Comparison of transfection efficiency between commercialy available transfection reagents

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Materials and methods:

Cell lines: NIH 3T3, HELA
Tansfected plasmid: pEGFP-N3 (Clontech)
Transfection reagents: Metafectene Pro, Metafectene, Fugene, Lipofectamine 2000

Experimental procedures / transfection protocol:

- cells were plated in 6 well plates
- transfected with 1µg plasmid and 3 µl reagent (1:3) for all in DMEM 10% FCS. In addition Metafectene Pro was also used at 1 µg plasmid and 4 µl reagent (1:4).
- 24 h post-transfection images were taken with Zeiss Axiovert 200 microscope. The cells were trypsinized and analyzed by FACS.

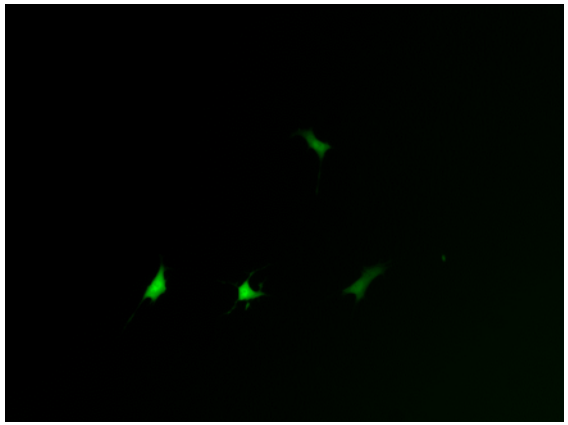
Conclusion / summary:

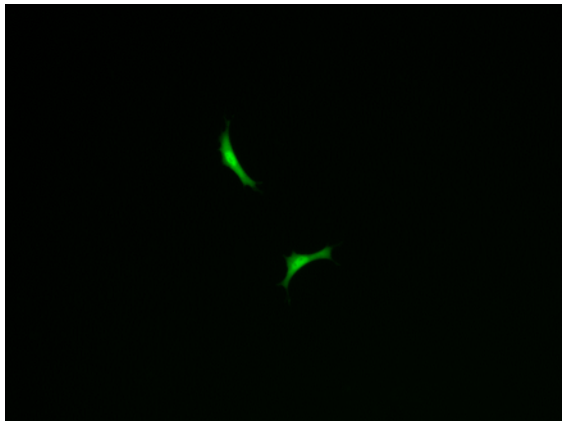
For NIH3T3 transfection:
Lipofectamine 2000 had highest efficiency but also highest toxic effect. The latter is shown by the fewer no. of adherent cells and the discrepancy between microscopy and FACS analysis, for which the loosly attached transfected cells were most likely lost for the FACS analysis.
Metafectene resulted in the best ratio transfection efficiency/toxicity as shown by the FACS analysis.
Metafected Pro and Fugene were comparable. Increasing the ratio reagent:DNA does not significantly increase the transfection efficiency.

For HELA transfection:
Much better transfection efficiency with all reagents. Metafectene Pro and Lipofectamine had the highest efficiencies. Metafectene Pro had less toxicity than Lipofectamine. Increasing the amount of Metafectene Pro (1:4) increases toxicity but not the transfection efficiency significantly. Increasing the post-transfection period increases toxicity: at 48 h the toxicity of Metafectene Pro and Lipofectamine is high.
Recommendations: use Metafectene or Lipofectamine for NIH3T3 and Metafectene Pro (1:3) for Hela. Aanalyze cells at 24 h post-transfection.

Appendix: Tables and/or figures:

