

Table S1 Detailed results of the database and literature searches for the 20 identified genes

No.	Symbol	CHOL	CRC	ESCA	PAAD	STAD	LIHC
1	WWTR1		PMID: 23372686	PMID: 34260541	PMID: 29953851		PMID: 31754005; PMID: 30717258
2	TBRG4				PMID: 39821094		PMID: 38347489
3	HEG1						PMID: 31278131; PMID: 33774129; PMID: 31654571
4	DNAAF9		PMID: 35974349				
5	RBMS3			PMID: 21844183		PMID: 27904780	
6	EHD2		PMID: 33356637	PMID: 23354948			PMID: 27221498; PMID: 35177645
7	CDX1	PMID: 10666391	PMID: 40399276; PMID: 25775580; PMID: 12970739; PMID: 14704280; PMID: 19188603			PMID: 39156870	PMID: 27566019
8	LIFR		PMID: 29751081		PMID: 35685476		PMID: 34921145; PMID: 26249360; PMID: 34699986
9	NIBAN1						
10	AMOTL1					PMID: 32313226	
11	AHCY						
12	ATP2B4		PMID: 24583174				
13	CDX2	PMID: 29862152; PMID: 16794828	PMID: 40399276		PMID: 19106744		
14	MSN		PMID: 37446127				
15	RNF43	PMID: 34733364; PMID: 26980022	PMID: 38058823; PMID: 39551397		PMID: 34973294	PMID: 33188943	PMID: 35039505
16	SPART						
17	LINC02381		PMID: 32092325	PMID: 39974376			
18	NR3C1				PMID: 36797317	PMID: 39731339	
19	HNF4A					PMID: 40517212	
20	TRABD2A						

CHOL, cholangiocarcinoma; CRC, colorectal cancer; ESCA, esophageal cancer; LIHC, liver hepatocellular carcinoma; PAAD, pancreatic adenocarcinoma; STAD, stomach adenocarcinoma.

