

**Table S1** Types of diseases in each system

ID	Human body systems	Types of disease	Numbers
0	Head and neck	1. Pleomorphic adenoma of salivary gland	3
		2. Parotid gland cellular schwannoma	3
		3. Papillary thyroid carcinoma	5
		4. Tongue squamous cell carcinoma	2
		5. Laryngeal squamous cell carcinoma	2
		6. Nodular thyroid cancer	5
			Total =20
1	Intracranial nervous system	1. Anaplastic oligodendroglioma	2
		2. Anaplastic astrocytoma	3
		3. Intracranial hair cell astrocytoma	3
		4. Intracranial meningioma	7
		5. Hippocampal sclerosis	5
			Total =20
2	Respiratory system	1. Large cell neuroendocrine carcinoma of the lung	6
		2. Lung adenocarcinoma	2
		3. Lymph node metastatic lung adenocarcinoma	5
		4. Lung adenocarcinoma in situ	4
		5. Keratinizing squamous cell carcinoma	1
		6. Anterior mediastinal thymoma	2
			Total =20
3	Digestive system	1. Omentum Malignant Mesothelioma	4
		2. Peritoneal mucous adenocarcinoma	2
		3. Small intestine stromal tumor	3
		4. Sigmoid colon adenocarcinoma	2
		5. Colon adenocarcinoma	4
		6. Rectal adenocarcinoma	5
			Total =20
4	Skin and soft tissue	1. Poorly differentiated adenocarcinoma of eyelid	3
		2. Highly differentiated myxoid liposarcoma of the buttocks	10
		3. Foot malignant melanoma	2
		4. Embryonic rhabdomyosarcoma	5
			Total =20

**Table S1** (continued)

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ID	Human body systems	Types of disease	Numbers
5	Female reproduction system	1.Uterine Leiomyoma	1
		2.High-grade serous carcinoma of the uterus	4
		3.Cervical endometrioid adenocarcinoma	2
		4.Cervical adenocarcinoma in situ	2
		5.Placenta adhesion and implantation	3
		6.Uterine pregnancy	1
		7.Cervical polyps	2
		8.Endometrial polyps	2
		9.Pelvic papillary serous carcinoma	3
		Total =20	
6	Urinary system	1.Adrenal sebaceous adenoma	4
		2.Retroperitoneal leiomyosarcoma	2
		3.Renal clear cell carcinoma	2
		4.Reninoma	3
		5.Kidney atrophy	4
		6.Renal medullary lipoma	5
		Total =20	
7	Lymphoid hematopoietic system	1.Reactive hyperplasia of peri-intestinal lymph nodes	5
		2.Reactive hyperplasia of inguinal lymph nodes	4
		3.Reactive hyperplasia of perigastric lymph nodes	5
		4.Ocular-MALT lymphoma	6
		Total =20	
8	Liver	1.Hepatocellular carcinoma	9
		2.Nodular hyperplasia of liver	11
		Total =20	
9	Breast	1.Invasive breast cancer	Total =20

