

Novel Basal Cell Culture Media Formulations Enable Long-Term Storage at Room Temperature

Jonathan Richter, Jeff Fein and Matthew Dallas, Thermo Fisher Scientific, Frederick, MD, USA, 21704

Introduction

Room-Temperature Stable Media Streamlines Workflow and Saves Refrigerator Space

Traditional basal cell culture media is a vital resource in modern laboratories. It must be stored at 4-8°C, and must be stocked at high volumes to ensure continuous supply. Media storage is a major contributor to cold-storage overcrowding, a very common inconvenience. To solve this problem, Thermo Fisher has developed media that can be stored at room temperature for up to 12 months without loss of critical components. This frees of cold storage, lowers the associated energy costs, and removes the need to allow media to warm to room temperature before use.



Cell Culture Performance

BenchStable media demonstrates equivalent performance for daily maintenance of mammalian cell culture, and does not impact cell morphology even during long-term cell cultures.

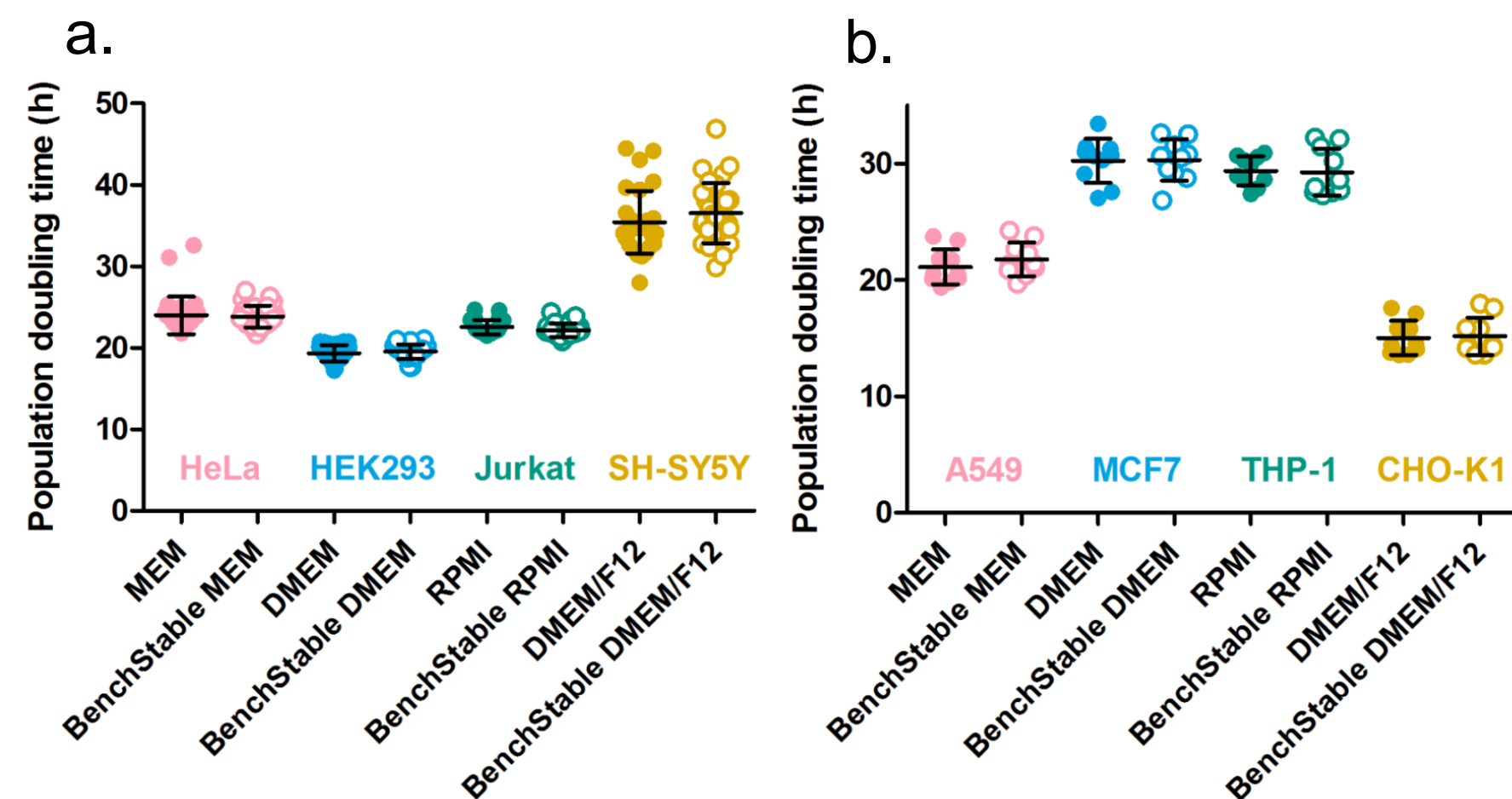


Figure 1. BenchStable media supports equivalent growth rates. BenchStable DMEM, RPMI, MEM, and DMEM/F-12 media was tested against traditional formulations using 8 different cell lines. Each line was selected to represent various species, organ systems and cell lineages as possible. Cells were maintained for 15 passages (a) or 5 passages (b).

