Disease	Reference	Model	Methods/ Treatment	Markers			Other markers	Main results
				E-cad	a-SMA	Vimentin		
BPD	Deng C et al(1)	Murine model of hyperoxia-induced BPD, GFP-tagged bone marrow (BM) chimera mice	60% oxygen for 14 days, CXCL12 chemotaxis assay	N	Y	N	S100A4, TTF-1, Pro-Surfactant Protein-B, Collagen I, CXCR4	GFP-tagged BM-derived fibroblasts were engrafting the lung in active fibrotic areas; there were significantly more BM-derived CXCR4+ fibroblasts in the lungs of O2 treated animals than in controls; BM-derived TTF-1+ epithelial cells were detected in injured lungs
Asthma	Heijink I et al (2)	Bronchial epithelial cell line, Primary bronchial epithelium (hBEC), in vitro	TGF-β1, House dust mite (HDM) allergen	y	N	Y	EGFR,α-catenin activation, cytokeratin (KRT), Myosin light chain phosphorilation	HDM allergen acted synergically with TGF-β1 in inducing EMT in primary hBECs.
	Hackett T-L et al (3)	hBEC from patients with asthma (8) and healthy controls (10)	TGF-β1 SMAD3 siRNA, BMP-7	Y	N	Y	Fibronectin (FN), collagen-1, occludin-1	In vitro evidence for EMT in HBEC; basal epithelial cells are especially sensitive to EMT as in vitro data suggest; no histological evidence for EMT in sections from matched asthmatic patients
	Hackett T-L et al (4)	hBEC cell lines 16HBE and BEAS-2B; primary hBEC from healthy controls and from patients with asthma	HDM allergen; epidermal growth factor (EGF)	Y	N	N	Caveolin-1 (Cav-1), β-catenin, Thymic Stromal Lymphopoietin (TSLP),	Cav-1 levels, junctional E-cadherin and β-catenin were significantly lower, TSLP levels were higher in asthma patients compared to controls; EGF and HDM treatment induced E-cad redistribution and Cav-1 internalization in 16HBE cells. Cav-1-specific siRNA inhibited E-cad internalisation and barrier dysfunction in 16HBE cells; Cav-1 overexpression restored barrier dysfunction and reduced TSLP levels in BEAS-2B cells.
	Johnson JI et al (5)	HDM-induced asthma in ROSA-26/SPC-Cre-LacZ reporter mice	HDM for 15 weeks	Y	Y	Y	TGF-β1, occludin, pro-collagen I, SNAIL	LacZ+/α-SMA+ cells were incorporated into airway smooth muscle; LacZ+/Vim+ cells were present in the sub-epithelium; 30% of Vim+ cell were also LacZ+
BOS	Hodge et al.(6)	Bronchial brushings from lung transplant (LTx)patients with (6) or without BOS (16)	N/A	N	Y	N	Flow cytometry, S100A4 FN, HLA-DR; TGF-β1 and HGF levels in BALF-ELISA	EMT markers α-SMA, S100A4 FN and HLA-DR were increased in epithelial cells from BOS patients compared to stable LTx patients; Increased levels of HGF but not TGF-β1 in the BALF of BOS patients.
BOS	Ward et al	Endobronchial biopsy and brushings from 16 stable Ltx patients	TGF-β1	N	N	N	S100A4 IHC, MMP-2, 7 and 9 zymography, invasion assay	A median 15% of the biopsy epithelium stained for S100A4 and MMP-7 in stable lung transplant recipients; Epithelial cultures from lung allografts were positive for S100A4 and MMP-2 and 9 showed zymographic activity. MMP total protein and activity was increased after TGF-β1 treatment; Both TGF-β1 stimulated and non-stimulated epithelial cells were invasive, invasion capacity was higher in TGF-β1 stimulated cells.
BOS	Borthwick et al.(7)	In vitro culturing of hBEC form obtained via bronchial brushing from stable LTx patients, co-culture with THP-	TGF β1 with or without P.aeruginosa cell lysate (lab. strain and clinical isolates (9))	Y	N	Y	IL-8, IL-1β, TNF-α, FN, KRT-19	Supernatants, but not co-cultures of THP-1 cells treated with P.aeruginosa accentuated EMT on cultured hBECs. Clinical isolates of P.aeruginosa induced significantly higher production of inflammatory cytokines in THP-1s than the reference strain.

