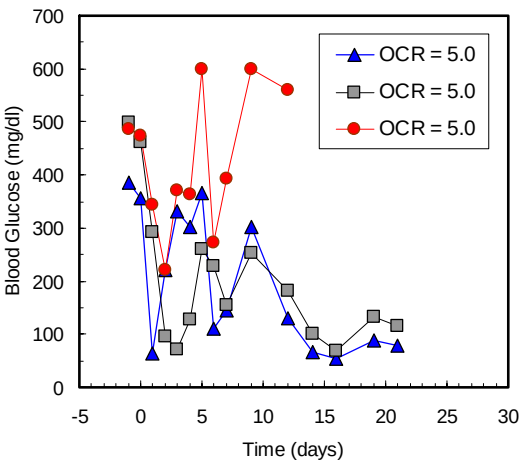
Transplantation Studies

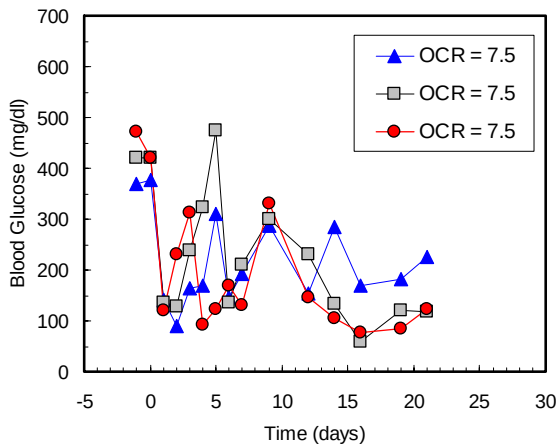
OCR/DNA = 142 nmoles/min/mgDNA
OCR Dose Transplanted = 1.0 - 7.5 nmoles/min