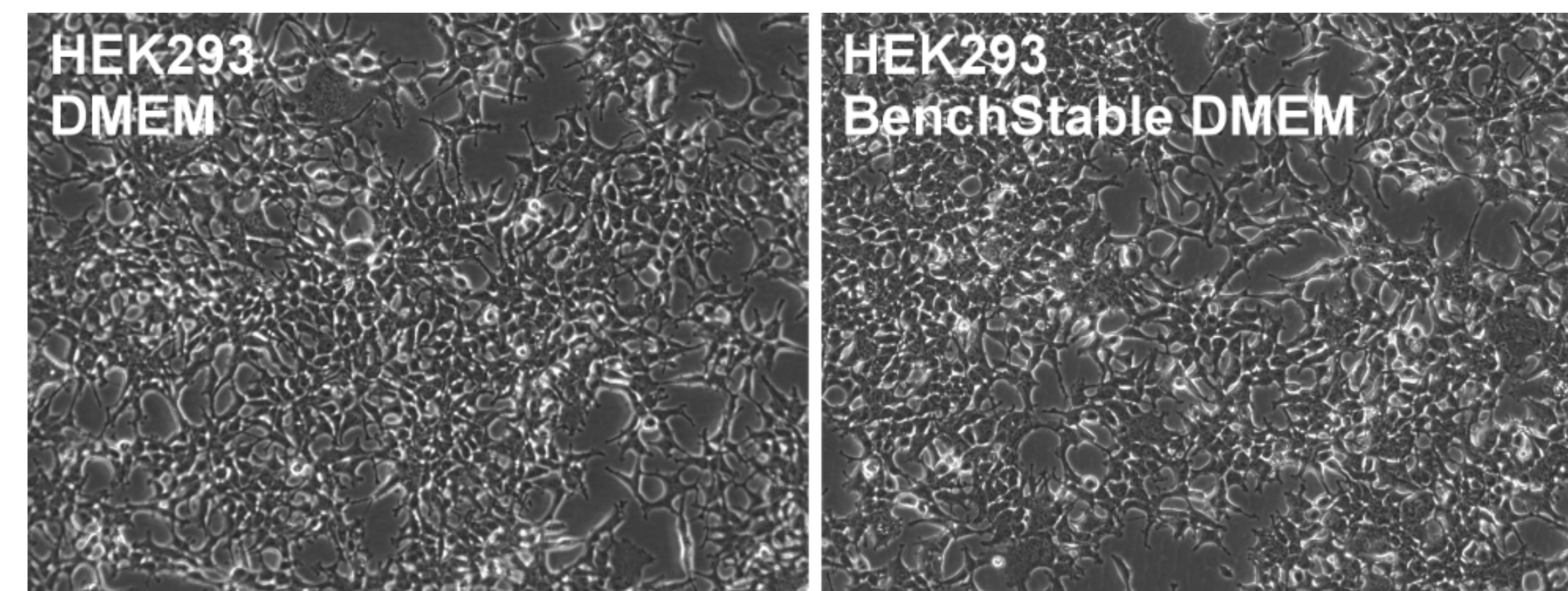


Figure 2. BenchStable DMEM supports HEK293 cell culture. HEK293 human embryonic kidney cells were cultured for 15 passages in DMEM (left; catalog number 10566016) or BenchStable DMEM (right; catalog number A4192101) supplemented with 10% FBS. Images were captured in the 15th passage at 10x magnification via EVOS FL Auto.

Fluorescent Light Exposure Damages Basal Media

Because BenchStable media is intended to be stored outside of the refrigerator, sensitivity to light was examined. Based on these results, BenchStable media was packaged in a light-protective paperboard box to protect it for long-term storage in a well-lit environment.

