1. Genes **@CDC24$** and **@CDC42$** are required for the establishment of cell polarity and for bud formation in Saccharomyces cerevisiae. – no causal pair

2. Temperature-sensitive (Ts-) mutations in either of these genes cause arrest as large, unbudded cells in which the nuclear cycle continues.

3. **@MSB1$** was identified previously as a multicopy suppressor of Ts- **cdc24** and **cdc42** mutations. – causal relation

4. We have now sequenced **@MSB1$** and constructed a deletion of this gene.

5. The predicted amino acid sequence does not closely resemble any other in the available data bases, and the deletion does not produce any readily detectable phenotype.

6. However, we have used a colony-sectoring assay to identify additional genes that appear to interact with **@MSB1$** and play a role in bud emergence.

7. Starting with a strain deleted for the chromosomal copy of **@MSB1$** but containing **@MSB1$** on a high-copy-number plasmid, mutants were identified in which **@MSB1$** had become essential for viability.

8. The new mutations defined two genes, **BEM1** and **BEM2**; both the **bem1** and **bem2** mutations are temperature sensitive and are only partially suppressed by **@MSB1$**. – causal relation

9. In **bem1** cells, a single copy of **@MSB1$** is necessary and sufficient for viability at 23 or 30 degrees C, but even multiple copies of **@MSB1$** do not fully suppress the growth defect at 37 degrees C. – causal evidence

10. In **bem2** cells, a single copy of **@MSB1$** is necessary and sufficient for viability at 23 degrees C, multiple copies are necessary for viability at 30 degrees C, and even multiple copies of **@MSB1$** do not suppress the growth defect at 37 degrees C. – causal evidence

11. In a wild-type background (i.e., a single chromosomal copy of **@MSB1$** , both **bem1** and **bem2** mutations cause cells to become large and multinucleate even during growth at 23 degrees C, suggesting that these genes are involved in bud emergence. – causal pair

12. This suggestion is supported for **BEM1** by other evidence obtained in a parallel study (J. Chant, K. Corrado, J. Pringle, and I. Herskowitz, submitted for publication).- causal evidence (from other study)

13. **BEM1** maps centromere distal to **TYR1** on chromosome II, and **BEM2** maps between **SPT15** and **STP2** on chromosome V. – no causal pair

RELATION PAIRS: [['CDC24', 'MSB1', 'Low'], ['CDC42', 'MSB1', 'Low'], ['BEM1', 'MSB1', 'Low'], ['BEM2', 'MSB1', 'Low']]