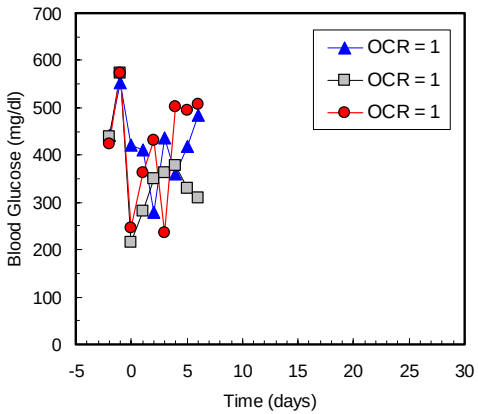


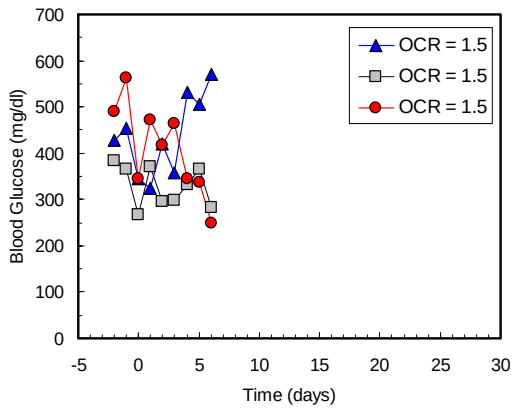


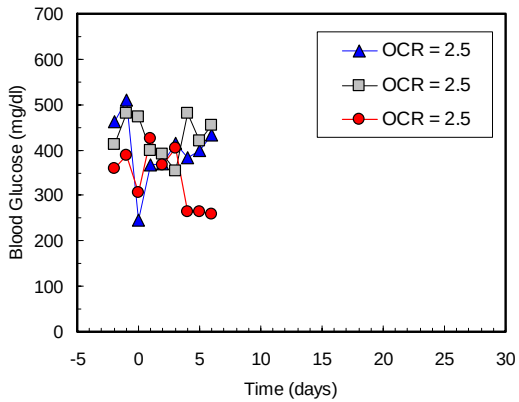


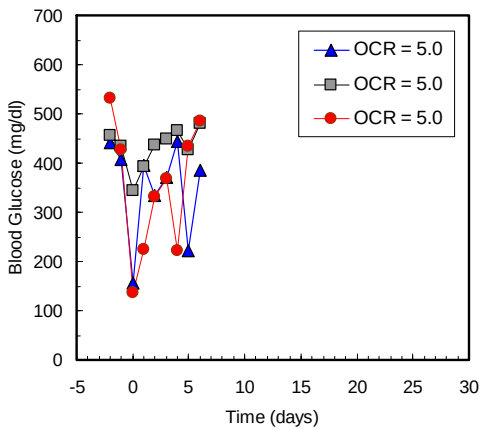
Transplantation Studies

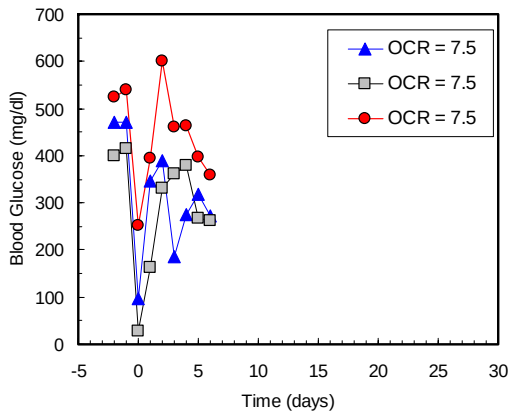
OCR/DNA = 109 nmoles/min/mgDNA
OCR Dose Transplanted = 1.0 - 7.5 nmoles/min



