

CDNA를 위한 Microarray chip 디자인

최규정*

Desing of CDNA Microarray Experiments

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실험 목적

The latest in genomics technology is microarrays. They are used for studying several genes at one time. Microarray experiments are now extensively used in several areas of molecular biology. Many of the advances in this field have taken place over the last few years. Efficient design of comparative experiments and factorial Experiments has been extensively developed in literature over the last several decades. The concepts of efficient design also are now being extended to microarray experiments. This paper aims to review language for constructing efficient block designs using classical designs as building blocks.

재료 및 방법

○ Factorial Microarrays

- 2^2 experiments
- 2^3 experiments
- 3×2 experiments

실험 결과

Balanced factorial designs available in literature provide building blocks for constructing microarray designs with desired statistical properties. In particular, classical confounded designs for two level factors readily provide efficient designs for microarrays. Designs with block size two tabulated by Lewis and Tuck (1985) and Gupta (1987) can also be used with advantage. Fractions of full-factorials may also be used as building blocks, especially when the number of factors is large. We have used the row-column structure to display designs mainly to show their close connection with classical factorial designs. Also, directed graph displays of microarray designs become quite cumbersome with an increase in the number of levels and/or the number of factors.

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Table1Designs for 2^2 factorial

Design	Blocks	Effect confounded
D_{11}	[00, 01], [10, 11]	F_1
D_{12}	[00, 10], [01, 11]	F_2
D_{13}	[00, 11], [01, 10]	$F_1 F_2$

Table2Designs for 2^3 factorial

Design	Blocks	Effects confounded
D_{21}	[000, 100],[001, 101],[010, 110],[011, 111]	$F_2, F_3, F_2 F_3$
D_{22}	[000, 010],[001, 011],[100, 110],[101, 111]	$F_1, F_3, F_1 F_3$
D_{23}	[000, 001],[010, 011],[100, 101],[110, 111]	$F_1, F_2, F_2 F_3$
D_{24}	[000, 111],[001, 110],[010, 100],[011, 100]	$F_1 F_2, F_1 F_3, F_2 F_3$
D_{25}	[000, 011],[001, 010],[101, 110],[100, 111]	$F_1, F_2 F_3, F_1 F_2 F_3$
D_{26}	[000, 101],[001, 100],[011, 110],[010, 111]	$F_2, F_1 F_3, F_1 F_2 F_3$
D_{27}	[000, 110],[010, 100],[011, 101],[001, 111]	$F_3, F_1 F_2, F_1 F_2 F_3$

Table3Designs for 3×2 factorial

Design	Blocks	Efficiency of estimation of		
		F_1	F_2	$F_1 F_2$
D_{41}	[00, 01],[10, 11],[20, 21]	0	1	1
D_{42}	[00, 11],[10, 21],[20, 01],[01, 10],[11, 20],[21, 00]	0.75	1	0.25
D_{43}	[00, 10],[10, 20],[20, 00],[01, 11],[11, 21],[21, 01]	0.75	0	0.75