Transfection of NIH3T3 with Metafectene Pro

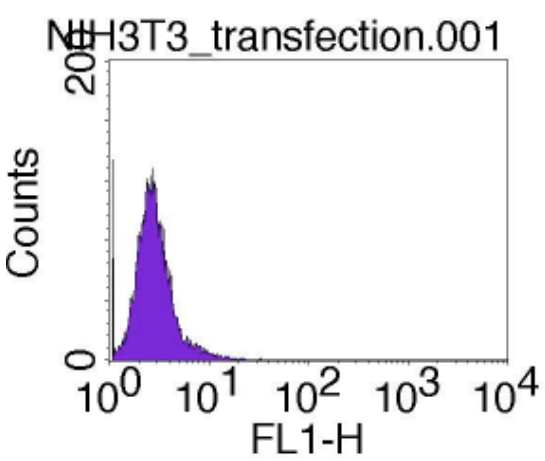


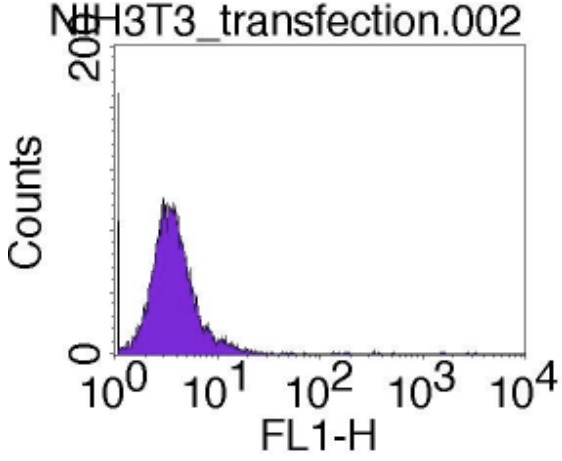


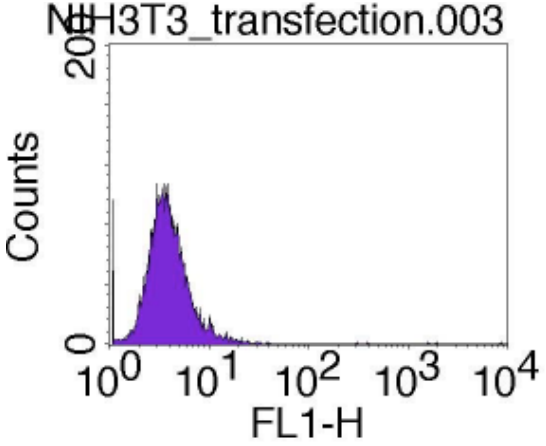
Control NIH3T3

Metafectene Pro 1:3

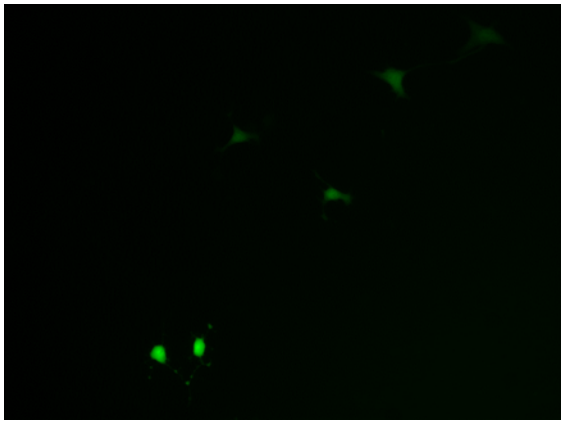
Metafectene Pro 1:4



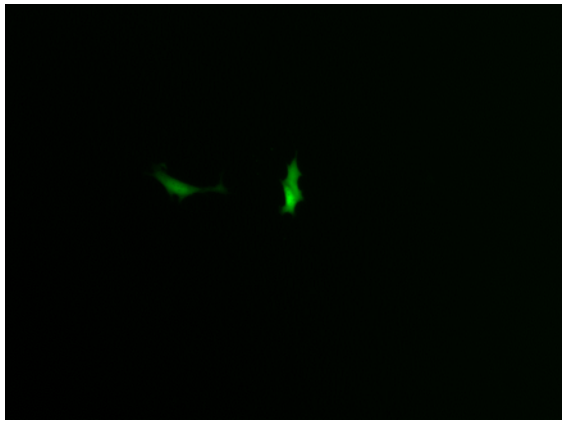




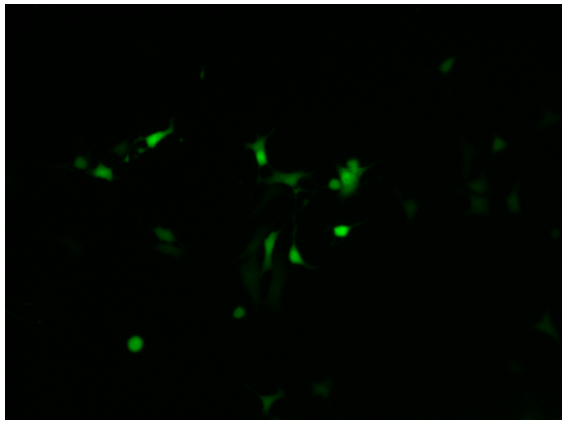
