The NTERA-2 (also designated NTERA2/D1, NTERA2, or NT2) cell line is a clonally derived, pluripotent human embryonal carcinoma cell line.

Trattnig et al. showed a role for miR 451a in neuronal differentiation through analysis of endogenous and ectopically expressed or silenced miR-451a in Ntera2/D1 cells during neuronal differentiation. Furthermore, they compared neuronal differentiation in the dentate gyrus of hippocampus of miR 451a-/- and wild type mice. MiR-451a overexpression in lentiviral transduced Ntera2/D1 cells was associated with a significant shifting of mRNA expression of the developmental markers Nestin, BIII Tubulin, NF200, DCX and MAP2 to earlier developmental time points, compared to control vector transduced cells. In line with this, accelerated neuronal network formation in AB.G.miR-451a transduced cells, as well as an increase in neurite outgrowth both in number and length was observed. MiR-451a targets genes MIF, AKT1, CAB39, YWHAZ, RAB14, TSC1, OSR1, POU3F2, TNS4, PSMB8, CXCL16, CDKN2D and IL6R were, moreover, either constantly downregulated or exhibited shifted expression profiles in AB.G.miR-451a transduced cells. Lentiviral knockdown of endogenous miR-451a expression in Ntera2/D1 cells resulted in decelerated differentiation. Endogenous miR-451a expression was upregulated during development in the hippocampus of wildtype mice. In situ hybridization revealed intensively stained single cells in the subgranular zone and the hilus of the dentate gyrus of wild type mice, while genetic ablation of miR-451a was observed to promote an imbalance between proliferation and neuronal differentiation in neurogenic brain regions, suggested by Ki67 and DCX staining. Taken together, these results provide strong support for a role of miR-451a in neuronal maturation processes in vitro and in vivo¹⁾.

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Trattnig C, Üçal M, Tam-Amersdorfer C, Bucko A, Zefferer U, Grünbacher G, Absenger-Novak M, Öhlinger KA, Kraitsy K, Hamberger D, Schaefer U, Patz S. MicroRNA-451a overexpression induces accelerated neuronal differentiation of Ntera2/D1 cells and ablation affects neurogenesis in microRNA-451a-/- mice. PLoS One. 2018 Nov 21;13(11):e0207575. doi: 10.1371/journal.pone.0207575. eCollection 2018. PubMed PMID: 30462722.

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