Table s1. Table of primers used for thyroid markers and screening of mutations.

RT-PCR Primers	Anneal temp	Cycles	Size, bp	Sequence	Additives
TSHR	58ºC	35	287	F – GAA CTG ATA GCA AGA AAC ACC TGG R – GTA TCC TGG AAC TTG GAC TTT T	
NIS[1]	62ºC	40	297	F – TCT CTC AGT CAA CGC CTC T R – ATC CAG GAT GGC CAC TTC TT	
TTF1	60ºC	35	268	F – AAC CTG GGC AAC ATG AGC R – GTC GCT CCA GCT CGT ACA C	
GAPDH	60ºC	35	450	F – ACC ACA GTC CAT GCC ATC AC R – TCC ACC ACC CTG TTG CTG TA	
PCR Primers	**Anneal temp**	**Cycles**	**Size, bp**	**Sequence**	**Additives**
PI3KCA exon 9[2]	55ºC	40	204	F – ATC ATC TGT GAA TCC AGA R – TTA GCA CTT ACC TGT GAC	
PI3KCA exon 20[2]	58ºC	40	387	F – TGA CAT TTG AGC AAA GAC C R – GTG TGG AAT CCA GAG TGA	
TERT promoter[3]	62ºC	35	475	F – CTG GCG TCC CTG CAC CCT GG R – ACG AAC GTG GCC AGC GGC AG	5% DMSO 5% glycerol
PAX8 exon 7[4] PPARγ exon 1	58ºC	35	380 to 400	F – AAA GCA CCT TCG CAC GGA TG R – ACG GAG CTG ATC CCA AAG TTG G	

1. ***Arturi F, Russo D, Schlumberger M, et al. Iodide symporter gene expression in human thyroid tumors. J Clin Endocrinol Metab. Jul 1998;83(7):2493-2496.***
2. ***Garcia-Rostan G, Costa AM, Pereira-Castro I, et al. Mutation of the PIK3CA gene in anaplastic thyroid cancer. Cancer Res. Nov 15 2005;65(22):10199-10207.***
3. ***Horn S, Figl A, Rachakonda PS, et al. TERT promoter mutations in familial and sporadic melanoma. Science. Feb 22 2013;339(6122):959-961.***
4. ***Espadinha C, Cavaco BM, Leite V. PAX8PPARgamma stimulates cell viability and modulates expression of thyroid-specific genes in a human thyroid cell line. Thyroid. Jun 2007;17(6):497-509.***

Table s2. Table of STR DNA fingerprint profiles of established thyroid cell lines. All male-derived cell lines carried the amelogenin Y-allele. -----indicated locus data was inconclusive

	AM	D5S818	D13S317	D7S820	D16S539	vWA	TH01	TPOX	CSF1PO	D18S51	D21s11	D3S1358	D8S1179	FGA
FF-1	X	11,13	12	9	14	16	9,9.3	8	12,13	12,16	-----	17,19	13	20
KTC-3	X	12	8	11	10,12	17,18	6,9	8,9	10	15,17	-----	16,17	13,15	22
LAM1	XY	12,13	10,11	10,11	8,12	17,19	9.3,10	8	11,12	15	-----	15,17	12	19,22
OCUT-1	X	9,13	8	11,13	8,12	16,18	6,9	8,11	12,13	19,20	-----	15	15,17	21,22
XTC.UC1	X	11,12	12	11	-----	18	9.3	8	11	13,17	-----	15	12	24.2

Figure s1. Histological and species verification over PDTX generations. **A**. As a representative, the $G_{3,}$ G_6 and G_8 H&E's of MC-Th-529 showed preservation of the PDTC phenotype. Human Lamin A+C was also continually expressed in all the generations, which indicated preservation of human content. **B**. The thyroid marker, TTF1, was also examined over multiple generations with no notable changes in TTF1 protein expression.

Figure s2. DNA electropherograms of the alleles that showed loss of heterogeneity (LOH) or microsatellite instability (MSI). **A.** JEM493 and MC-Th-493 had a LOH at locus TH01 with loss of variant allele 6 while MC-Th-467 had a LOH at locus D21s11 with loss of variant allele 31.2. **B**. THJ560 and MC-Th-560 had LOH at loci D13S317 with loss of variant allele 8, loci D18S51 with loss of variant allele 16, and loci FGA with loss variant allele 21. **C**. MC-Th-374 had LOH at loci D16S539 with loss of variant allele 13 and loci D21s11 with a loss of variant allele 28. **D**. MC-Th-562 also likely had MSI by loss of multiple variant alleles. LOH was observed at the following loci: D3S1358 for variant allele 15, TH01 for variant allele 8, D21s11 for variant allele 28, D18S51 for variant allele 13, D16S539 for variant allele 13 and FGA for variant allele 21. These LOH events were independently verified by the Genetics Resources Core Facility at John Hopkins University.