Transfection of NIH3T3



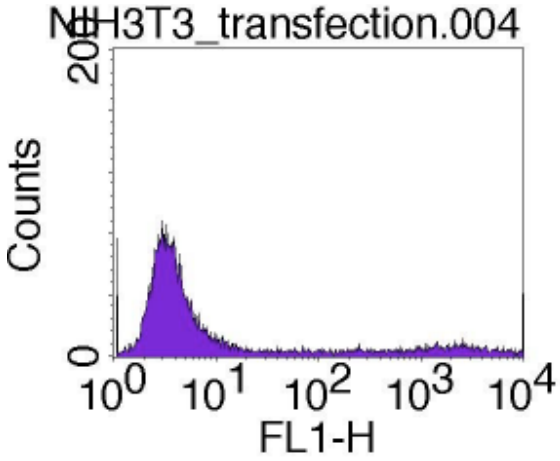
Metafectene - 1:3

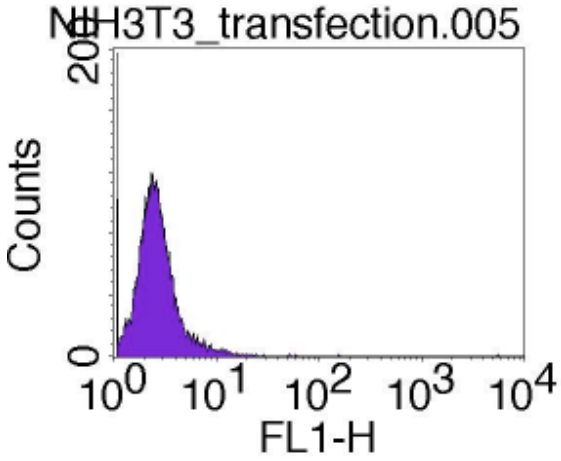


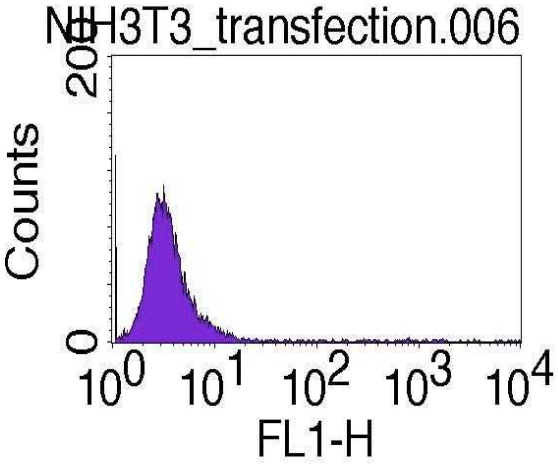
Fugene - 1:3



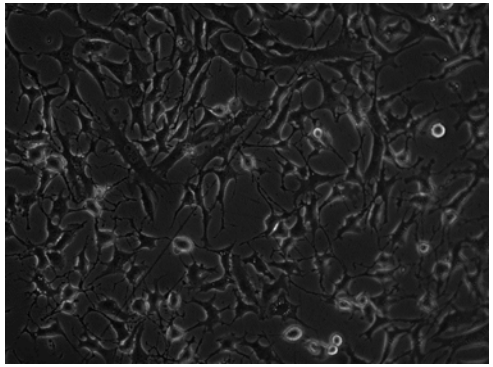
Lipofectamine - 1:3



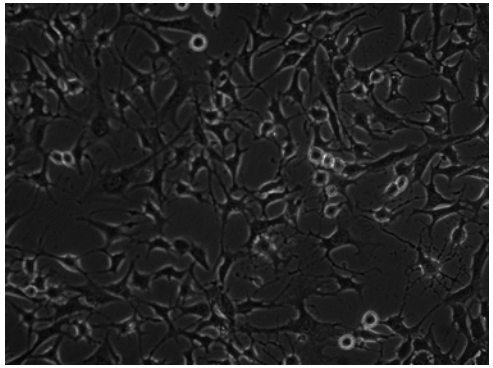




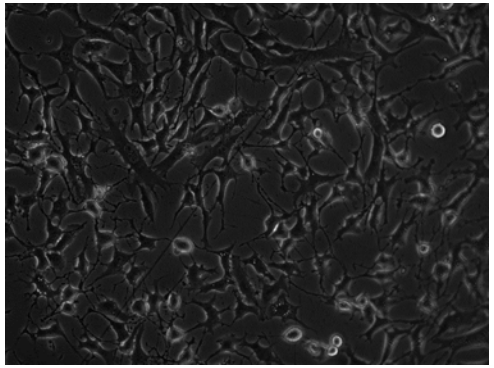
NIH3T3 Cells after 24hours (Phase)



