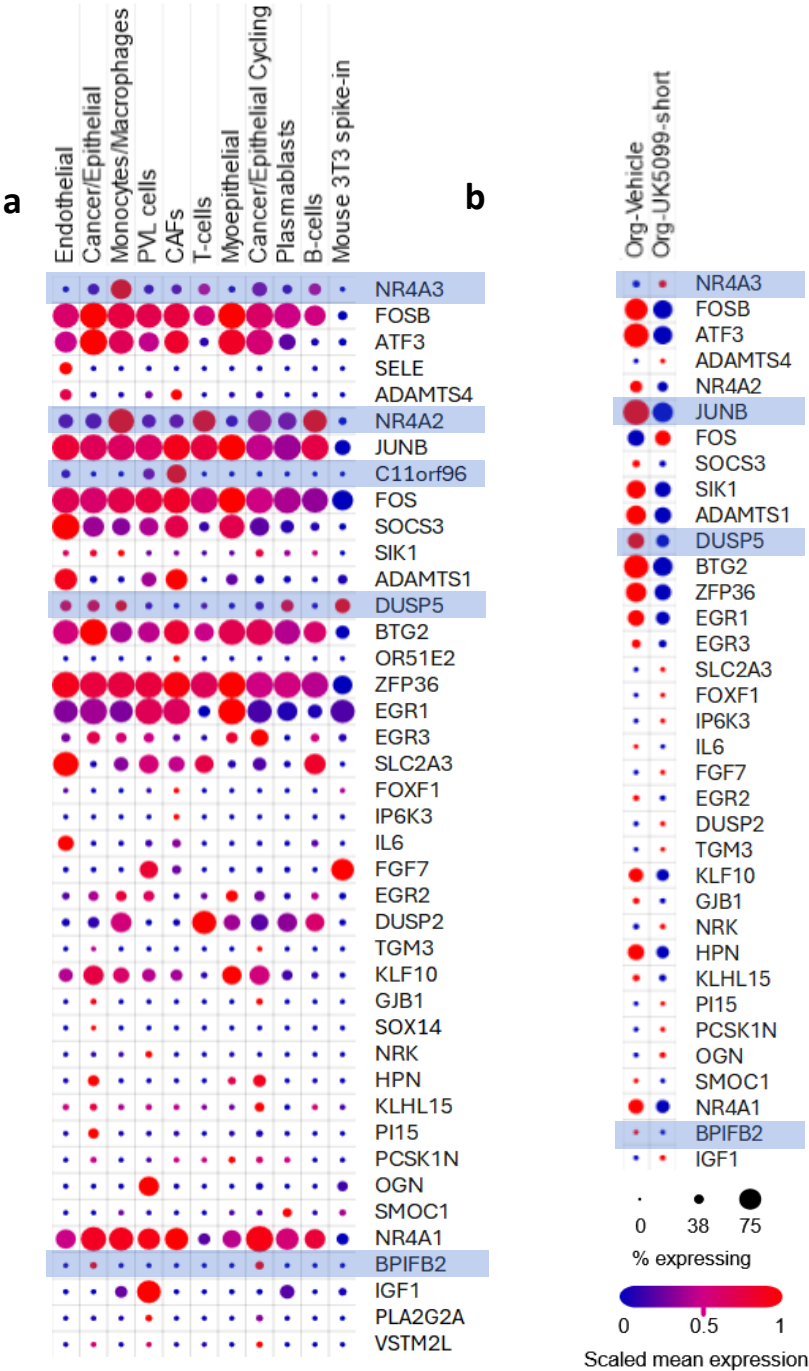