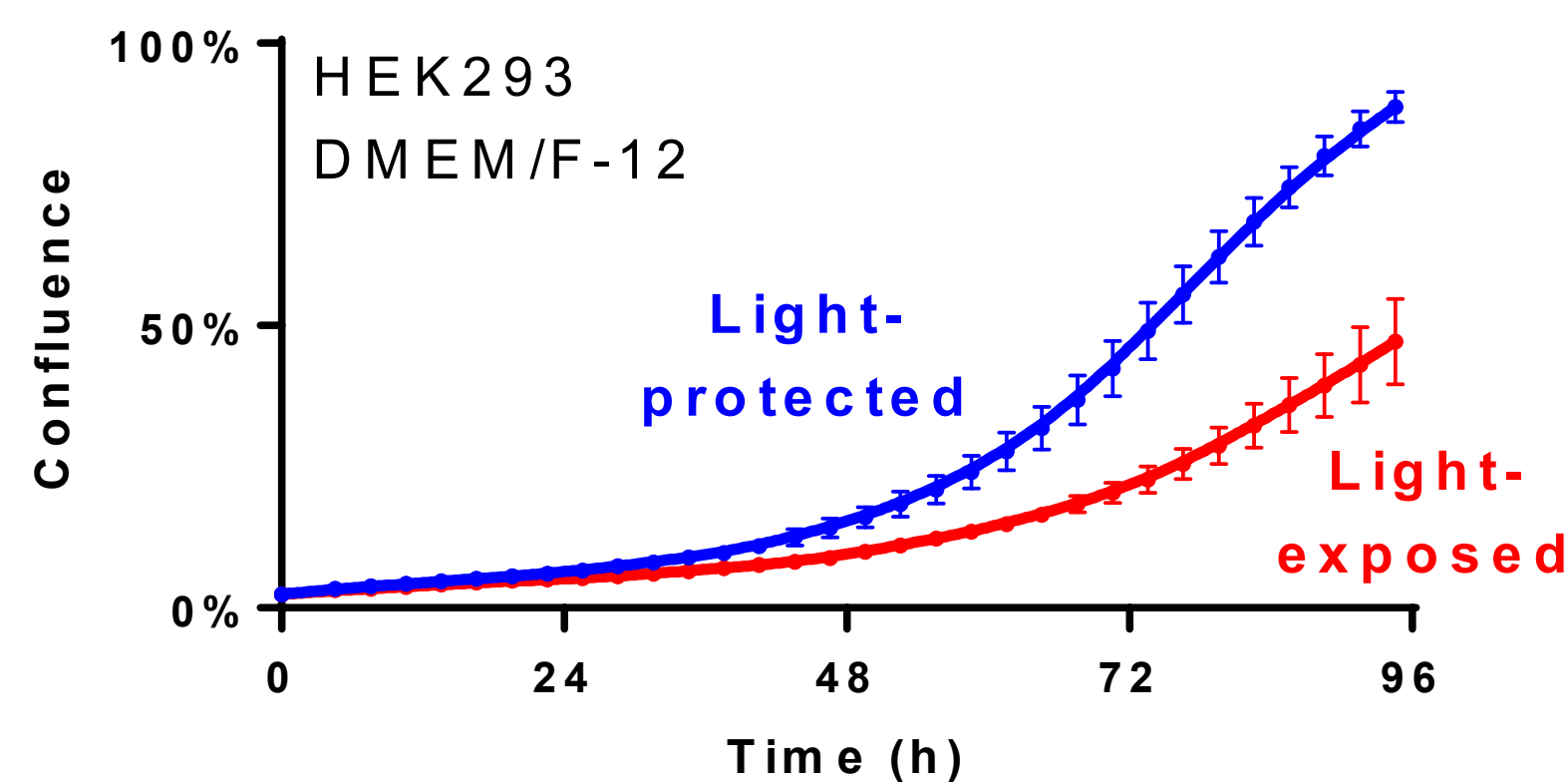


Figure 3. Light exposure alters media performance. DMEM/F-12 regularly exposed to standard laboratory light was supplemented with 10% FBS and used to culture HEK293 cells over a period of 4 weeks. After 25 days of