Synthetic Lethality with Multiple Genes

Where more than 2 genes are SL → Query, Gene$_X$, Gene$_Y$ → Function, Expression
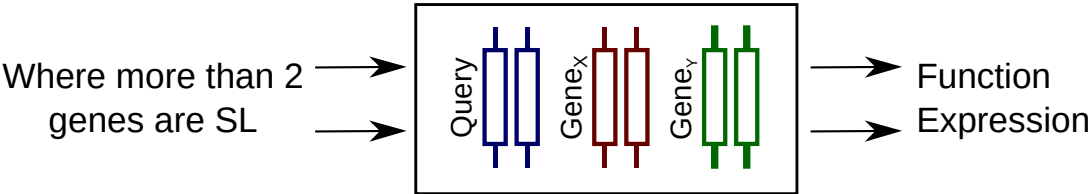
Pairwise SL
One of each pair needed
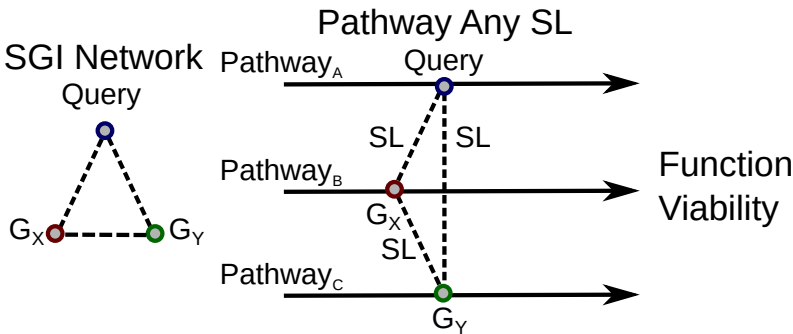Stronger Signal

SGI Network — Query, G$_X$, G$_Y$

Pathway Pairwise — Pathway$_A$, Query, SL, SL, Pathway$_B$, G$_X$, G$_Y$

Function Viability
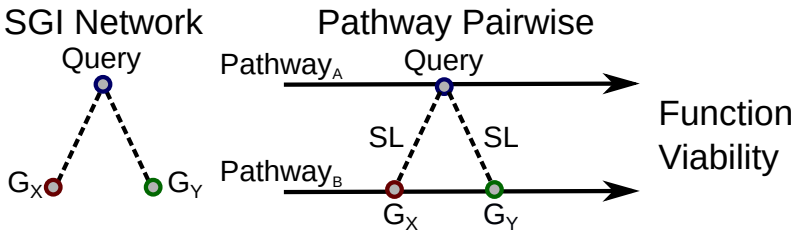
Query$^-$ + G$_X^-$ = nonviable
Query$^-$ + G$_Y^-$ = nonviable

Higher-order SL
Any of triplet needed
Weaker Pairwise Signal

SGI Network — Query, G$_X$, G$_Y$

Pathway Any SL — Pathway$_A$, Query, SL, SL, Pathway$_B$, G$_X$, SL, Pathway$_C$, G$_Y$

Function Viability

Query$^-$ + G$_X^-$ + G$_Y^-$ = nonviable
May be viable with G$_X^-$ or G$_Y^-$
(samples under-represented)

Samples

	S$_1$	S$_2$	S$_3$	S$_4$	S$_5$	S$_6$	S$_7$	S$_8$	. . . .	S$_N$
Query	+	+	+	+	-	-	-	-	. . . .	.
G$_X$	+	+	-	-	+	+	-	-	. . . .	.
G$_Y$	+	-	+	-	+	-	+	-	. . . .	.

Gene Function

Lethal / Not Observed

SL / SL

Under the synthetic lethal model, all SL partners can not be inactivated but inactive pairs may be detected at lower frequency than expected