Table S2 Drug prediction results for the genes

Gene	Drug	Regulatory approval	Indication	Interaction score
RBMS3	METHOTREXATE	Approved	DMARD	0.9492
LIFR	EMFILERMIN	Not Approved		104.4076
HNF4A	ROSUVASTATIN	Approved	antihypecholesterolemic agent	0.2719
HNF4A	MEDICATION	Not Approved		1.6314
HNF4A	CHEMBL:CHEMBL482792	Not Approved		1.6314
HNF4A	DOCETAXEL ANHYDROUS	Approved	antineoplastic agent	0.0786
HNF4A	ALVERINE	Approved		1.6314
HNF4A	INSULIN, REGULAR, HUMAN	Approved	for treatment of diabetic foot ulcers,antidiabetic	0.1847
HNF4A	UREA	Approved		0.7251
HNF4A	RECOMBINANT INTERFERON ALFA	Not Approved		1.0876
HNF4A	EFAVIRENZ	Approved		0.3263
HNF4A	ANDROSTENEDIONE	Not Approved		0.6525
HNF4A	ROSIGLITAZONE	Approved	for treatment of Alzheimer's disease,antidiabetic	0.2966
HNF4A	TOREMIFENE	Approved	SERM,antineoplastic agent	0.2510
HNF4A	ANTISERUM	Not Approved		0.1864
HNF4A	CHEMBL:CHEMBL585591	Not Approved		0.1359
HNF4A	TESTOSTERONE	Approved	for treatment of female sexual dysfunction,hormone replacement	0.1673
HNF4A	WARFARIN	Approved	Anticoagulants	0.2966
ATP2B4	ZN2+	Not Approved		1.1864
ATP2B4	PREGNENOLONE SULPHATE	Not Approved		5.2204
CDX2	TEGAFUR	Approved	antineoplastic agent	4.3503
CDX2	CAPECITABINE	Approved		0.6824
CDX2	DRUGSATFDA.NDA:008378	Not Approved		3.8669
NR3C1	PREDNISONE	Approved	corticosteroid,antiinflammatory agent	0.0606
NR3C1	FLUNISOLIDE ANHYDROUS	Approved	glucocorticoid,antiinflammatory agent	0.1417
NR3C1	HYDROCORTAMATE	Approved	Anti-Inflammatory Agents; Glucocorticoids	0.5844
NR3C1	HE3286	Not Approved	DMARD,antiinflammatory agent	0.3896
NR3C1	DESOXIMETASONE	Approved	Anti-Inflammatory Agents; Glucocorticoids	0.1299
NR3C1	POTASSIUM DICHROMATE	Not Approved		0.0779
NR3C1	MOMETASONE	Approved	glucocorticoid,antiinflammatory agent	0.2164
NR3C1	APIGENIN	Approved		0.0150
NR3C1	MIFEPRISTONE	Approved	antidepressant,antipsychotic,for lowering intraocular pressure,ophthalmological agent	0.0557
NR3C1	BECLOMETHASONE	Approved	glucocorticoid,antiinflammatory agent	0.0649
NR3C1	ESTRADIOL VALERATE	Approved	for treatment of menopausal symptoms,contraceptive,treatment for menopause,hormone replacement	0.0249
NR3C1	CORT 108297	Not Approved	for prevention of weight gain during antipsychotic treatment	0.7792
NR3C1	BENZO(K)FLUORANTHENE	Not Approved		0.0390
NR3C1	OUABAIN OCTAHYDRATE	Not Approved		0.3896
NR3C1	METHYLPREDNISOLONE	Approved	Anti-Inflammatory Agents; Glucocorticoids	0.0649
NR3C1	RELACORILANT	Not Approved		0.7792
NR3C1	CHEMBL:CHEMBL1275761	Not Approved		0.7792
NR3C1	BAICALEIN	Not Approved		0.0312
NR3C1	PREDNISOLONE ACETATE	Approved		0.1299