light exposure HEK293 growth rates were significantly reduced. Images were taken approximately 95 hours after plating HEK293 cells at passage seven.

Common Functional Workflows

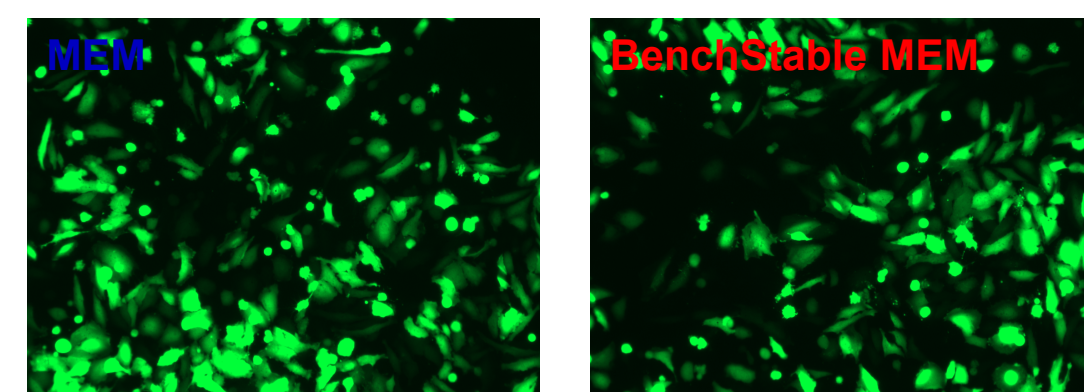
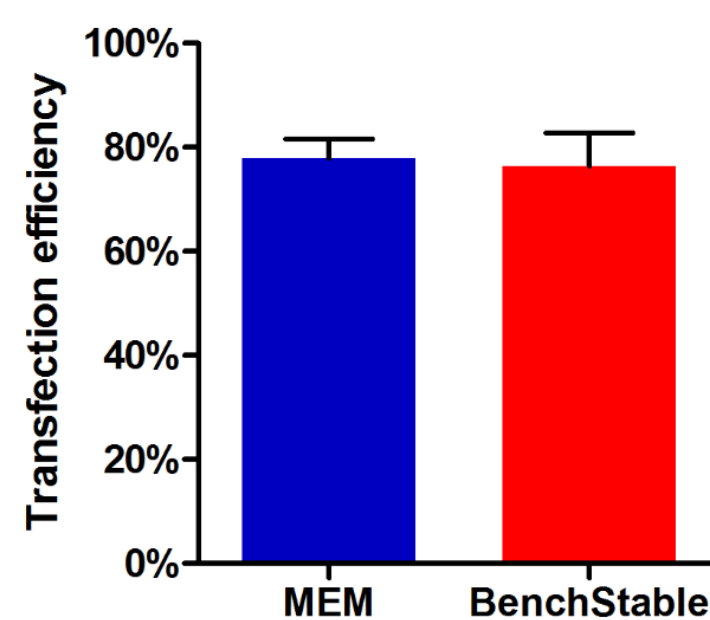


