

Supporting Information

Nanoscale Advances

**Magnetic Nanoparticles Mediated-Gene Delivery for Simpler and More
Effective Transformation of *Pichia pastoris***

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Table S 1. Primer sequences used in this study

Specific Primers	Name	Sequencing
Gene	GFP Forward	5'-CGCGAATTCATGTCTAAAGGTGAAGA-3'
	GFP Reverse	5'-GGGGTACCTTTGTACAATTCATCCAT-3'
Vector	pGAP Forward	5'-GTCCTATTTCAATCAATTGAA-3'
	3'AOX1	5'-GCAAATGGCATTCTGACATCC-3'

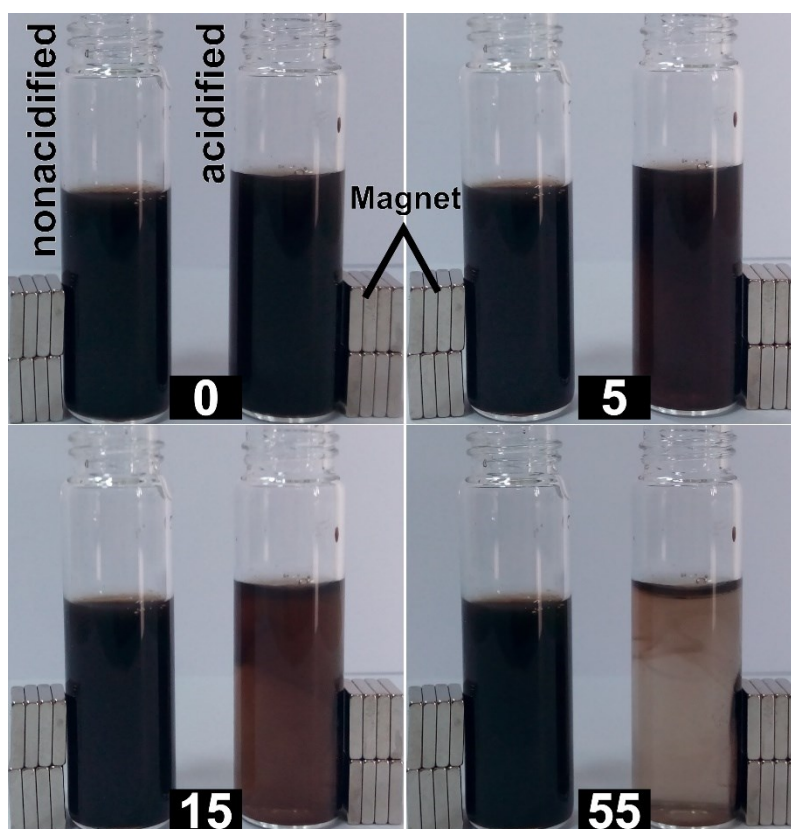


Fig S 1. The photos of the time-dependent magnetic accumulation of non-acidified and acidified Fe_3O_4 @PEI MNPs after 0, 5, 15 and 55 seconds.

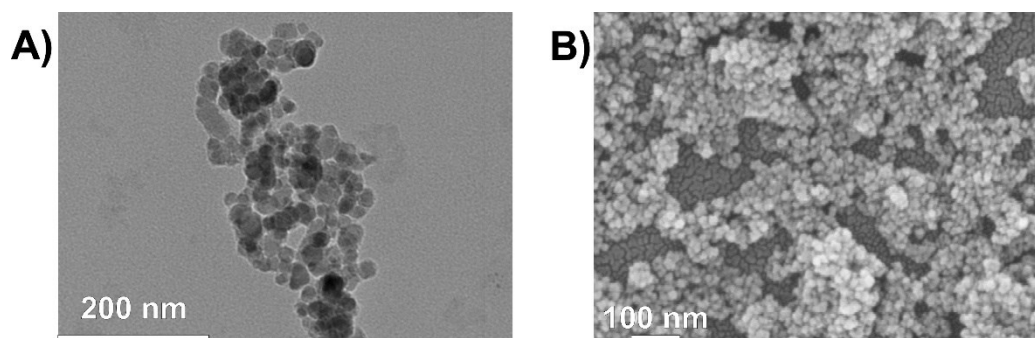


Fig S 2. **A.** TEM image of non-acidified Fe_3O_4 @PEI MNPs and **B.** SEM image of Fe_3O_4 @PEI MNPs.