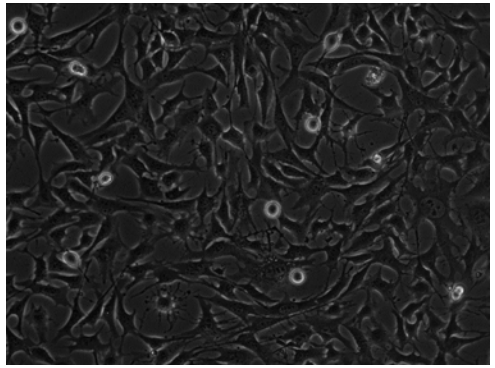
Metafectene Pro 1:3



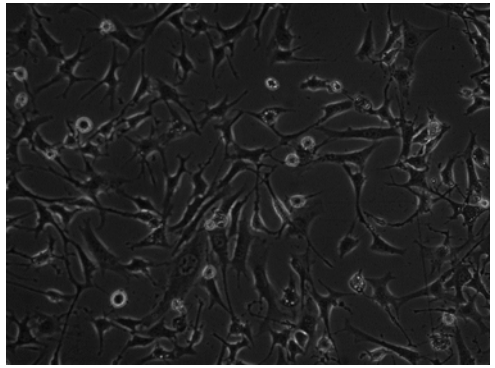
Metafectene Pro 1:4



Metafectene - 1:3

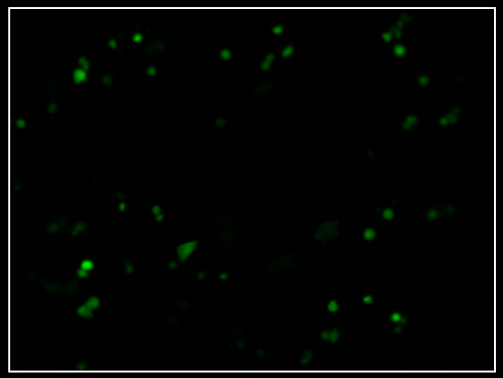


Fugene - 1:3

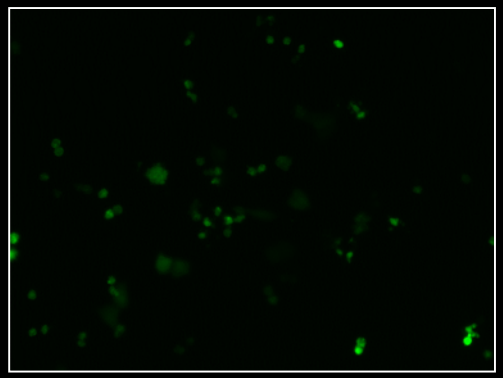


Lipofectamine - 1:3

HeLa Transfection with EGFP 24 h



Metafectene Pro 1:3



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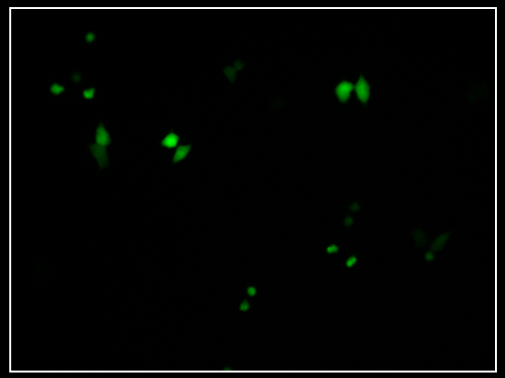

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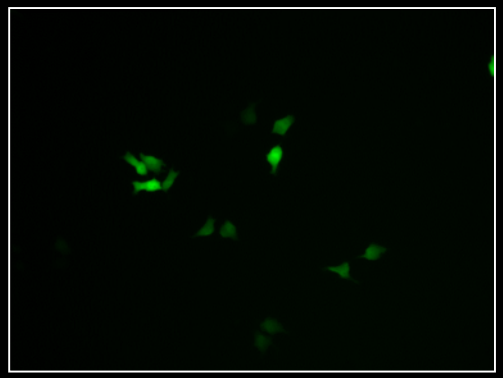

