

**Table S1.** Multiple ratters' impressions of tissue type (Surgeon vs Histopathologist vs iKnife).

Burn	SAMPLE INFORMATION	SURGEON'S IMPRESSION	HISTOPATHOLOGISTS IMPRESSION			IKNIFE IMPRESSION	
	Patient -Burn	Class	Histological diagnosis (comments)	Class	Tumour content (%)	Class	Probability (%)
01	1-1	Ca	N	N	N/A	HPV±CIN	95.97
02	1-2	Ca	N	N	N/A	HPV±CIN	87.18
03	2-1	N	N	N	N/A	Normal	80.28
04	2-2	N	N	N	N/A	Normal	91.34
05	3-1	Ca	SCC (CIN2-3 in sample)	Ca	60	Cancer	99.21
06	3-2	Ca	SCC (CIN2-3 in sample)	Ca	60	Cancer	91.05
07	3-3	Ca	SCC (CIN2-3 in sample)	Ca	60	Cancer	93.42
08	4-1	Ca	N (Dense fibrotic stroma)	N	N/A	Normal	90.47
09	4-2	Ca	N (Dense fibrotic stroma)	N	N/A	Normal	95.83
10	5-1	Ca	SCC	Ca	95	Cancer	98.58
11	5-2	Ca	SCC	Ca	95	Cancer	99.16
12	5-3	Ca	SCC	Ca	95	Cancer	98.22
13	6-1	Ca	SCC	Ca	80	Cancer	98.08
14	6-2	Ca	SCC	Ca	80	Normal	94.79
15	6-3	Ca	SCC	Ca	80	Cancer	90.01
16	6-4	Ca	SCC	Ca	80	Cancer	86.75
17	7-1	Ca	SCC (CIN3 in 40% of sample)	Ca	50	Normal	92.56
18	7-2	Ca	SCC (CIN3 in 40% of sample)	Ca	50	Cancer	99.19
19	8-1	Ca	SCC	Ca	90	Normal	62.91
20	9-1	Ca	SCC	Ca	95	Normal	95.60
21	9-2	Ca	SCC	Ca	95	Cancer	99.31
22	9-3	Ca	SCC	Ca	95	Normal	87.65
23	10-1	CIN3	CIN2/3	CIN	N/A	HPV±CIN	99.30
24	10-2	CIN3	CIN2/3	CIN	N/A	HPV±CIN	99.35
25	10-3	CIN3	CIN2/3	CIN	N/A	HPV±CIN	99.36
26	11-1	CIN3	HPV	CIN	N/A	HPV±CIN	99.38
27	11-2	CIN3	HPV	CIN	N/A	HPV±CIN	99.37
28	11-3	CIN3	HPV	CIN	N/A	HPV±CIN	99.37
29	12-1	CIN1	N	N	N/A	Normal	79.20
30	12-2	CIN1	N	N	N/A	Normal	91.48
31	13-1	N	N	N	N/A	Normal	89.80
32	14-1	CIN1-2	N	N	N/A	Normal	86.27
33	15-1	CIN3	CIN2	CIN	N/A	HPV±CIN	99.37
34	15-2	CIN3	CIN2	CIN	N/A	HPV±CIN	99.37
35	16-1	CIN2	CIN3	CIN	N/A	HPV±CIN	99.36
36	16-2	CIN2	CIN3	CIN	N/A	HPV±CIN	99.37
37	17-1	CIN2	CIN1	CIN	N/A	HPV±CIN	99.36
38	17-2	CIN2	CIN1	CIN	N/A	HPV±CIN	99.37
39	17-3	CIN2	CIN1	CIN	N/A	HPV±CIN	98.57
40	18-1	CIN2	CIN2	CIN	N/A	HPV±CIN	99.34
41	18-2	CIN2	CIN2	CIN	N/A	HPV±CIN	99.35
42	18-3	CIN2	CIN2	CIN	N/A	HPV±CIN	99.32
43	18-4	CIN2	CIN2	CIN	N/A	HPV±CIN	99.36
44	18-5	CIN2	CIN2	CIN	N/A	HPV±CIN	99.38
45	19-1	CIN1	N	N	N/A	Normal	91.20
46	20-1	CIN3	CIN1	CIN	N/A	HPV±CIN	99.32
47	20-2	CIN3	CIN1	CIN	N/A	HPV±CIN	99.38
48	20-3	CIN3	CIN1/2	CIN	N/A	HPV±CIN	98.78
49	21-1	CIN2	CIN2/3	CIN	N/A	HPV±CIN	99.34
50	21-2	CIN2	CIN2/3	CIN	N/A	HPV±CIN	99.31
51	22-1	CIN3	HPV	CIN	N/A	HPV±CIN	99.37
52	22-2	CIN3	HPV	CIN	N/A	HPV±CIN	99.34
53	22-3	CIN3	HPV	CIN	N/A	HPV±CIN	99.34
54	23-1	CIN2	CIN3	CIN	N/A	HPV±CIN	99.36
55	23-2	CIN2	CIN3	CIN	N/A	HPV±CIN	99.38
56	24-1	CIN2	HPV	CIN	N/A	HPV±CIN	99.35
57	24-2	CIN2	HPV	CIN	N/A	HPV±CIN	99.36
58	25-1	CIN2	HPV	CIN	N/A	HPV±CIN	99.36
59	25-2	CIN2	HPV	CIN	N/A	HPV±CIN	99.33
60	25-3	CIN2	HPV	CIN	N/A	HPV±CIN	99.29
61	25-4	CIN2	HPV	CIN	N/A	HPV±CIN	99.31
62	26-1	CIN1/2	CIN2/3	CIN	N/A	HPV±CIN	99.39

