



GENE TRANSFER: BIOLISTICS

Biolistic PDS-1000/He™ System

- Applicable to a wider range of biological targets than any other transformation method
- Bypasses membrane receptor barriers
- Eliminates the need for potentially toxic biological or chemical vectors
- Used with the Hepta adaptor, maximizes the number of cells transformed in one bombardment

Transform Targets From Organs to Organelles

Versatile Gene Delivery

The biolistic PDS-1000/He system uses helium-accelerated, nucleic acid-coated microparticles to penetrate target cells, tissues, and organelles. The direct simplicity of the technique makes it very versatile. High-velocity microparticles penetrate and transform a huge range of gene expression targets: insect and fish embryos, cultured plant and animal cells, pollen, algae, fungi, bacteria, intact plant tissues, animal tissues, mitochondria, and chloroplasts. The PDS-1000/He system may be used for biolistic transformation of samples in situ, in vitro, in vivo, and ex vivo.

Optimized Delivery

Microparticle composition, size, and velocity are key determinants of target viability and effective transformation.

- The PDS-1000/He system uses biologically inert, spherically shaped gold microparticles available in a range of accurately sized diameters (0.6, 1.0, and 1.6 μm)
- Penetration velocity is a direct function of helium pressure, and this may be adjusted and optimized from 600 to 2,400 psi
- Microparticle velocity may be further refined by simple manual adjustments that control microparticle travel distance within the bombardment chamber
- Up to 50 sample cartridges, each containing 500 μg of microcarrier, can be quickly prepared. Sample cartridges are stable for up to 1 year when stored at 4°C



The PDS-1000/He system, shown here with magnified view of the Hepta adaptor.

PDS-1000/He System With Hepta™ Adaptor

The Hepta adaptor for the PDS-1000/He biolistic system enables 7–10 times more cells to be transformed than the standard system. It fits into the shocking chamber of the PDS-1000/He system, where it splits the helium shock wave over seven macrocarriers, nearly doubling the biolistic target area from 40 cm² to ~75 cm². By uniformly spreading the gold microparticles over this larger area, the system maximizes the number of cells transformed during one bombardment. As the helium is split seven ways, pressure and microparticle velocity are reduced, making the Hepta adaptor an ideal accessory for plants and cell cultures that require less forceful penetration.

Biolistic PDS-1000/He System

Recommended Settings and Conditions for Various Tissues, Cells, and Organelles

Target	Growth Phase	Cell Density	Osmoticum	Vacuum (" Hg)	Target Distance (cm)	Helium Pressure (psi)	Particle Size
Bacteria	Late log to early stationary	10 ⁸ -10 ⁹ per 100 mm plate	0.75 M sorbitol	29	6	1,100	0.7 µm tungsten
Yeast	Early stationary	10 ⁸ -10 ⁹ per 100 mm plate	0.75 M sorbitol and 0.75 M mannitol	28	6	1,300	0.6 µm gold
Algae	Log	10 ⁸ -10 ⁹ per 100 mm plate	None	29	6	1,300	0.6 µm gold
Plants							
Embryos	N/A	10 explants per 100 mm plate	None	28	6	1,300	1.0 µm gold
Callus or cell culture	Log	0.75 ml packed cell volume	None	28	9	1,100	1.0 µm gold
Subcellular organelles	Mid-log	5 x 10 ⁷ per 100 mm plate	None	28	6	1,300	0.6 µm gold
Animals							
Tissue culture	Log	50-80% confluent on 35 mm plates	None	15	3	1,100	1.6 µm gold
Tissue sections	1 hr to 4 days post-excision	400 µm sections	None	25	9	1,100	1.6 µm gold

Specifications

Mechanical

Fuse	1.0 A, 250 V, 5 x 20 mm
Vacuum	<0.4" Hg/min leakage
Overpressure	0.5 psi relief valve, self-resetting

Environmental

Operating conditions	0-35°C (32-95°F); 0-95% noncondensing humidity
Storage conditions	0-70°C (32-158°F); 0-95% noncondensing humidity

Physical

Construction	Aluminum, ABS plastic, and acrylic chassis
Input power	100-120 VAC, 50-60 Hz
Maximum current	<5 A
Dimensions (W x D x H)	29 x 25.5 x 47.5 cm
Weight	15 kg

Ordering Information

Catalog #	Description
165-2257*	PDS-1000/He System , includes helium pressure regulator, solenoid, spacer rods, microcarrier launch assembly, target shelf, 5 macrocarrier holders, tubing, instructions
165-2258*	PDS-1000/He Hepta System , includes PDS-1000/He system, Hepta adaptor
165-2225	Hepta Adaptor for PDS-1000/He System , includes 5 stopping screens
165-2259	Voltage Converter , for 220 V or 240 V line voltage

* Required items for operation (in addition to PDS-1000/He system): helium tank, grade 4.5 (99.995% pure) or better, pressurized to 2,600 psi, vacuum source.



Transformation of *Aspergillus nidulans*.

Transformation of conidia 48 hr after bombardment with tungsten particles coated with pRG-1. Mycelium of a putative transformant is visible in the upper left corner on a background of untransformed conidia. Tungsten particles are also visible near the edges of the growing colony. Magnification approximately 150x. Work performed by Roland Herzog, Auburn University of Alabama.

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