

Table S2: Genes in *HOXA9* gene cluster

Gene	TPM	Functional role	Reference (PMID)
<i>HOXA1</i> (Homeobox A1)	15.2	<ul style="list-style-type: none"> • Encodes transcription factor which is needed for controlling gene expression, morphogenesis, and differentiation • Play a role in oncogenesis via TNF/NF-κB • Contributes to cancer progression 	27382069,23088713, 22498108, 22864671, 23435427, 26791264, 32561925, 31426381, 16909099, 15084694
<i>HOXA2</i> (Homeobox A2)	0.79	<ul style="list-style-type: none"> • Encodes transcription factor which is needed for controlling gene expression, morphogenesis, and differentiation • Involved in homeostasis • Play a part in the embryonic development via Wnt-β-catenin • Contributes to cancer progression 	32436804, 32649979, 1358459, 22223247
<i>HOXA3</i> (Homeobox A3)	0.67	<ul style="list-style-type: none"> • Encodes transcription factor which is needed for controlling gene expression, morphogenesis, and differentiation • Involved in organ development • Associated with the Colon Cancer progression through EGFR/Ras/Raf/MEK/ERK • Contributes to cancer progression 	15714286, 11784044, 30604847, 29073728
<i>HOXA4</i> (Homeobox A4)	2.8	<ul style="list-style-type: none"> • Encodes transcription factor which is needed for controlling gene expression, morphogenesis, and differentiation • Contributes to cancer progression 	17785556, 29700285, 16525643, 23980595
<i>HOXA5</i> (Homeobox A5)	14.5	<ul style="list-style-type: none"> • Encodes transcription factor which is needed for controlling gene expression, morphogenesis, and differentiation • Play a role in Adipose Differentiation via PKA/HSL pathway • Contributes to cancer progression 	35219772, 33136093, 33223227
<i>HOXA6</i> (Homeobox A6)	3.3	<ul style="list-style-type: none"> • Encodes transcription factor which is needed for controlling gene expression, morphogenesis, and differentiation • Play a role in Renal Cell Carcinoma via PI3K/Akt • Contributes to cancer progression 	31081053, 19157684, 26870170
<i>HOXA7</i> (Homeobox A7)	27.3	<ul style="list-style-type: none"> • Encodes transcription factor which is needed for controlling gene expression, morphogenesis, and differentiation • Associated with the progression of cancers • Involved in MLL-mediated transformation 	17959889, 19424076, 11070089, 21626505
<i>HOXA9</i> (Homeobox A9)	50.5	<ul style="list-style-type: none"> • Encodes transcription factor which is needed for controlling gene expression, morphogenesis, and differentiation • Play a role in leukemia via Wnt-β-catenin and JAK/STAT • Play a part in pyroptosis of human trophoblasts via CMKLR1/AMPK/TXNIP/NLRP3 signaling • Contributes to cancer progression 	20339075, 34461109, 29496663
<i>HOXA10</i> (Homeobox A10)	67.5	<ul style="list-style-type: none"> • Encodes transcription factor which is needed for controlling gene expression, morphogenesis, and differentiation • Play a role in infertility and viability of the embryo • Associated with the progression of cancers via TGFB2/Smad/METTL3, Wnt/β-catenin, PTEN/AKT/PI3K, and NF-κB signaling pathways 	20821045, 35550944, 33563300 32299243, 25120782, 35553652 34293937, 32571260, 34496932 30614022
<i>HOXA11</i> (Homeobox A9)	56.3	<ul style="list-style-type: none"> • Encodes transcription factor which is needed for controlling gene expression, morphogenesis, and differentiation • Play a part in endometrial carcinoma via PTEN/AKT signaling pathway • Involved in uterine development and female fertility • "Double-agent" gene (proto-oncogenes and tumor-suppressor function) 	33515421, 20695189, 12050232 29914539, 28423531, 35430506

<i>HOXA11-AS</i> (HOXA11 antisense RNA)	15.9	<ul style="list-style-type: none"> • Produces lncRNA • Play a part in embryo implantation, endometrial development, and inflammation • Associated with the progression of cancers via PI3K/AKT, WNT1/β-catenin, JAK-STAT 	9745033, 26054679, 30402857, 31099097
<i>HOXA13</i> (Homeobox A13)	28.5	<ul style="list-style-type: none"> • Encodes transcription factor which is needed for controlling gene expression, morphogenesis, and differentiation • Involved in Colon Cancer progression via Wnt/β-Catenin • Contributes to cancer progression 	32822724, 29678634
<i>HOXA-AS2</i> (HOXA cluster antisense RNA 2)	0.16	<ul style="list-style-type: none"> • Produces lncRNA • Play a role in acute myeloid leukemia via SOX4/PI3K/AKT • Associated with the progression of cancers via EGFR/Ras/Raf/MEK/ERK, Notch, and NF-κB 	34076871, 30658190, 32369230 30551418
<i>HOXA-AS3</i> (HOXA cluster antisense RNA 3)	0.27	<ul style="list-style-type: none"> • Produces lncRNAs • Control endothelium inflammation via NF-κB, MEK/ERK • Contributes to cancer progression 	31285272, 30963785
<i>HOTTIP</i> (HOXA distal transcript antisense RNA)	0.47	<ul style="list-style-type: none"> • produces lncRNAs (antisense to the HOXA gene cluster) • Associated with progression of cancers via NF-κB, MEK/ERK, Wnt/β-catenin • "Double-agent" gene (proto-oncogenes and tumor-suppressor function) 	35210436, 33000231, 32307830, 31002141
<i>HOTAIRM</i> (HOXA transcript antisense RNA, myeloid-specific 1)	4.82	<ul style="list-style-type: none"> • Produces lncRNA, which is specific for maturing myeloid cells • Control the cell cycle progression during the maturation of myeloid leukemia cells • Play a role in leukemia via the Wnt/β-catenin • Involved in tumorigenesis via PFKP, NF-κB, JNK/AP-1, and JNK/MAPK/ERK 	29164055, 31904363, 33404645, 31512358, 30551410
<i>HOXA10-AS</i> (HOXA10 antisense RNA)	13.6	<ul style="list-style-type: none"> • Produces lncRNAs (transcribed from the antisense strand of HOXA10 gene • Involved in Lung Adenocarcinoma through the Wnt/β-catenin • Contributes to cancer progression 	29729275, 30132568, 31867596