Figure 4. Equivalent transfection efficiency in BenchStable cultures. HeLa cells cultured in MEM (left) and BenchStable MEM (right) for over five passages were transfected with a GFP-containing plasmid DNA via Lipofectamine 3000 (catalog number L3000015). Transfection efficiency was measured in cells harvested 24 h post-transfection via Attune NxT flow cytometry.

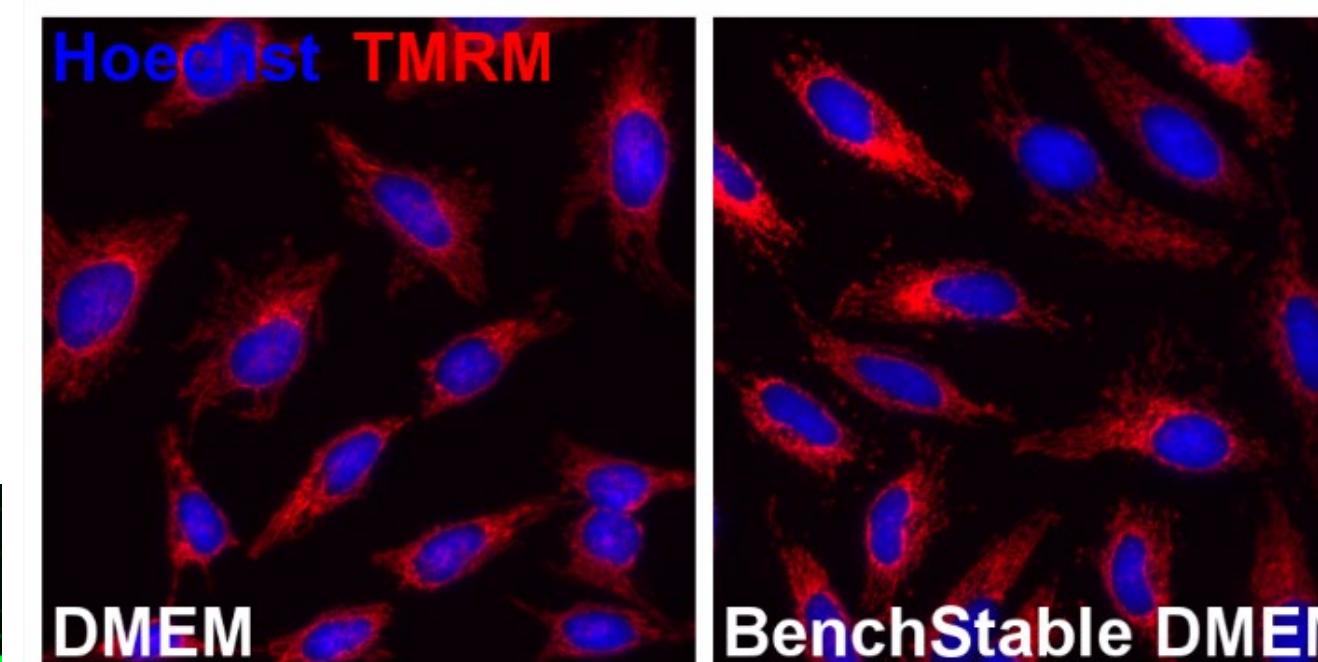


Figure 5. Cells cultured in BenchStable medium maintain healthy mitochondria. HeLa cells cultured in DMEM (left) and BenchStable DMEM (right) for eight passages were stained with Tetramethyl Rhodamine Methyl Ester (TMRM; catalog number T668) and Hoechst (catalog number 33342).