Burn	SAMPLE INFORMATION	SURGEON'S IMPRESSION	HISTOPATHOLOGISTS IMPRESSION			IKNIFE IMPRESSION	
	Patient -Burn	Class	Histological diagnosis (comments)	Class	Tumour content (%)	Class	Probability (%)
63	26-2	CIN1/2	CIN2/3	CIN	N/A	HPV±CIN	99.38
64	26-3	CIN1/2	CIN3	CIN	N/A	HPV±CIN	99.36
65	27-1	CIN1	CIN1/2	CIN	N/A	HPV±CIN	99.32
66	27-2	CIN1	CIN1/2	CIN	N/A	HPV±CIN	99.37
67	27-3	CIN1	CIN1/2	CIN	N/A	HPV±CIN	99.37
68	28-1	CIN2/3	CIN2/3	CIN	N/A	HPV±CIN	99.36
69	28-2	CIN2/3	CIN2/3	CIN	N/A	HPV±CIN	99.31
70	28-3	CIN2/3	CIN2/3	CIN	N/A	HPV±CIN	99.25
71	28-4	CIN2/3	CIN2/3	CIN	N/A	HPV±CIN	99.35
72	28-5	CIN2/3	CIN2/3	CIN	N/A	HPV±CIN	99.37
73	28-6	CIN2/3	CIN2/3	CIN	N/A	HPV±CIN	99.36
74	28-7	CIN2/3	CIN2/3	CIN	N/A	HPV±CIN	99.39
75	29-1	CIN1	N	N	N/A	Normal	92.19
76	30-1	CIN1	CIN2	CIN	N/A	HPV±CIN	99.35
77	30-2	CIN1	CIN2/3	CIN	N/A	HPV±CIN	99.31
78	30-3	CIN1	CIN2/3	CIN	N/A	HPV±CIN	99.35
79	31-1	CIN2	HPV	CIN	N/A	HPV±CIN	99.35
80	32-1	X	N	N	N/A	Normal	88.52
81	33-1	CIN3	HPV	CIN	N/A	HPV±CIN	99.33
82	33-2	CIN3	HPV	CIN	N/A	HPV±CIN	99.37
83	34-1	CIN3	CIN3	CIN	N/A	HPV±CIN	99.36
84	34-2	CIN3	CIN3	CIN	N/A	HPV±CIN	99.38
85	34-3	CIN3	CIN3	CIN	N/A	HPV±CIN	99.35
86	35-1	CIN2	HPV	CIN	N/A	HPV±CIN	99.38
87	35-2	CIN2	HPV	CIN	N/A	HPV±CIN	99.37
88	36-1	CIN3	HPV	CIN	N/A	HPV±CIN	99.39
89	36-2	CIN3	HPV	CIN	N/A	HPV±CIN	99.37
90	36-3	CIN3	HPV	CIN	N/A	HPV±CIN	99.38
91	37-1	CIN1	N	N	N/A	Normal	97.61
92	37-2	CIN1	N	N	N/A	Normal	92.03
93	38-1	CIN1	HPV	CIN	N/A	HPV±CIN	99.39
94	39-1	CIN1	HPV	CIN	N/A	HPV±CIN	99.38
95	39-2	CIN1	HPV	CIN	N/A	HPV±CIN	99.38