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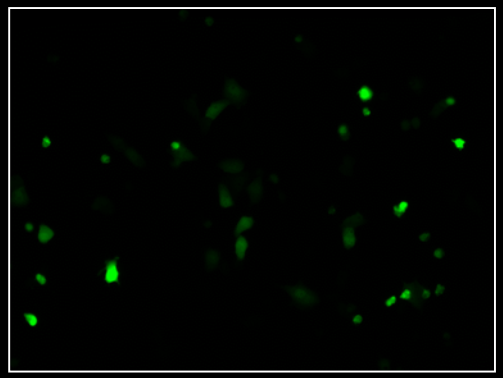
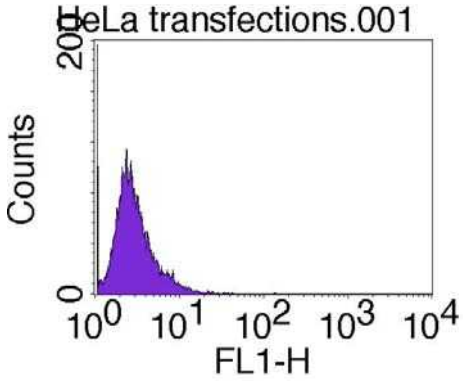
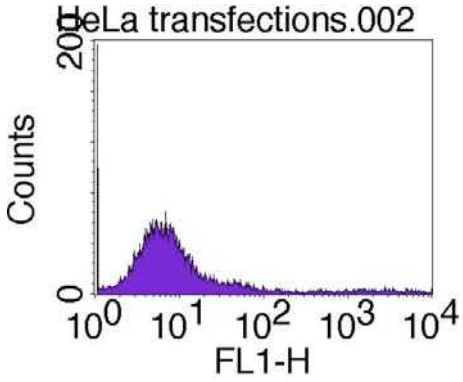


Lipofectamine 1:3

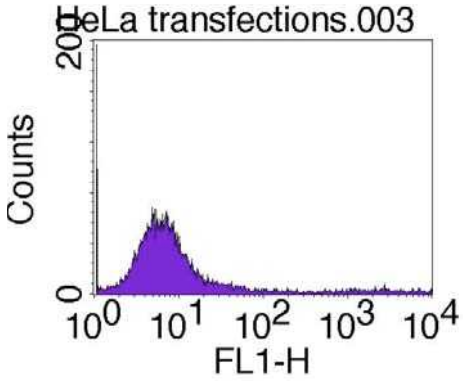
FACS Analysis of HeLa Transfections 24h



Hela Control



Metafectene Pro 1:3



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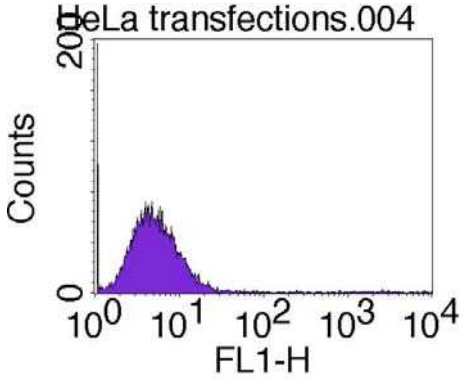

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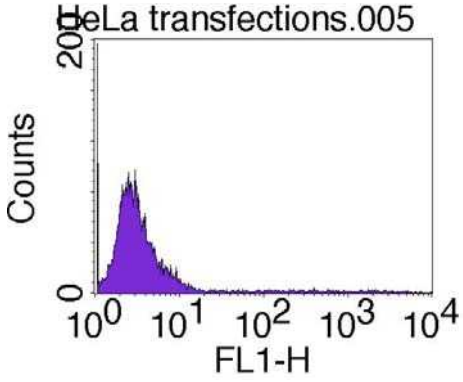