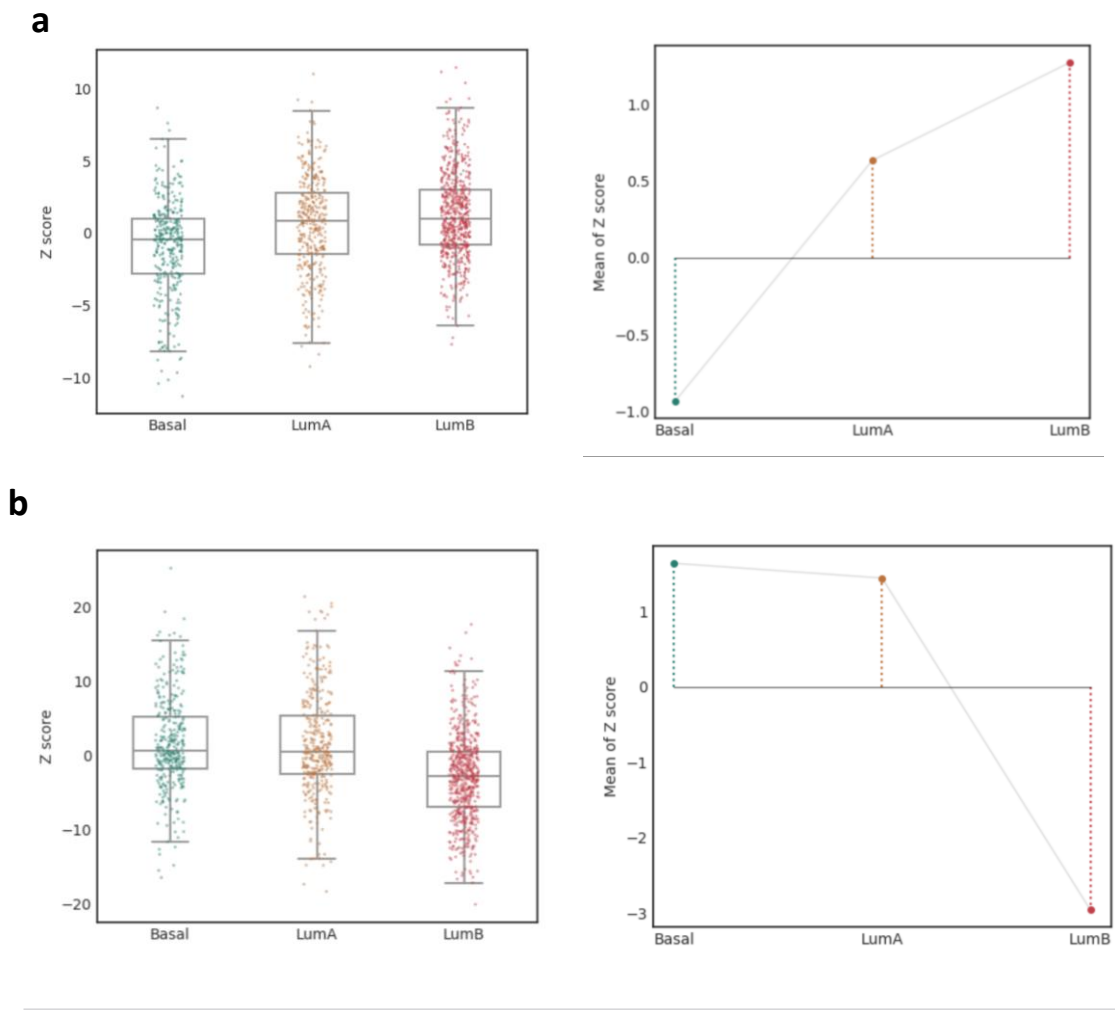