96	40-1	CIN2	HPV	CIN	N/A	HPV±CIN	99.38
97	40-2	CIN2	HPV	CIN	N/A	HPV±CIN	99.37
98	40-3	CIN2	HPV	CIN	N/A	HPV±CIN	99.38
99	41-1	CIN3	CIN2/3	CIN	N/A	HPV±CIN	99.35
100	41-1	CIN3	CIN2/3	CIN	N/A	HPV±CIN	99.37
101	42-1	CIN1	HPV	CIN	N/A	HPV±CIN	99.35
102	42-2	CIN1	CIN1/2	CIN	N/A	HPV±CIN	99.32
103	42-3	CIN1	CIN1/2	CIN	N/A	HPV±CIN	99.36
104	43-1	CIN3	HPV	CIN	N/A	HPV±CIN	99.30
105	43-2	CIN3	HPV	CIN	N/A	HPV±CIN	99.37
106	44-1	N	N	N	N/A	Normal	99.36
107	44-2	N	N	N	N/A	Normal	88.51
108	45-1	CIN1/2	CIN3	CIN	N/A	HPV±CIN	99.35
109	45-2	CIN1/2	CIN3	CIN	N/A	HPV±CIN	99.35
110	46-1	CIN1	N	N	N/A	Normal	98.87
111	47-1	CIN3	HPV	CIN	N/A	HPV±CIN	99.37
112	47-2	CIN3	HPV	CIN	N/A	HPV±CIN	99.28
113	48-1	N	N	N	N/A	Normal	97.93
114	49-1	CIN2	CIN2/3	CIN	N/A	HPV±CIN	99.35
115	49-2	CIN2	CIN2/3	CIN	N/A	HPV±CIN	99.35
116	49-3	CIN2	CIN2/3	CIN	N/A	HPV±CIN	99.38
117	50-1	CIN2	HPV	CIN	N/A	HPV±CIN	99.35
118	51-1	CIN2	HPV	CIN	N/A	HPV±CIN	99.38
119	51-2	CIN2	HPV	CIN	N/A	HPV±CIN	99.37
120	52-1	CIN3	CIN3	CIN	N/A	HPV±CIN	99.39
121	53-1	CIN2	CIN3	CIN	N/A	HPV±CIN	99.38
122	53-2	CIN2	CIN3	CIN	N/A	HPV±CIN	99.38
123	54-1	CIN2	CIN3	CIN	N/A	HPV±CIN	99.28
124	54-2	CIN2	CIN3	CIN	N/A	HPV±CIN	99.36
125	55-1	CIN2	HPV	CIN	N/A	HPV±CIN	99.35
126	55-2	CIN2	HPV	CIN	N/A	HPV±CIN	99.35
127	56-1	CIN2	CIN3	CIN	N/A	HPV±CIN	99.37
128	56-2	CIN2	CIN3	CIN	N/A	HPV±CIN	99.37
129	57-1	CIN2	CIN2/3	CIN	N/A	HPV±CIN	99.37
130	57-2	CIN2	CIN2/3	CIN	N/A	HPV±CIN	99.37
131	57-3	CIN2	CIN2/3	CIN	N/A	HPV±CIN	99.37
132	58-1	N	N	N	N/A	Normal	79.48
133	59-1	CIN3	CIN3	CIN	N/A	HPV±CIN	99.38