Figure s3. DNA chromatogram of telomerase promoter sequence. SDAR1 and SDAR2 either have a homozygous or hemizygous mutation at *Tert C250T* as indicated by a single peak.

Figure s1

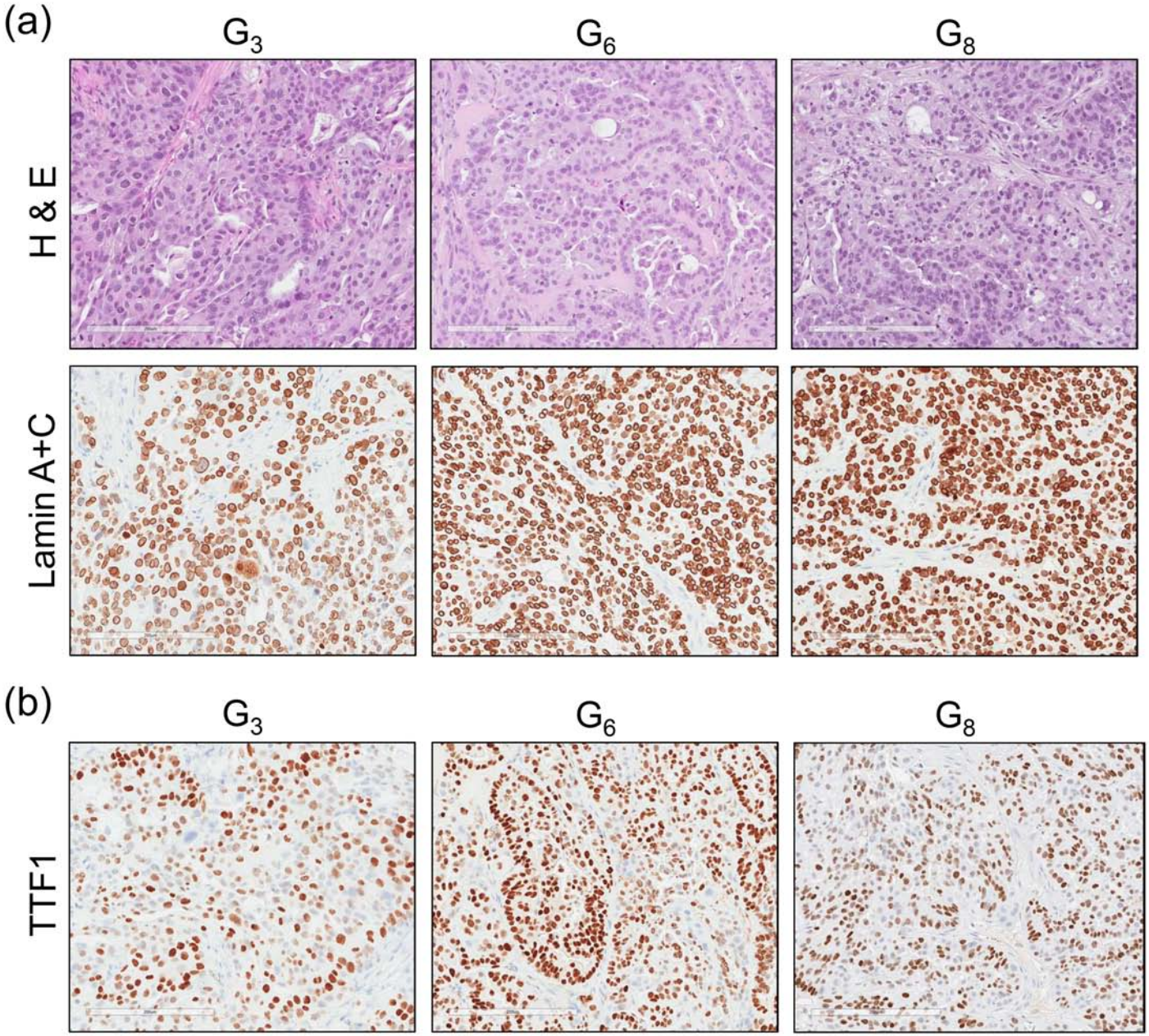

Figure s2

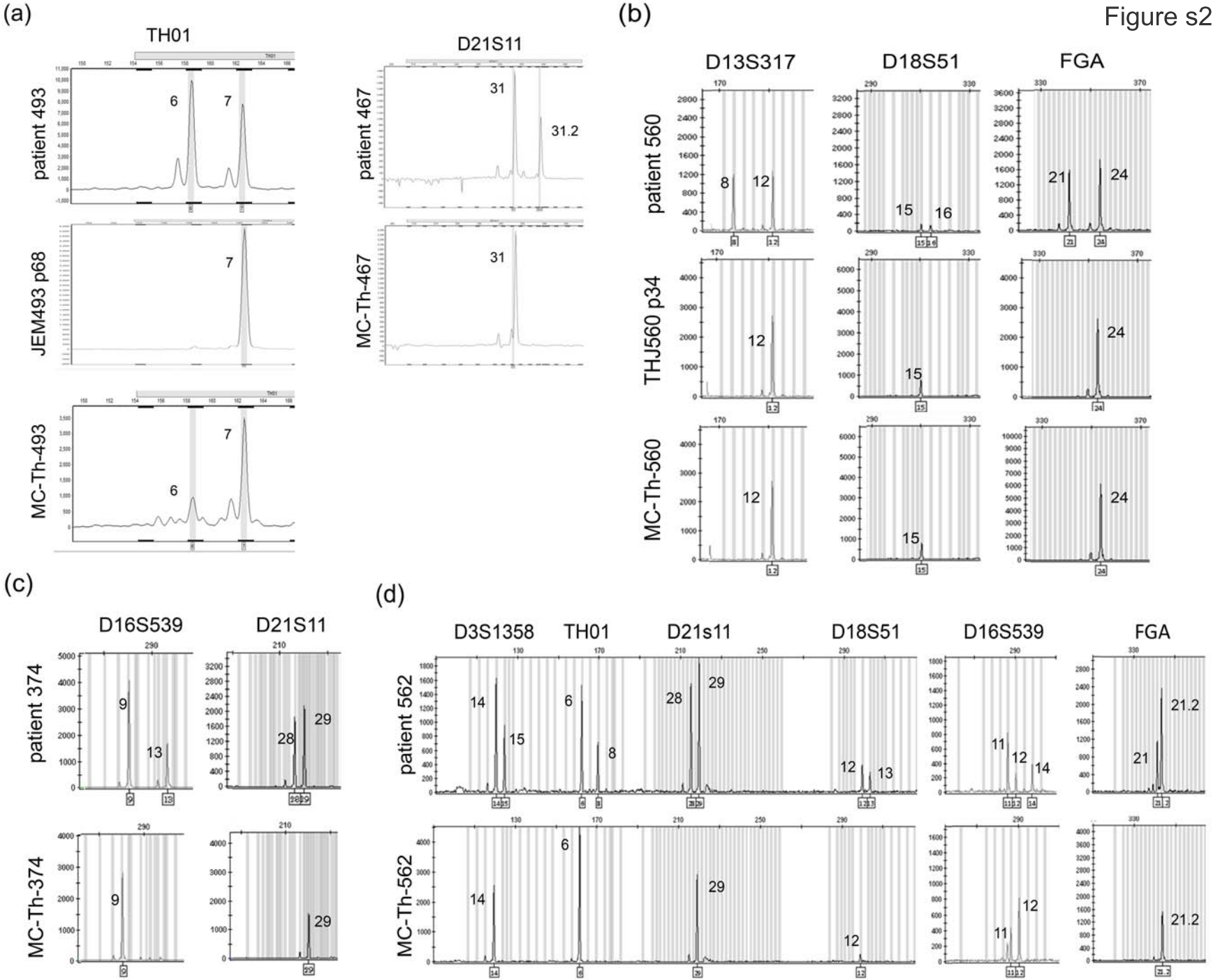
(a)
TH01
D21S11
patient 493
JEM493 p68
MC-Th-493
patient 467
MC-Th-467
6
7
31
31.2
(b)
D13S317
D18S51
FGA
patient 560
THJ560 p34
MC-Th-560
8
12
15
16
21
24
(c)
D16S539
D21S11
patient 374
MC-Th-374
9
13
28
29
(d)
D3S1358
TH01
D21s11
D18S51
D16S539
FGA
patient 562
MC-Th-562
14
15
6
8
28
29
12
13
11
21
21.2

Figure s3