Supplementary Figure 1



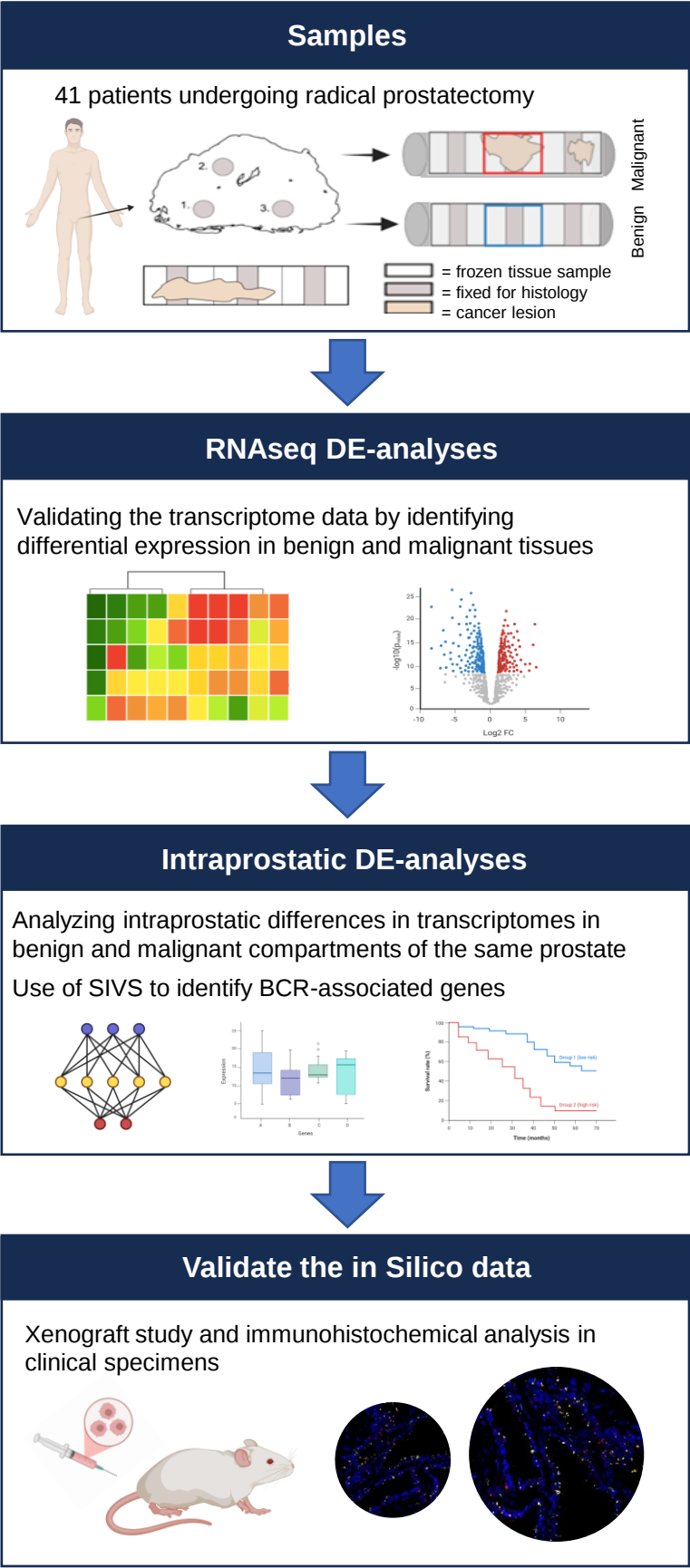
a. Cell-specific expression of the 45 genes whose expression between benign and malignant tissues showed a statistical difference between patients with biochemical relapse and those without. The four BCR predictive genes (BPIFB2, C11orf96, DUSP5, NR4A2 and NR4A3) are highlighted. **b.** The regulation of 35 genes of the 45 gene fingerprint was identified in prostate cancer organoids and were regulated by UK5099, a specific and potent inhibitor of the mitochondrial pyruvate carrier, link the identified fingerprint to the increased aerobic glycolysis. Data was extracted from the Broad Institute Single Cell Portal (https://singlecell.broadinstitute.org/single_cell). On the right side it is stated with if the gene expression is higher (+) or lower (-) in malignant tissue compared to benign tissue of the given gene. Similarly, it is shown if the malignant/benign gene expression ratio is higher (+) or lower (-) in patients who develop BCR. Threshold for light green and light red values are log2FC of 1 and FDR=0.05, for dark green values have a log2FC of less than 1 and a FDR less than 0.05. Light blue values indicate the low expression of the given gene thus its was filtered out from the malignant to benign comparison.

Supplementary Figure 2



The analysis included the 45 genes whose expression between benign and malignant tissues showed a statistical difference between patients with biochemical relapse and those without. The expression of the gene set was analyzed in luminal A and luminal B tumors using the PCTA dataset (<http://www.thepcta.org/>). **a.** The 12 genes with a higher benign-to-malignant ratio in BCR patient samples compared to non-BCR samples show increased expression in luminal B tumors compared to the luminal A and basal groups. **b.** The 33 genes with a lower benign-to-malignant ratio in BCR patients samples compared to non-BCR samples show decreased expression in luminal B tumors compared to the luminal A and basal groups. The data further indicate an association of the fingerprint with the aggressiveness of the tumors.

Supplementary Figure 3



A graphical abstract showing the main analyses of the study.