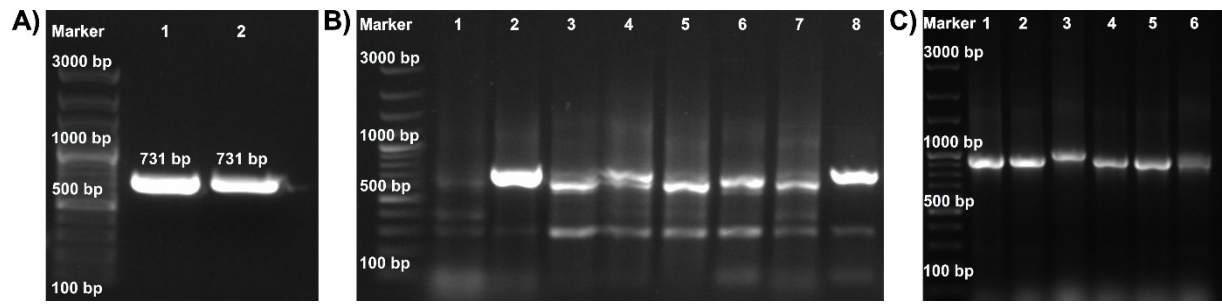


Fig S 3. Agarose gel electrophoresis results belong to **A)** the GFP amplification by PCR (1: reaction with 50 mM MgCl₂ 2: reaction without MgCl₂), the colony PCR from selected *E. coli* colonies with **B)** gene-specific primers (1-8: numbers of colonies) and **C)** vector-specific primers (1-6: numbers of colonies).

		Download ▾	Graphics		
Sequence ID: Query_59613 Length: 1186 Number of Matches: 1					
Range 1: 170 to 883 Graphics					▼ Next Match
Score	Expect	Identities	Gaps	Strand	
1319 bits(714)	0.0	714/714(100%)	0/714(0%)	Plus/Minus	
Query	1	ATGTCTAAAGGTGAAGAATTGTTCACTGGTGTGTTCCAATTTTGGTTGAATTGGATGGT			60
Sbjct	883	ATGTCTAAAGGTGAAGAATTGTTCACTGGTGTGTTCCAATTTTGGTTGAATTGGATGGT			824
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Sbjct	823	GATGTTAATGGTCAAAAATTCTCTGTTTCTGGTGAGGGTGAAGGTGATGCAACATACGGT			764
Query	121	AAATTGACCTTGAAATTTATTTGCACTACTGGTAAGTTGCCTGTTCCATGGCCAACATTG			180
Sbjct	763	AAATTGACCTTGAAATTTATTTGCACTACTGGTAAGTTGCCTGTTCCATGGCCAACATTG			704
Query	181	GTTACTACTTTCTCTTATGGTGTTCATGCTTTTCTAGATACCCAGATCATATGAAACAG			240
Sbjct	703	GTTACTACTTTCTCTTATGGTGTTCATGCTTTTCTAGATACCCAGATCATATGAAACAG			644
Query	241	CATGACTTTTTCAAGTCTGCCATGCCCGAAGGTTATGTTCAAGAAAGAACTATATTTTAC			300
Sbjct	643	CATGACTTTTTCAAGTCTGCCATGCCCGAAGGTTATGTTCAAGAAAGAACTATATTTTAC			584
Query	301	AAAGATGACGGTAACTACAAGACACGTGCTGAAGTTAAGTTTGAAGGTGATACCTTGGTT			360
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Sbjct	523	AATAGAATCGAGTTGAAAGGTATTGATTTTAAAGAAGATGGTAACATTTGGGTACACAAA			464
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Query	601	TTGTCTACACAATCTGCCTTGTCTAAAGATCCCAACGAAAAGAGAGATCACATGATCTTG			660
Sbjct	283	TTGTCTACACAATCTGCCTTGTCTAAAGATCCCAACGAAAAGAGAGATCACATGATCTTG			224
Query	661	TTGGAGTTTGTTACAGCTGCTGGTATTACACATGGTATGGATGAATTGTACAAA			714
Sbjct	223	TTGGAGTTTGTTACAGCTGCTGGTATTACACATGGTATGGATGAATTGTACAAA			170

Fig S 4. Nucleotide BLAST analysis result of pGKB-GFP expression cassette (sequencing with pGAP forward and 3' AOX1 primer)