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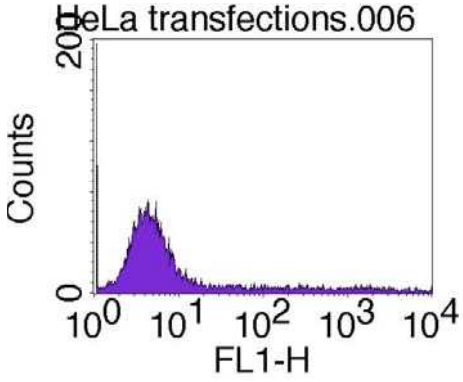
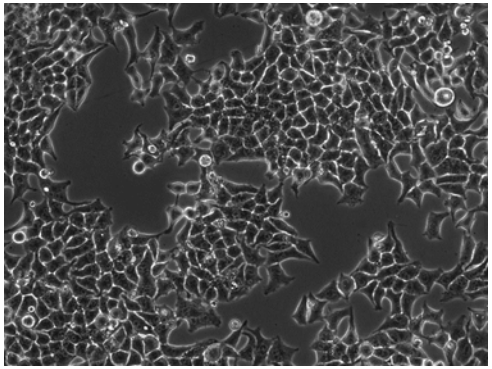
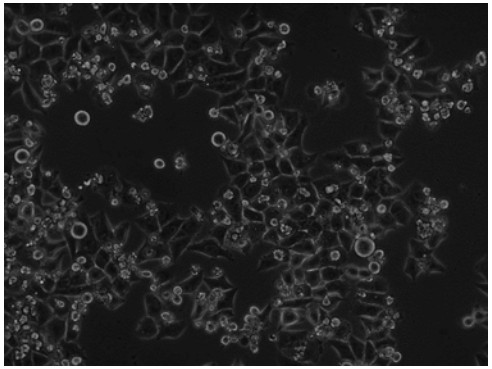