BOS	Borthwick et al.(8)	In vitro culturing of hBEC form obtained via bronchial brushing from stable LTx patients	TGF-β, TNF-α	Y	Y	Y	FN, KRT-19, S100A4, MMP-9 zymography, Matrigel invasion assay, collagen synthesis	Bronchial epithelium upregulating EMT and downregulating epithelial markers in BOS but not in stable transplants; epithelial cells; TNF- accentuates TGF –induced EMT and cell migration, but not ECM deposition.
BOS	Milara et al (9)	In vitro culture of hBECs isolated from small airways (>1mm) of non-smokers (5), smokers (12) and COPD patients (15); IHC of tissue samples	Cigarette Smoke Extract (CSE)	Y	Y	Y	collagen type I, NOX4, ZO-1 (IHC); TGF-β1, cAMP and MMP-9 (ELISA) ERK1/2 and Smad3 phosphorylation (WB)	hBECs from smokers and COPD patients but not from controls show EMT; CSE-induced EMT is mediated by the ROS and downregulation of cAMP;
BOS	Zou et al	HBEC cell line	Nicotine, Wnt-3a, TGF-β1 siRNA	Y	Y	Y	MMP-9, Collagen-I	Nicotine treatment leads β-catenin to nuclear translocation, E-cad downregulation, αSMA, Vim, Col-1, MMP-9 and TGF-β1 upregulation in HBECs; Knockdown of Wnt3a and TGF-β1 using specific siRNA constructs prevented these effects..

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COPD	Sohal et al (10, 11)	Endobronchial biopsies from non-smokers(15); ex-smokers with COPD(15), smokers with normal lung function(16) and current smokers (17)	N/A	N	N	Y	IHC for S100A4, MMP-9, KRT and EGFR	Evidence for Rbm fragmentation / remodelling, increased EGFR expression of epithelial cells in COPD patients and smokers compared to non-smoker control(11), 7.2% of basal epithelial cells and cells in the Rbm frequently co-express KRT and S100A4 suggesting EMT in vivo(10).
COPD	Wang et al	Lung tissue samples obtained during lobectomy from 25 non-smokers, 25 smokers with and 18 smokers without COPD; Human primary small airway epithelial cells (SAEC)	CSE extract, uPAR-1 and 2-specific siRNA constructs;	Y	Y	Y	uPAR, α-catenin, N-cadherin, p-Akt, p-GSK-3β	Increased expression of EMT markers and uPAR small airway epithelium (SAE) of patients with COPD compared to controls; Vimentin and uPAR expression are correlated in SAE; CSE-induced EMT in SAEC was associated with high uPAR expression; Targeted silencing of uPAR inhibited CSE-induced EMT; uPAR mediates EMT in SAEC through the PI3K/Akt signaling pathway.
COPD	Churg et al.	C57Bl/6 mice were exposed to cigarette smoke for up to 6 months	Smoke of 2R1 Kentucky research cigarettes in various doses	N	N	N	Procollagen, TGF-β1, platelet-derived growth factor (PDGF)-A, PDGF-B, connective tissue growth factor (CTGF), p-SMAD2	With a single smoke exposure, increases in procollagen, CTGF, TGF-β1, PDGF-A and -B expression were seen after 2 h of smoke exposure; With chronic smoke exposures increases in procollagen, CTGF, PDGF-B expression persisted through 1 wk, 1 mo, and 6 mo; Increased p-Smad2 was present at all time points, indicating constitutively active TGF-β signalling; Small airways in smoke-exposed mice had more collagen at 6 mo.
COPD	Milara et al.	Air-liquid interface (ALI) cultures were set up from HBECs from non-smokers (n=5), smokers (n=12) and patients with COPD (n=15)	CSE exposure	Y	Y	Y	collagen-I, NOX4, ZO-1, MMP-9	EMT markers were upregulated and epithelial markers were downregulated in HBECs of smokers and patients with COPD compared with non-smokers; CSE exposure caused EMT within 72 h in in vitro differentiated HBECs; CSE effects were mediated by intracellular reactive O2 species, autocrine action of TGF-β1, activation of ERK1/2 and Smad3 and by the downregulation of cAMP
IPF	Kim et al (12)	ROSA-26/SPC-Cre-LacZ reporter mice, in vitro culture of transgenic ATIIs	Intranasal Adeno-TGF-β1, culturing ATIIs on Matrigel or FN, TGFR kinase inhibitor SB431542	N	Y	N	Pro-SP-C, FN, N-cad, p-SMAD2, TUNEL	Lung injury induced by TGF-β1 expressing adenoviri causes massive EMT AECs; genetic fate tracking proves epithelial origin of myofibroblasts. Culturing genetically tagged AECs on FN but not on Matrigel induces EMT by activating intracellular TGF-β/SMAD signalling through αvβ6 integrin.