NR3C1	TRIAMCINOLONE	Approved	for treatment of diabetic macular edema	0.0678
NR3C1	AZD-5423	Not Approved		0.1299
NR3C1	MAPRACORAT	Not Approved		0.3896
NR3C1	AMCINONIDE	Approved	topical,Anti-Inflammatory Agents; Anti-pruritics; Corticosteroids	0.1670
NR3C1	DIFLORASONE DIACETATE	Approved	Anti-Inflammatory Agents; Glucocorticoids	0.1299
NR3C1	FLUPREDNISOLONE	Approved		0.1948
NR3C1	TNF-ALPHA	Not Approved		0.0325
NR3C1	CHEMBL:CHEMBL1915270	Not Approved		0.7792
NR3C1	FLUOCINONIDE	Approved	glucocorticoid,antiinflammatory agent	0.1948
NR3C1	CHEMBL:CHEMBL184450	Not Approved		0.0278
NR3C1	METHYLPREDNISOLONE ACETATE	Approved		0.7792
NR3C1	ORG-34517	Not Approved		0.7792
NR3C1	BECLOMETHASONE DIPROPIONATE	Approved	glucocorticoid,antiinflammatory agent	0.0779
NR3C1	PREDNISOLONE	Approved	corticosteroid,antiinflammatory agent	0.0557
NR3C1	PARAMETHASONE ACETATE	Approved		0.1948
NR3C1	RIMEXOLONE	Approved	Anti-Inflammatory Agents; Corticosteroids	0.1558
NR3C1	ANDROSTENEDIONE	Not Approved		0.1169
NR3C1	MEDRYSONE	Approved	Topical,Anti-Inflammatory Agents	0.1948
NR3C1	DIFLUPREDNATE	Approved	corticosteroid,antiinflammatory agent	0.2922
NR3C1	THERAPEUTIC GLUCOCORTICOID	Not Approved		0.0229
NR3C1	PREDNISOLONE TEBUTATE	Approved		0.3896
NR3C1	BETAMETHASONE BENZOATE	Approved		0.7792
NR3C1	METHADONE HYDROCHLORIDE	Approved	Opioid; Antitussive Agents,Analgesics	0.0229
NR3C1	HYDROCORTISONE ACEPONATE	Not Approved		0.3896
NR3C1	CARBAMAZEPINE	Approved	for treatment of bipolar disorder	0.0080
NR3C1	DIGOXIN	Approved	Anti-Arrhythmia Agents; Cardiotonic Agents	0.0115
NR3C1	BUDESONIDE	Approved	glucocorticoid,antiinflammatory agent	0.1199
NR3C1	TO-901317	Not Approved		0.0243
NR3C1	PARAMETHASONE	Approved	Anti-Inflammatory Agents; Glucocorticoids	0.1948
NR3C1	RESOCORTOL BUTYRATE	Not Approved		0.3896
NR3C1	DEFLAZACORT	Approved		0.3896
NR3C1	ALDOSTERONE	Not Approved		0.1299
NR3C1	GW7647	Not Approved		0.0130
NR3C1	HYDROCORTISONE ACETATE	Approved		0.1948
NR3C1	ALCLOMETASONE	Approved	topical,Anti-Inflammatory Agents; Anti-pruritics; Corticosteroids	0.1948
NR3C1	FLUOROMETHOLONE	Approved	Anti-Inflammatory Agents; Anti-allergic agents; Glucocorticoids	0.2922
NR3C1	FLUMETHASONE PIVALATE	Approved	Anti-Inflammatory Agents; corticosteroid	0.2922
NR3C1	DEXAMETHASONE	Approved	for treatment of Meniere's disease,glucocorticoid,antiinflammatory agent	0.0321
NR3C1	CLOCORTOLONE	Approved	topical,Anti-Inflammatory Agents; Anti-pruritics; Corticosteroids	0.1558
NR3C1	FLUTICASONE	Approved	for treatment of symptomatic exophthalmos associated with thyroid-related eye disease,bronchodilator,glucocorticoid,antiinflammatory agent	0.0820