Burn	SAMPLE INFORMATION	SURGEON'S IMPRESSION	HISTOPATHOLOGISTS IMPRESSION			IKNIFE IMPRESSION	
	Patient -Burn	Class	Histological diagnosis (comments)	Class	Tumour content (%)	Class	Probability (%)
134	59-2	CIN3	CIN3	CIN	N/A	HPV±CIN	99.29
135	60-1	CIN2	CIN2	CIN	N/A	HPV±CIN	99.38
136	60-2	CIN2	HPV	CIN	N/A	HPV±CIN	99.37
137	61-1	HPV	N	N	N/A	Normal	98.74
138	62-1	CIN2	HPV	CIN	N/A	HPV±CIN	99.30
139	62-2	CIN2	HPV	CIN	N/A	HPV±CIN	99.37
140	62-3	CIN2	HPV	CIN	N/A	HPV±CIN	99.35
141	63-1	N	HPV	CIN	N/A	HPV±CIN	99.22
142	63-2	N	HPV	CIN	N/A	HPV±CIN	99.31
143	64-1	CIN1/2	CIN1	CIN	N/A	HPV±CIN	99.37
144	64-2	CIN1/2	CIN1	CIN	N/A	HPV±CIN	99.35
145	65-1	CIN1	N	N	N/A	Normal	78.39
146	65-2	CIN1	HPV	CIN	N/A	HPV±CIN	99.17
147	65-3	CIN1	HPV	CIN	N/A	HPV±CIN	99.26
148	66-1	CIN1	HPV	CIN	N/A	HPV±CIN	92.38
149	67-1	CIN1/2	CIN1/2	CIN	N/A	HPV±CIN	99.36
150	67-2	CIN1/2	CIN1/2	CIN	N/A	HPV±CIN	99.36
151	67-3	CIN1/2	CIN2/3	CIN	N/A	HPV±CIN	99.34
152	67-4	CIN1/2	CIN2/3	CIN	N/A	HPV±CIN	99.36
153	68-1	N	HPV	CIN	N/A	HPV±CIN	99.21
154	68-2	N	HPV	CIN	N/A	HPV±CIN	99.12
155	68-3	N	HPV	CIN	N/A	HPV±CIN	98.88
156	69-1	CIN1	CIN3	CIN	N/A	HPV±CIN	99.38
157	69-2	CIN1	CIN3	CIN	N/A	HPV±CIN	99.38
158	69-3	CIN1	CIN2/3	CIN	N/A	HPV±CIN	99.37
159	70-1	N	N	N	N/A	Normal	98.36
160	70-2	N	N	N	N/A	Normal	98.12
161	71-1	N	HPV	CIN	N/A	HPV±CIN	99.37
162	71-2	N	CIN1/2	CIN	N/A	HPV±CIN	99.36
163	71-3	N	CIN1/2	CIN	N/A	HPV±CIN	99.19
164	72-1	CIN2	N	N	N/A	Normal	99.24
165	73-1	Ca	SCC	Ca	90	Cancer	99.33
166	73-2	Ca	SCC	Ca	90	Cancer	98.78
167	73-3	Ca	SCC	Ca	90	Cancer	99.12
168	73-4	Ca	SCC	Ca	90	Cancer	97.01
169	73-5	Ca	SCC	Ca	90	Cancer	99.87
170	74-1	Ca	SCC	Ca	90	Cancer	98.22
171	74-2	Ca	SCC	Ca	90	Cancer	99.01
172	74-3	Ca	SCC	Ca	90	Cancer	98.14
173	75-1	Ca	SCC	Ca	50	Cancer	88.74
174	75-2	Ca	SCC	Ca	50	Cancer	89.03
175	75-3	Ca	SCC	Ca	50	Cancer	91.11
176	76-1	Ca	SCC	Ca	60	Cancer	92.44
177	76-2	Ca	SCC	Ca	60	Cancer	90.12
178	76-3	Ca	SCC	Ca	60	Cancer	87.79
179	76-4	Ca	SCC	Ca	60	Cancer	90.59
180	77-1	Ca	SCC	Ca	80	Cancer	80.67
181	77-2	Ca	SCC	Ca	80	Cancer	98.58
182	77-3	Ca	SCC	Ca	80	Cancer	95.31
183	77-4	Ca	SCC	Ca	80	Cancer	99.23
184	77-5	Ca	SCC	Ca	80	Cancer	97.81
185	77-6	Ca	SCC	Ca	80	Cancer	99.09
186	78-1	Ca	SCC	Ca	50	Cancer	79.98
187	79-1	Ca	SCC	Ca	80	Cancer	96.37
188	80-1	Ca	AdenoCa	Ca	50	Cancer	88.98
189	81-1	Ca	SCC	Ca	90	Cancer	94.46
190	81-2	Ca	SCC	Ca	90	Cancer	92.39
191	81-3	Ca	SCC	Ca	90	Cancer	93.09
192	81-4	Ca	SCC	Ca	90	Cancer	97.82
193	81-5	Ca	SCC	Ca	90	Cancer	99.27
194	82-1	Ca	SCC (CIN2-3 in sample)	Ca	50	Cancer	91.24
195	82-2	Ca	SCC (CIN2-3 in sample)	Ca	50	Cancer	94.06
196	82-3	Ca	SCC (CIN2-3 in sample)	Ca	50	Cancer	90.72
197	82-4	Ca	SCC (CIN2-3 in sample)	Ca	50	Cancer	93.92
198	83-1	Ca	SCC	Ca	95	Cancer	95.17
199	83-2	Ca	SCC	Ca	95	Cancer	98.20
200	83-3	Ca	SCC	Ca	95	Cancer	97.89
201	84-1	Ca	SCC	Ca	50	Cancer	88.47
202	84-2	Ca	SCC	Ca	50	Cancer	92.38
203	84-3	Ca	SCC	Ca	50	Cancer	94.12
204	85-1	Ca	SCC (HPV in sample)	Ca	50	Cancer	95.35