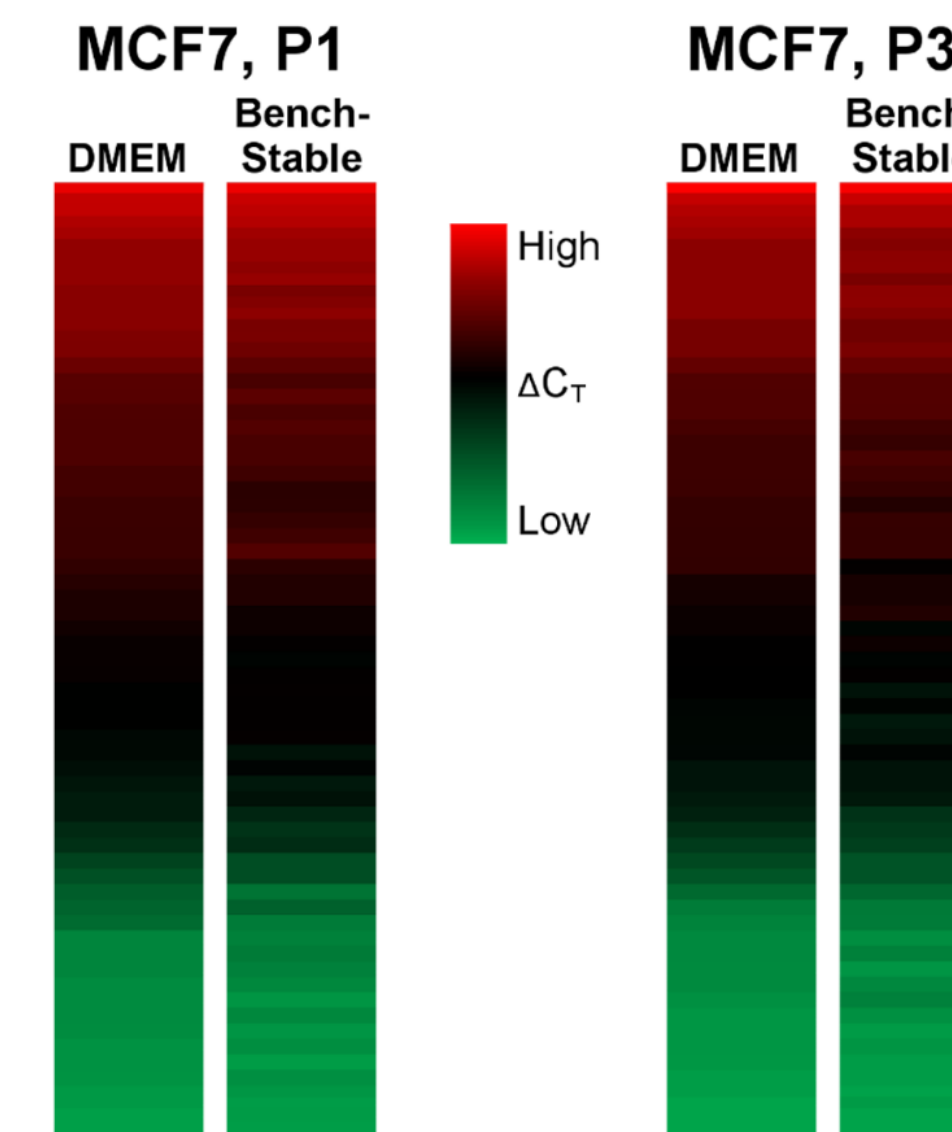


Figure 6. Similar gene expression patterns in BenchStable cultures. The TaqMan Human Signal Transduction Pathways Array (catalog number 4414130) was used to compare expression of genes involved in major pathways in MCF7 cells transitioned directly to BenchStable DMEM (left) and expanded for three passages (right).