Table S2 (continued)

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Gene	Drug	Regulatory approval	Indication	Interaction score
NR3C1	PMI-001	Not Approved	DMARD,antiinflammatory agent	0.3896
NR3C1	METHYLTESTOSTERONE	Approved	for treatment of dysfunctional libido in women	0.0649
NR3C1	FLUTICASON FUROATE	Approved	glucocorticoid,antiinflammatory agent	1.1687
NR3C1	BETAMETHASONE VALERATE	Approved		0.3896
NR3C1	FLUOCINOLONE ACETONIDE	Approved	glucocorticoid,antiinflammatory agent	0.2337
NR3C1	RALOXIFENE HYDROCHLORIDE	Approved	Hormone Replacement Agents	0.0078
NR3C1	OMEGA-CHLOROACETOPHENONE	Not Approved		0.0649
NR3C1	BETAMETHASONE SODIUM PHOSPHATE	Approved		0.1948
NR3C1	HYDROCORTAMATE HYDROCHLORIDE	Approved		0.3896
NR3C1	CICLESONIDE	Approved	Anti-Inflammatory Agents; Anti-allergic agents; Glucocorticoids	0.1948
NR3C1	HALCINONIDE	Approved		0.1299
NR3C1	CLOBETASOL PROPIONATE	Approved		0.0779
NR3C1	FLUOROMETHOLONE ACETATE	Approved		0.3896
NR3C1	STANOLONE	Not Approved		0.0649
NR3C1	MEPREDNISONE	Approved		0.3896
NR3C1	CLIOQUINOL	Approved		0.0216
NR3C1	CHEMBL:CHEMBL259820	Not Approved		0.7792
NR3C1	AZACITIDINE	Approved	antineoplastic agent	0.0097
NR3C1	METHYLPREDNISOLONE SODIUM SUCCINATE	Approved		0.1948
NR3C1	FOSDAGROCORAT	Not Approved		0.1948
NR3C1	TESTOSTERONE	Approved	for treatment of female sexual dysfunction,hormone replacement	0.0100
NR3C1	ETHINYL ESTRADIOL	Approved	contraceptive	0.0195
NR3C1	METHOTREXATE	Approved	DMARD	0.0071
NR3C1	PROPYLPYRAZOLETRIOL	Not Approved		0.0325
NR3C1	CLOBETASOL	Approved	corticosteroid,antiinflammatory agent	0.0974
NR3C1	PHENOLPHTHALEIN	Approved		0.0487
NR3C1	GUGGULSTERONE	Not Approved		0.0433
NR3C1	HYDROCORTISONE CYPIONATE	Approved		0.3896
NR3C1	HYDROCORTISONE PROBUTATE	Approved		0.1948
NR3C1	NIFEDIPINE	Approved	Antianginal Agents; Vasodilator Agents	0.0070
NR3C1	CHEMBL:CHEMBL1915271	Not Approved		0.7792
NR3C1	DEXAMETHASONE SODIUM PHOSPHATE	Approved		0.3896
NR3C1	CORTIVAZOL	Approved		0.3896
NR3C1	URSODIOL	Approved	for prevention of recurrence of colorectal polyps	0.0487
NR3C1	HYDROCORTISONE SODIUM PHOSPHATE	Approved		0.1948
NR3C1	PHENYLMERCURIC ACETATE	Not Approved		0.0195
NR3C1	OCHRATOXIN A	Not Approved		0.0433
NR3C1	CATECHOL	Not Approved		0.0177
NR3C1	PENTABROMOPHENOL	Not Approved		0.0300
NR3C1	ZEARALENONE	Not Approved		0.0300
NR3C1	DIGITOXIN	Approved	Anti-Arrhythmia Agents; Cardiotonic Agents	0.0205
NR3C1	FLURANDRENOLIDE	Approved	Anti-Inflammatory Agents; Glucocorticoids	0.2597
NR3C1	VAMOROLONE	Approved		0.1299
NR3C1	HYDROCORTISONE VALERATE	Approved		0.1299
NR3C1	CHEMBL:CHEMBL1915269	Not Approved		0.7792
NR3C1	KEPONE	Not Approved		0.0325
NR3C1	BETAMETHASONE ACETATE	Approved		0.3896
NR3C1	CHEMBL:CHEMBL2059711	Not Approved		0.2597
NR3C1	DAGROCORAT	Not Approved		0.1948
NR3C1	HALOBETASOL	Approved	Anti-inflammatory Agents	0.2597
NR3C1	HYDROCORTISONE SODIUM SUCCINATE	Approved		0.1299
NR3C1	VELSECORAT	Not Approved		0.1948
NR3C1	TESTOSTERONE PROPIONATE	Approved		0.0487
NR3C1	PREDNISOLONE SODIUM PHOSPHATE	Approved		0.3896
NR3C1	DESONIDE	Approved	corticosteroid,antiinflammatory agent	0.2597
NR3C1	TRIAMCINOLONE DIACETATE	Approved		0.1948
NR3C1	PREDNICARBATE	Approved	Anti-Inflammatory Agents; Corticosteroids	0.1948
NR3C1	LOTEPREDNOL	Approved	corticosteroid,antiinflammatory agent	0.2922
NR3C1	FLUOXYMESTERONE	Approved	Anabolic Agents; Antineoplastic Agents	0.0974
NR3C1	ETIPREDNOL DICLOACETATE	Not Approved		0.3896
NR3C1	CYCLOHEXIMIDE	Not Approved		0.0041
NR3C1	CHEMBL:CHEMBL210411	Not Approved		0.7792
NR3C1	DEXAMETHASONE ACETATE	Approved		0.1948
NR3C1	CORTISONE ACETATE	Approved		0.1948
NR3C1	HYDROCORTISONE BUTYRATE	Approved		0.0371
NR3C1	DIBUTYLDICHLOROSTANNANE	Not Approved		0.0779
NR3C1	PROGESTERONE	Approved	for reducing the risk of pre-term birth for women with short cervix a mid-pregnancy,for prevention of preterm delivery,for symptomatic treatment of menopausal symptoms,neuroprotectant for stroke victims	0.0066
NR3C1	CYPROTERONE ACETATE	Approved		0.1113
NR3C1	BETAMETHASONE	Approved	glucocorticoid,antiinflammatory agent	0.1948
NR3C1	THERAPEUTIC ANDROGEN	Not Approved		0.0458
NR3C1	TRIAMCINOLONE HEXACETONIDE	Approved		0.3896
NR3C1	ANTIDEPRESSANT AGENT	Not Approved		0.0150
NR3C1	DACTINOMYCIN	Approved		0.0111
NR3C1	ABBV-3373	Not Approved		0.1299
NR3C1	CHRYSIN	Approved		0.0557
DNAAF9	RIBAVIRIN	Approved		1.3738
DNAAF9	PEGINTERFERON ALFA-2B	Approved		1.6314
DNAAF9	PEGINTERFERON ALFA-2A	Approved	Antineoplastic Agents; Immunomodulatory Agents,for treatment of hepatitis B and C	1.2001