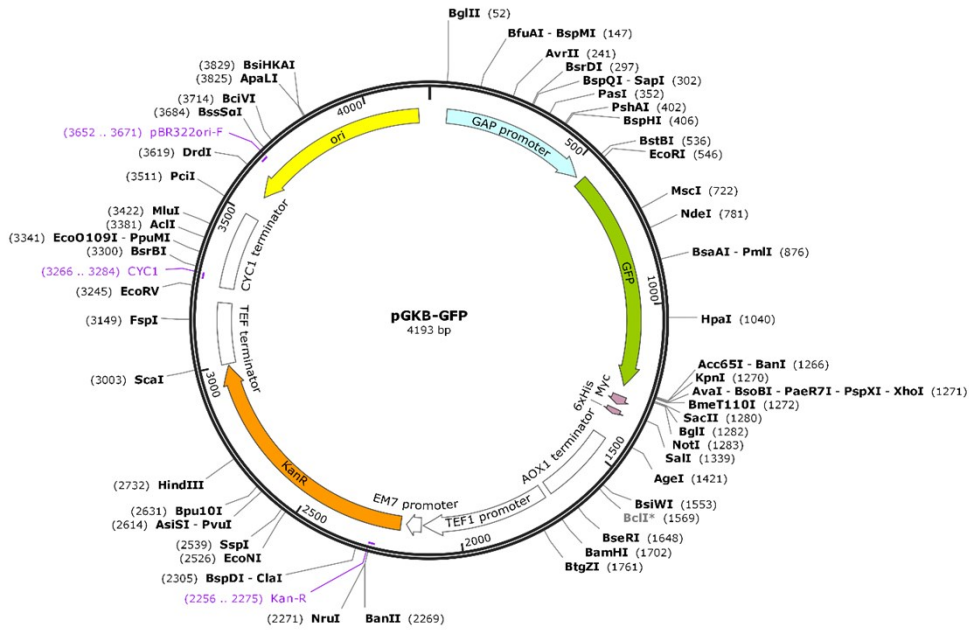


Fig S 5. Construction map of pGKB-GFP which is used in this study (vector map was visualized by SnapGene (SnapGene® software, www.snapgene.com).

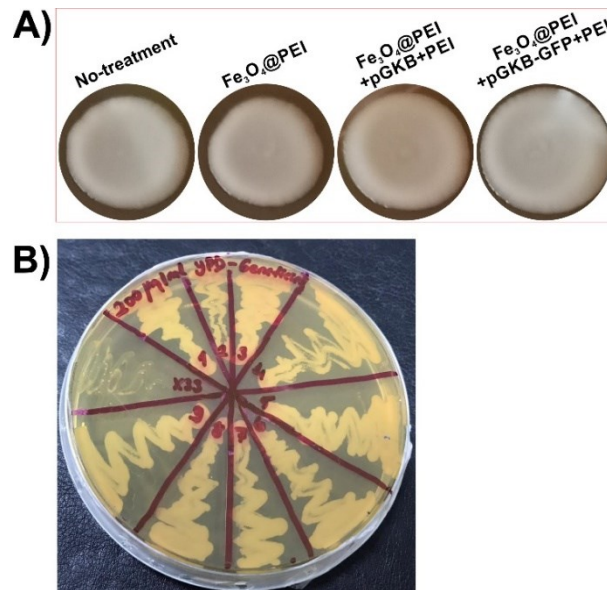


Fig S 6. A) Growing of the cells exposed to Fe_3O_4 @PEI MNPs and magnetofectins prepared with both pGKB and pGKB-GFP (Fe_3O_4 @PEI+pGKB+PEI and Fe_3O_4 @PEI+pGKB-GFP+PEI) in YPD agar and, **B)** Second selection of the transformed cells in YPD plates containing geneticin (G418, 200 $\mu\text{g}/\text{mL}$).

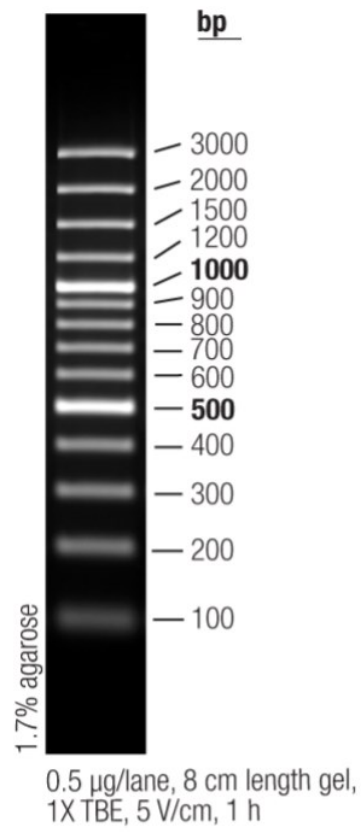


Fig S 7. DNA ladder used in the study (GeneRuler 100 bp Plus DNA Ladder, Thermo Scientific™).