IPF	Tanjore et al (13)	ROSA-26/SPC-Cre-LacZ reporter mice, in vitro culture of transgenic ATIIs	IT bleomycin (single 0.08U dose	N	Y	N	S100A4, pro–SP-C	Approximately one-third of S100A4+ fibroblasts are derived from tagged epithelial cells; α-SMA+ myofibroblasts are a distinct population from EMT-derived S100A4+ Fibroblasts; some S100A4+ Fibroblasts derive from bone marrow
IPF	Deagryse et al. (14)	ROSA-26/SPC-Cre-LacZ reporter mice	IT bleomycin (0.04U given biweekly 8 times)	N	Y	N	pro-SP-C, Clara cell 10 (CC-10), β-galactosidase, S100A4, TUNEL	Repetitive bleomycin dosing results in greater lung fibrosis, less neutrophilic inflammation, greater cell death, and more prominent EMT compared with the single-dose model; one-half of the S100A4+ fibroblasts were of epithelial lineage. The authors suggest this recapitulates better the features of IPF than the single-dose bleomycin model.
IPF	Harada et al (15)	13 patients with UIP histology; 11 IPF, 2 autoimmune; 10 control patients w/ normal lung function	N/A	N	Y	Y	Pro-SP-B, TTF-1, KRT7/8 (CAM5.2)	-SMA were detectable in some epithelial cells covering the fibroblastic foci in UIP but not in healthy control lungs. Spindle-shaped cells positive for TTF-1, ProSP-B, and KRT7/8 were detectable in the fibroblastic foci of UIP lungs.
IPF	Rock et al (16)	ROSA-26 / Sftpctm1-Cre-Tomato transgenic reporter mice	IT bleomycin (1.25 U/kg – 5 U/kg body weight dose) in a single injection	N	Y	Y	SP-C; AQP-5; S100A4; NG2; Desmin; CC-10; PECAM	Proliferating fibroblasts were derived from NG2+ and/or PDGFRB+ stromal populations but not from SP-C+ or CC-10+ epithelial cells using genetically tagged murine models.

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Lung Cancer	Prudkin et al (17)	Tissue from human lung cancers: squamous metaplasia (13), squamous dysplasia (34) & carcinoma in situ (20), Brain metastases: adenocarcinoma (37), squamous cell (11).	N/A	Y	N	Y	N-Cadherin, Integrin αvβ6, MMP-9, and phosphorylated EGFR. Methods: Tissue microarray construction, IHC, EGFR mutation analysis.	EMT phenotype was commonly expressed in dysplastic lesions, lung squamous cell carcinoma and adenocarcinoma. Brain metastases from these tumours expressed higher levels of E-cadherin than primary tumours implicating the occurrence of MET after dissemination.
Lung Cancer	Pirozzi et al (18)	A549s (control) and LC31 (lung cancer primary cell line). LC31 cells grown as pneumospheres were subcutaneously injected in NOD/SCID mice.	TGF-β1 2ng/ml: A549s for 30 days, LC31s for 80 days	Y	N	Y	KRT, N-cad, CD90, SLUG, TWIST, β-catenin. Stem markers: Oct4, Nanog, Sox2, c-kit, CD133.	TGF-β1 lung cancer cells underwent EMT showing mesenchymal phenotype and LC31s also showed over-expression of stemness markers. TGF-β1treatmentincreased the pneumoshere-forming capacity and invasiveness of LC31s in NOD/SCID mice.
	Ren et al (19)	Cell lines: Doxetacel (DTX) sensitive and resistant human NSCLC line SPC-A1. Animal model: SPC-A1/DTX cells injected into nude mice.	ZEB1 siRNA knockdown. DTX treatment.	Y	N	Y	N-cad, KRT-19, TWIST. Methods: apoptosis assay, colony formation assay, wound healing assay, migration/invasion assays.	Acquisition of DTX resistance coincides with EMT/mesenchymal phenotype, an increased migratory and invasive capacity, increased ZEB1 expression. ZEB1 knockdown was found to reverse the EMT phenotype and inhibit the migratory ability of SPC-A1/DTXs, enhanced the chemo-sensitivity.
	Tominaga et al (20)	Human NSCLC lines: A549, PC-9, RERF-LC-KJ, and LC-2/ad	Cell lines were transfected to over-express miR-1.	Y	N	Y	Vinculin, occludin, SNAIL, SLUG, ZEB1	miR-1 expression was down-regulated in lung cancer cell lines. Overexpression of miR-1 endowed A549 cells with epithelial features upregulated E-cad by inhibiting SLUG. miR-1 suppressed the migratory & invasive capacity of A549s.
	Witta et al (21)	21 NSCLC cell lines were used: squamous (4), large cell (5), adeno-carcinoma (10), & bronchio-alveolar (2).	Gefitinib, HDAC inhibitor (MS-275). E-cad transfection.	Y	N	N	EGFR, ZEB1	Gefetinib sensitivity correlated with E-cadand ZEB1 expression. E-cad overexpression restored gefetinib sensitivity. HDAC inhibitor (MS-275) treatment induced E-cadherin & EGFR, and led to a growth-inhibitory & apoptotic effect with gefitinib treatment, even in resistant cell lines harbouring EGFR mutations.

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