**Table S2** The distribution of PSNR and SSIM on each body system.

			0	1	2	3	4	5	6	7	8	9
Our Model	10×	SSIM	0.837±0.072	0.813±0.132	<b>0.857±0.060</b>	0.850±0.064	0.859±0.081	0.836±0.084	<b>0.844±0.069</b>	<b>0.884±0.061</b>	<b>0.816±0.079</b>	0.855±0.051
		PSNR	<b>24.783±3.812</b>	<b>23.657±2.508</b>	<b>24.235±3.525</b>	<b>24.716±3.007</b>	<b>24.895±6.118</b>	<b>25.332±2.957</b>	<b>23.444±2.998</b>	<b>22.461±2.112</b>	<b>23.467±4.300</b>	<b>24.684±2.662</b>
	20×	SSIM	0.680±0.121	0.619±0.198	<b>0.694±0.116</b>	<b>0.694±0.103</b>	0.705±0.162	0.686±0.110	<b>0.662±0.127</b>	<b>0.731±0.101</b>	<b>0.624±0.165</b>	<b>0.703±0.093</b>
		PSNR	<b>23.011±4.061</b>	<b>21.491±2.975</b>	<b>22.184±3.853</b>	<b>22.996±3.288</b>	<b>23.211±6.777</b>	<b>23.623±3.267</b>	<b>21.351±3.471</b>	<b>20.477±2.243</b>	<b>21.336±5.317</b>	<b>23.045±2.988</b>
	40×	SSIM	<b>0.577±0.163</b>	<b>0.492±0.209</b>	<b>0.585±0.158</b>	<b>0.581±0.134</b>	<b>0.584±0.200</b>	<b>0.592±0.133</b>	<b>0.528±0.149</b>	<b>0.581±0.109</b>	<b>0.483±0.203</b>	<b>0.588±0.120</b>
		PSNR	<b>21.209±3.656</b>	19.760±2.965	<b>20.210±3.613</b>	<b>21.191±3.142</b>	<b>21.254±5.325</b>	<b>21.753±2.917</b>	19.557±3.442	<b>18.685±2.195</b>	19.424±4.470	<b>21.319±2.819</b>
DBPN	10×	SSIM	0.832±0.065	<b>0.816±0.118</b>	0.848±0.050	0.845±0.054	0.855±0.079	0.837±0.049	0.837±0.059	0.876±0.053	0.810±0.074	0.841±0.040
		PSNR	24.064±3.712	23.310±2.598	23.515±3.563	23.961±3.078	24.300±6.573	24.752±3.031	22.718±3.094	21.842±2.060	22.787±5.077	23.767±2.655
	20×	SSIM	0.614±0.109	0.582±0.180	0.638±0.102	0.632±0.100	0.652±0.152	0.627±0.113	0.606±0.109	0.679±0.094	0.563±0.146	0.637±0.074
		PSNR	21.792±3.615	20.895±2.602	21.073±3.592	21.733±3.037	22.066±6.557	22.436±2.888	20.404±3.173	19.402±2.155	20.416±5.018	21.691±2.765
	40×	SSIM	0.551±0.167	0.469±0.203	0.545±0.159	0.551±0.132	0.563±0.239	0.568±0.128	0.490±0.144	0.526±0.092	0.451±0.227	0.550±0.113
		PSNR	20.992±3.847	<b>20.027±2.753</b>	19.995±3.944	20.926±3.233	21.223±6.867	21.608±3.047	19.468±3.507	18.201±2.453	19.610±5.428	20.900±2.878
ESPCN	10×	SSIM	<b>0.842±0.069</b>	0.814±0.133	0.849±0.060	<b>0.856±0.063</b>	<b>0.862±0.084</b>	<b>0.848±0.062</b>	0.840±0.064	0.866±0.054	0.812±0.086	<b>0.856±0.046</b>
		PSNR	24.073±3.464	23.227±2.532	23.362±3.542	23.973±2.934	24.095±5.561	24.666±2.903	22.771±3.117	21.490±2.378	22.879±4.132	23.814±2.491
	20×	SSIM	<b>0.682±0.118</b>	<b>0.626±0.183</b>	0.689±0.107	0.694±0.098	<b>0.706±0.164</b>	<b>0.691±0.100</b>	0.658±0.110	0.711±0.083	0.619±0.162	0.695±0.081
		PSNR	22.273±3.644	21.258±2.600	21.475±3.717	22.206±3.038	22.382±6.177	22.867±2.987	20.877±3.230	19.713±2.289	20.960±4.708	22.081±2.608