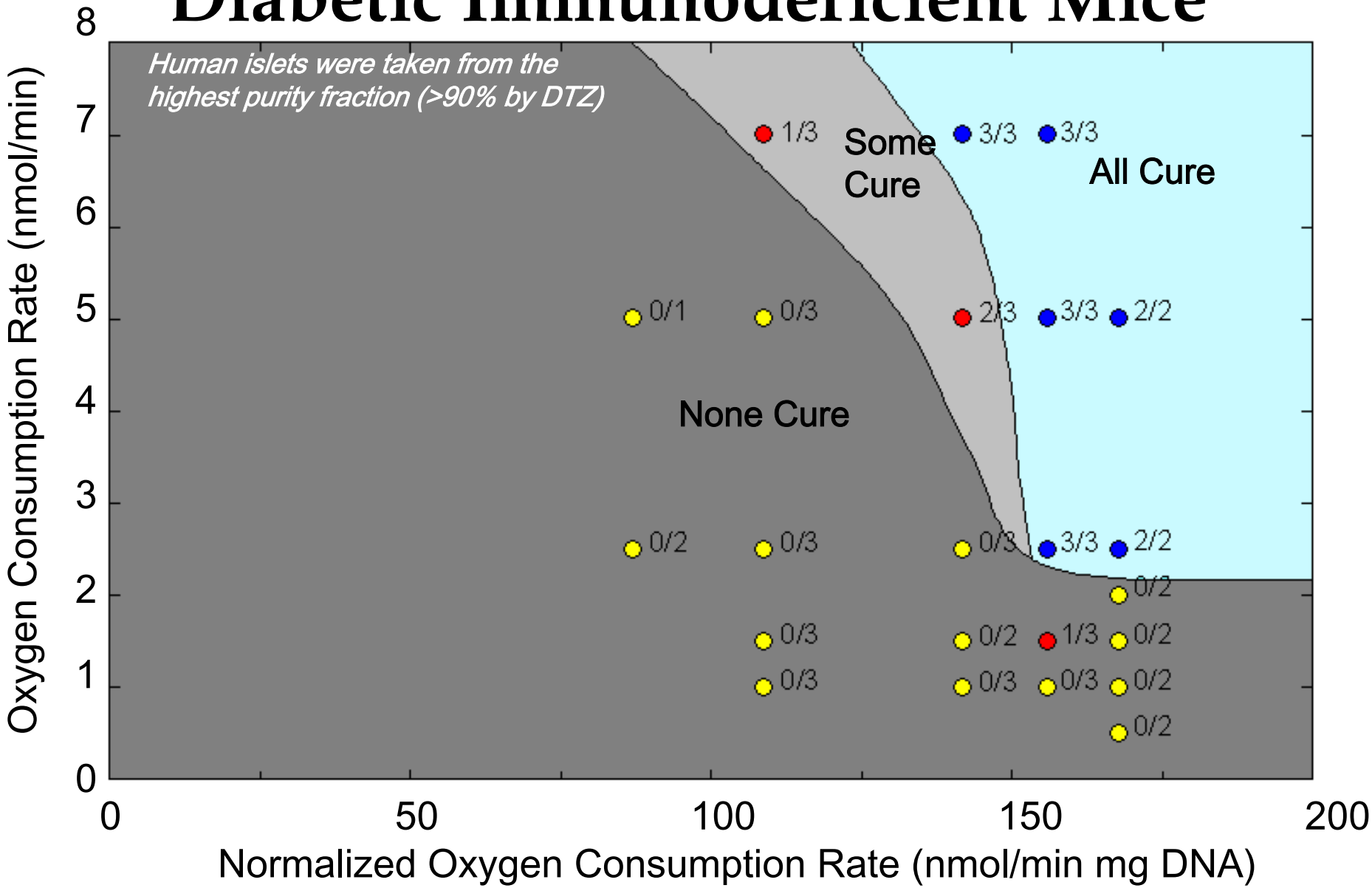






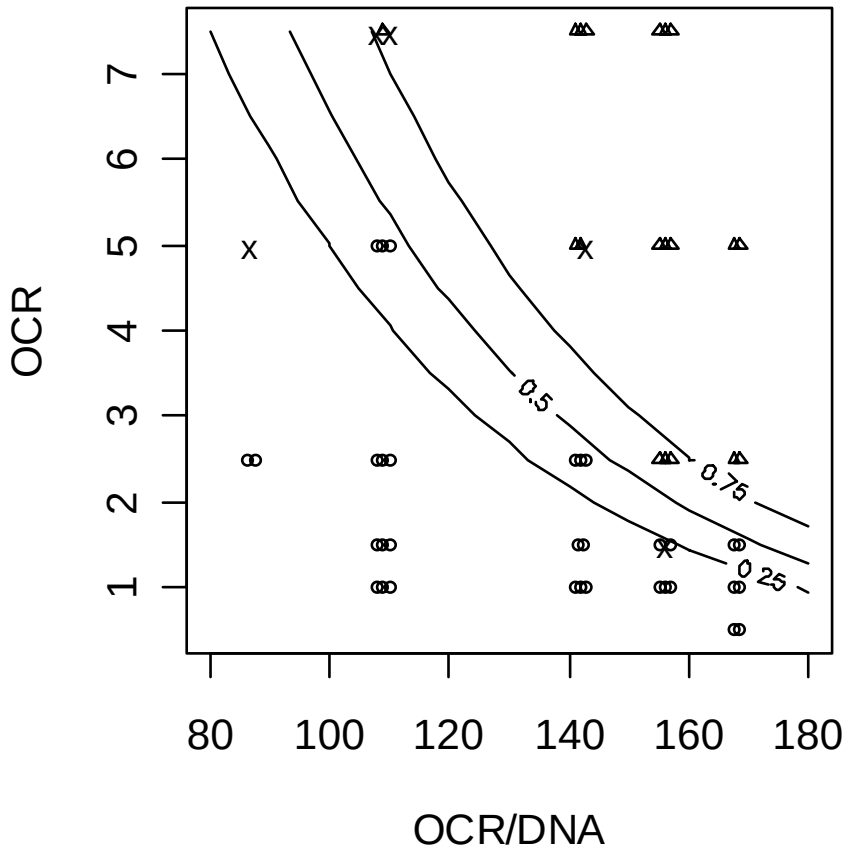


Response to Human Islet Transplants in Diabetic Immunodeficient Mice



Statistical Analysis by City of Hope ABCC

Sensitivity of 91.7% and a specificity of 90.5%



Conclusion

- **Human islet potency assay based on OC and DNA measurements is highly sensitive and highly specific to the mouse transplantation outcome**