Lipofectamine 1:3

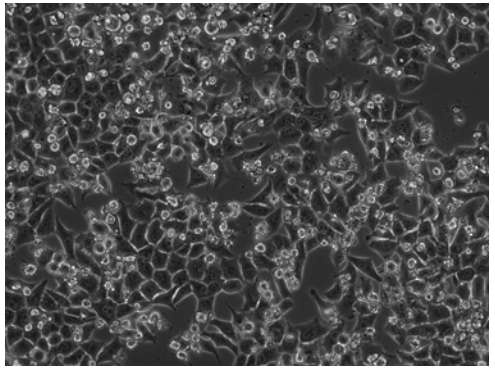
HeLa Transfections EGFP (Phase) 24 h



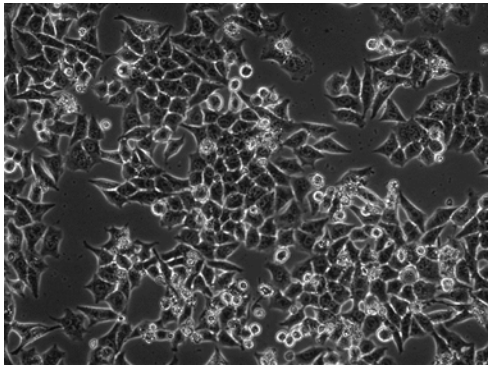
Hela Control



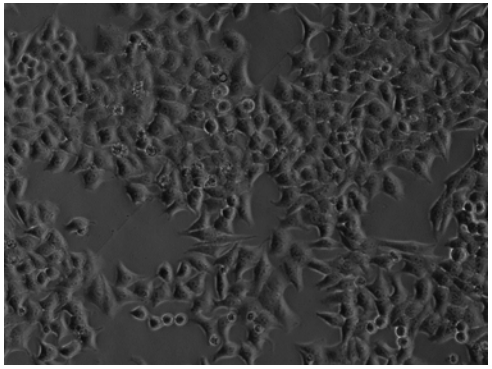
Metafectene Pro 1:3



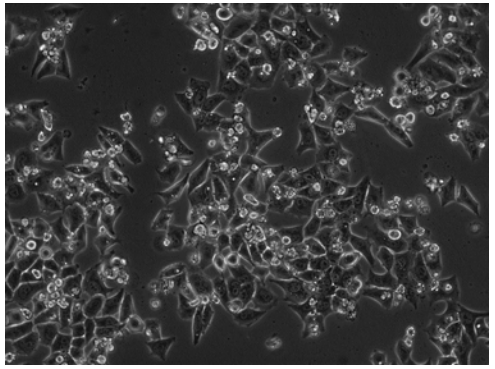
Metafectene Pro 1:4



Metafectene 1:3

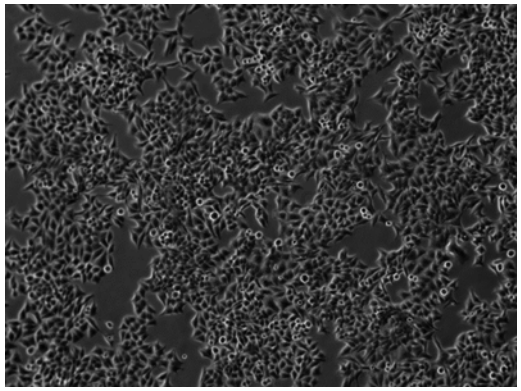


Fugene 1:3

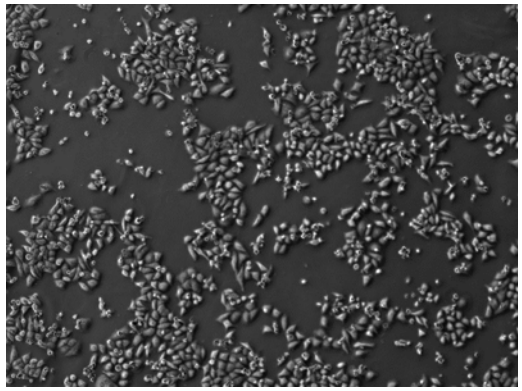


Lipofectamine 1:3

HeLa Transfection with EGFP (Phase) 48hrs



Metafectene Pro 1:2



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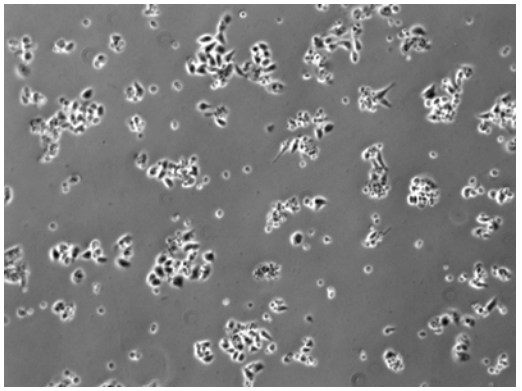

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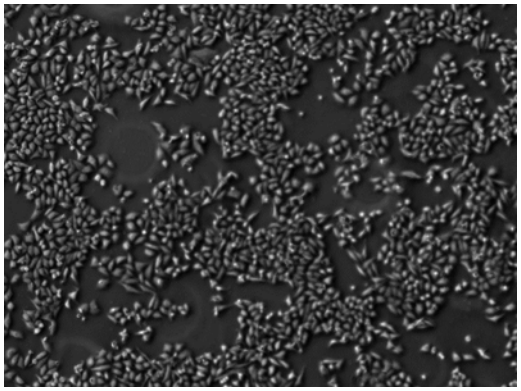
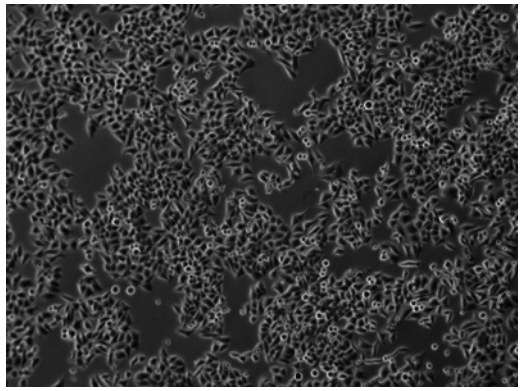
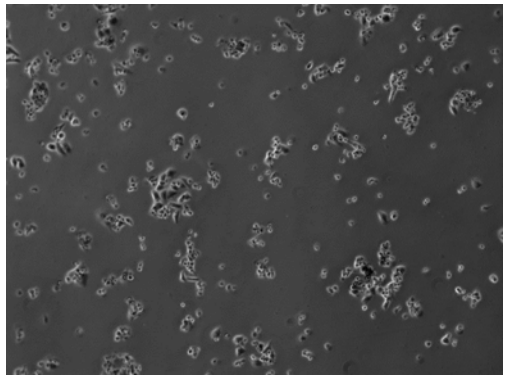


Metafectene1:3



Fugene 1:3



Lipofectamine 1:3