Burn	SAMPLE INFORMATION		HISTOPATHOLOGISTS IMPRESSION			IKNIFE IMPRESSION	
	Patient -Burn	SURGEON'S IMPRESSION Class	Histological diagnosis (comments)	Class	Tumour content (%)	Class	Probability (%)
205	85-2	Ca	SCC (HPV in sample)	Ca	50	Cancer	97.27
206	85-3	Ca	SCC (HPV in sample)	Ca	50	Cancer	91.23
207	86-1	Ca	SCC	Ca	70	Cancer	96.41
208	86-2	Ca	SCC	Ca	70	Cancer	93.49
209	87-1	Ca	SCC (CIN2-3 in sample)	Ca	50	Cancer	92.52

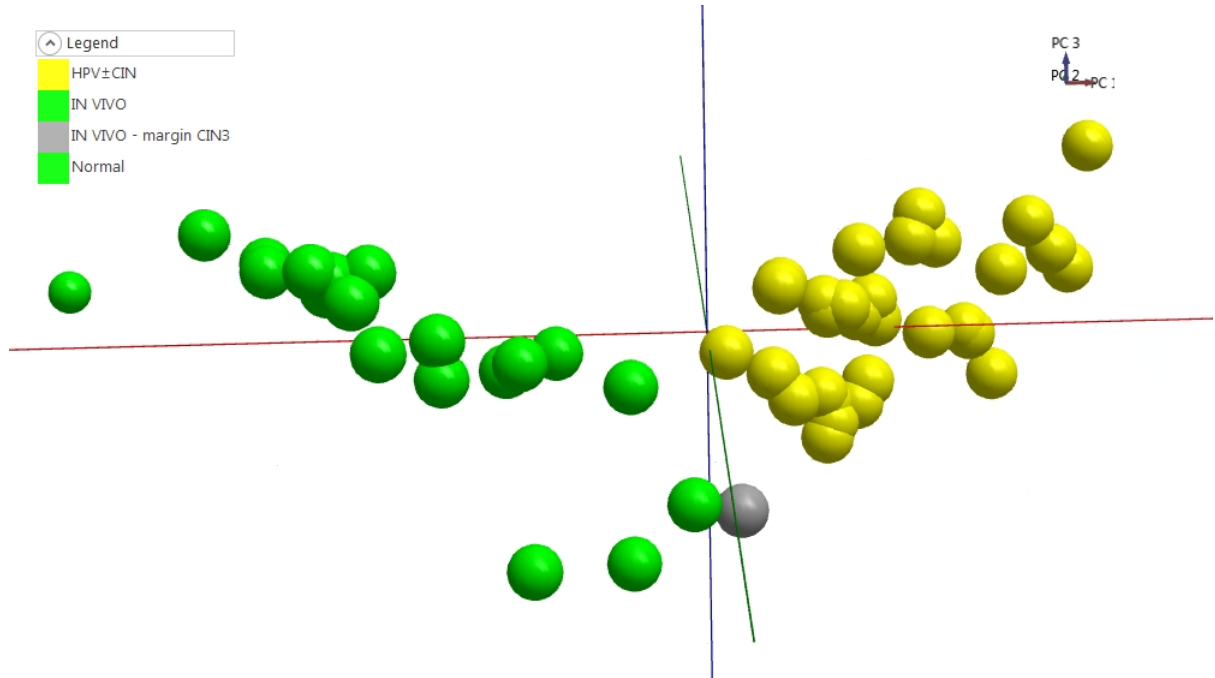
CIN: Cervical Intraepithelial Neoplasia, HPV: Human Papilloma Virus, SCC: Squamous Cell Carcinoma, AdenoCa: Adeno Carcinoma.

\*Burn ID explanation: Sample (patient)\_No of burn on sample.

**Table S2.** Fresh frozen tissue samples classified using frozen cut model as reference dataset (cut mode). Correct report analysis is based on number of burns. Diagnostic accuracy (%) is based on number of samples.

<b>Tissue Class</b>	<b>No of Patients</b>	<b>No of Burns</b>	<b>&gt;75% probability</b>	<b>Correct report</b>	<b>Cross Validation (%)</b>
<b>Normal</b>	16	25	25	23	92.0%
<b>HPV±CIN</b>	50	123	123	123	100%
<b>Cancer</b>	21	61	61	56	91.8%
<b>TOTALS</b>	87	209	209	202	96.7%

CIN: cervical intraepithelial neoplasia; HPV: human papillomavirus.



**Figure S1.** *In vivo* iKnife data of surgical margins from four patients modelled against *ex vivo* data from normal vs CIN tissue biopsies. The *in vivo* samples have been reclassified as normal samples, showing clear separation from the CIN samples alongside with the histopathology misclassified sample.