	40×	SSIM	0.575±0.159	0.492±0.208	0.573±0.154	0.580±0.131	<b>0.589±0.224</b>	0.591±0.129	0.521±0.146	0.568±0.098	0.476±0.221	0.581±0.115
		PSNR	20.987±3.559	19.973±2.524	20.103±3.565	20.932±2.966	21.151±6.135	21.521±2.831	<b>19.568±3.180</b>	18.603±2.159	19.610±4.668	20.891±2.644
EDSR	10×	SSIM	0.835±0.066	0.813±0.123	0.848±0.051	0.849±0.055	0.856±0.080	0.839±0.052	0.838±0.059	0.869±0.052	0.813±0.077	0.847±0.040
		PSNR	24.268±3.680	23.414±2.485	23.585±3.555	24.168±2.951	24.437±6.525	24.860±2.991	22.951±3.034	21.817±2.203	23.126±4.870	24.051±2.568
	20×	SSIM	0.659±0.118	0.611±0.172	0.670±0.102	0.670±0.090	0.687±0.163	0.670±0.090	0.640±0.105	0.698±0.079	0.600±0.158	0.667±0.073
		PSNR	22.108±3.798	21.173±2.640	21.345±3.746	22.038±3.125	22.389±6.954	22.770±3.104	20.723±3.229	19.656±2.192	20.809±5.409	21.944±2.713
	40×	SSIM	0.485±0.190	0.415±0.197	0.496±0.167	0.482±0.145	0.503±0.250	0.515±0.145	0.431±0.153	0.482±0.087	0.381±0.236	0.471±0.119
		PSNR	20.375±3.801	19.544±2.728	19.611±3.769	20.280±3.192	20.702±6.896	21.089±3.142	18.974±3.296	18.056±2.115	18.983±5.473	20.154±2.712
MDSR	10×	SSIM	0.835±0.066	0.813±0.123	0.848±0.051	0.849±0.055	0.856±0.080	0.839±0.053	0.838±0.060	0.869±0.053	0.812±0.077	0.847±0.040
		PSNR	24.258±3.682	23.406±2.485	23.578±3.549	24.160±2.950	24.428±6.532	24.850±2.995	22.943±3.030	21.816±2.187	23.117±4.876	24.045±2.568
	20×	SSIM	0.662±0.116	0.613±0.172	0.672±0.100	0.673±0.089	0.689±0.162	0.672±0.089	0.643±0.104	0.700±0.078	0.605±0.156	0.670±0.072
		PSNR	22.189±3.777	21.231±2.622	21.406±3.751	22.131±3.102	22.457±6.909	22.839±3.074	20.799±3.222	19.714±2.213	20.900±5.371	22.053±2.719
	40×	SSIM	0.511±0.163	0.441±0.194	0.515±0.152	0.513±0.130	0.530±0.223	0.536±0.127	0.459±0.140	0.508±0.086	0.414±0.222	0.512±0.111
		PSNR	20.703±3.631	19.825±2.598	19.842±3.654	20.673±3.087	20.945±6.081	21.361±2.927	19.303±3.275	18.301±2.173	19.313±4.809	20.690±2.763
BICUBIC	10×	SSIM	0.832±0.071	0.802±0.131	0.841±0.058	0.843±0.062	0.850±0.087	0.838±0.058	0.828±0.061	0.847±0.049	0.800±0.088	0.841±0.044
		PSNR	24.052±3.853	23.178±2.707	23.247±3.841	23.893±3.176	24.170±6.812	24.634±3.200	22.671±3.286	21.162±2.614	22.912±4.997	23.761±2.780
	20×	SSIM	0.659±0.130	0.595±0.187	0.660±0.119	0.667±0.105	0.677±0.184	0.670±0.102	0.625±0.113	0.658±0.076	0.588±0.177	0.662±0.085
		PSNR	22.075±3.941	21.043±2.791	21.109±4.051	21.946±3.294	22.233±7.204	22.679±3.254	20.593±3.489	19.053±2.649	20.812±5.465	21.851±2.888
	40×	SSIM	0.546±0.185	0.449±0.219	0.529±0.183	0.542±0.151	0.549±0.263	0.564±0.144	0.472±0.164	0.482±0.110	0.432±0.249	0.540±0.130
		PSNR	20.970±3.927	19.948±2.784	19.835±4.105	20.870±3.320	21.141±7.016	21.553±3.145	19.427±3.615	17.912±2.631	<b>19.632±5.412</b>	20.875±2.983

