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Good Mutation? Bad Mutation? A Simulation Based on Sickle Cell Disease to Teach the Hardy-Weinberg Principle

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Sickle Cell Disease is a serious genetic condition caused by the abnormal folding of hemoglobin. Surprisingly, the mutations that cause this disease occur at unusually high frequencies in some human populations. HHMI's short film "The Making of the Fittest: Natural Selection in Humans" documents the fascinating story of how the connection between the Sickle Cell trait and malaria was discovered, documenting a genetic trade-off that affords a selective advantage to humans living in regions where malaria is endemic. The participants of this workshop will work in groups to perform a hands-on simulation, analyze their data, and share ideas on how to implement this activity in their courses. This simulation helps students understand how allele frequencies change (or not) from generation to generation under different selective pressures. The activity underscores the basic principles underlying Hardy Weinberg Equilibrium, placing abstract concepts in a context that students can more easily understand.

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