**Table S2** (continued)

**Table S2** (continued)

			0	1	2	3	4	5	6	7	8	9
BILINEAR	10×	SSIM	0.799±0.086	0.760±0.148	0.807±0.078	0.810±0.077	0.815±0.108	0.810±0.073	0.786±0.073	0.794±0.060	0.754±0.112	0.806±0.057
		PSNR	23.563±4.048	22.612±2.954	22.607±4.147	23.320±3.417	23.628±7.239	24.161±3.501	22.098±3.554	20.239±2.955	22.423±5.265	23.200±2.992
	20×	SSIM	0.631±0.147	0.559±0.197	0.628±0.139	0.637±0.120	0.645±0.207	0.647±0.116	0.586±0.125	0.606±0.086	0.549±0.198	0.632±0.098
		PSNR	21.783±4.054	20.720±2.917	20.711±4.250	21.602±3.441	21.900±7.469	22.405±3.434	20.255±3.657	18.468±2.870	20.541±5.623	21.519±3.022
	40×	SSIM	0.531±0.196	0.429±0.224	0.510±0.196	0.525±0.161	0.530±0.278	0.550±0.153	0.450±0.173	0.449±0.121	0.411±0.260	0.522±0.138
		PSNR	20.736±4.017	19.693±2.877	19.523±4.262	20.594±3.432	20.872±7.220	21.336±3.283	19.159±3.745	17.443±2.801	19.420±5.528	20.606±3.087
RND	10×	SSIM	0.830±0.066	0.809±0.121	0.841±0.051	0.843±0.055	0.851±0.081	0.835±0.051	0.833±0.058	0.861±0.051	0.808±0.076	0.841±0.039
		PSNR	24.110±3.571	23.293±2.447	23.358±3.519	23.986±2.897	24.163±5.841	24.682±2.948	22.814±3.047	21.563±2.260	23.027±4.664	23.864±2.499
	20×	SSIM	0.664±0.115	0.614±0.172	0.674±0.100	0.675±0.089	0.691±0.162	0.673±0.089	0.645±0.104	0.701±0.077	0.608±0.156	0.673±0.072
		PSNR	22.212±3.759	21.239±2.618	21.420±3.746	22.150±3.086	22.447±6.770	22.844±3.060	20.818±3.219	19.709±2.237	20.929±5.292	22.070±2.699

The bold indicates that the SSIM or PSNR value of the method on the generated and real images (10×, 20× or 40×) of one body system is the maximum among all methods. 0–10 represent the IDs of ten body systems, which are listed in *Table S1*.

**Table S3** The visual score distribution of pathologists A, B, and C on each body system

	Head and neck	Intracranial nervous system	Respiratory system	Digestive system	Skin and soft tissue	Female reproduction system	Urinary system	Lymphoid hematopoietic system	Liver	Breast
Pathologist A	3.5±0.980	3.5±0.980	3.7±0.898	3.7±1.255	3.7±0.898	3.8±1.176	3.7±0.898	3.7±0.898	3.4±0.960	3.6±0.960
Pathologist B	3.7±1.255	3.6±0.960	3.7±1.255	3.6±0.960	3.8±1.176	3.7±0.898	3.7±1.255	3.9±1.055	3.7±0.898	3.6±1.300
Pathologist C	3.8±1.176	3.6±0.960	3.8±1.176	3.7±0.898	3.9±1.055	4.0±0.877	3.6±0.960	3.9±1.372	3.6±0.960	3.5±0.980