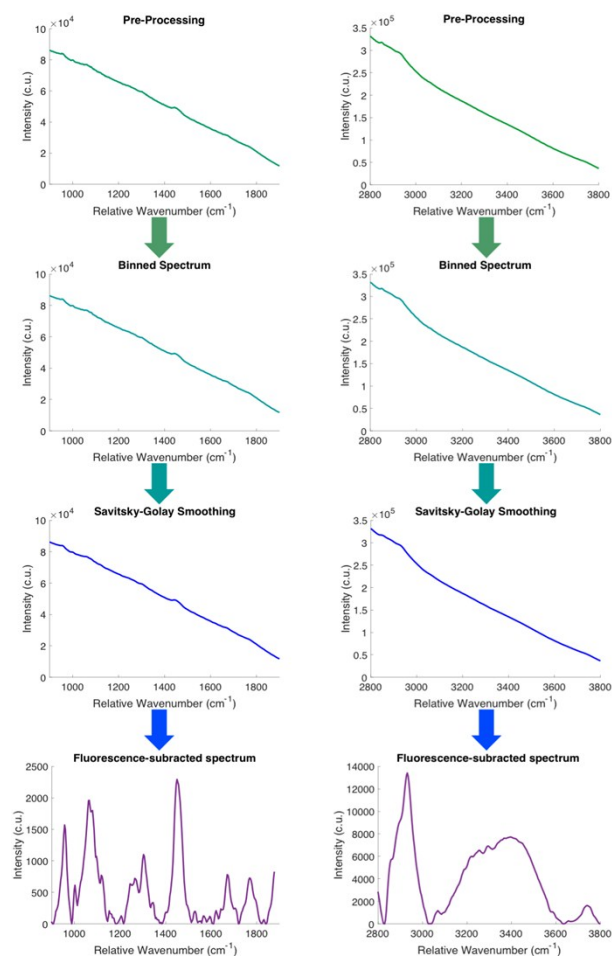
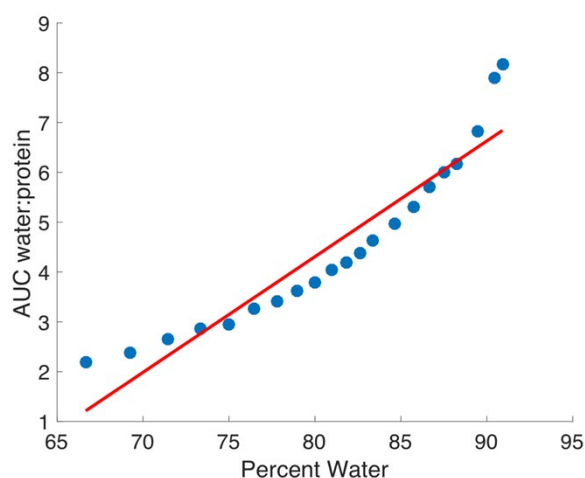


Supplementary Figures:



Supplementary Figure 1- Data processing steps demonstrated for an *in vivo* cervix spectrum in both the fingerprint and high wavenumber regions.



Supplementary Figure 2-Ratio of the area under the curve associated with water (3350-3550 cm^{-1}) to the area under the protein peak (2910-2965 cm^{-1}) for gelatin phantom spectra, plotted as a function of known percent water. Linear fit with $R^2=0.8397$. This ratio, along with a linear trend, was previously reported by Capsers, et. al. (2001) for Raman measurements acquired in skin.

Supplementary Tables:

Amount Gelatin (g)	Amount Water (ml)	Percent Water	Percent Gelatin	Ratio Partially to Fully Bound Water
2	4	66.67	33.33	1.15
2	4.5	69.23	30.77	1.22
2	5	71.43	28.57	1.34
2	5.5	73.33	26.67	1.35
2	6	75	25	1.33
2	6.5	76.47	23.53	1.35
2	7	77.78	22.22	1.36

2	7.5	78.95	21.05	1.37
2	8	80	20	1.37
2	8.5	80.95	19.05	1.39
2	9	81.82	18.18	1.39
2	9.5	82.61	17.39	1.40
2	10	83.33	16.67	1.43
2	11	84.62	15.38	1.48
2	12	85.71	14.29	1.47
2	13	86.67	13.33	1.48
2	14	87.5	13	1.50
2	15	88.24	11.76	1.50
2	17	89.47	10.53	1.60
2	19	90.48	9.52	1.53
2	20	90.91	9.09	1.53

Table 1- Composition of gelatin phantoms

	Peak Center (cm ⁻¹)	Peak Amplitude (a.u.)	Gaussian Width (cm ⁻¹)	Lorentzian Width (cm ⁻¹)
50% gel	3075	876	11	0.001
	3245	14306	90	0.001
	3329	976	28	0.001
	3420	17067	91	0.001
	3550	96	4	0.001
	3650	0	0	100
90% gel	3075	0.001	0.001	100
	3245	37743	81	0.001
	3329	2468	25	0.001
	3420	49344	81	0.001
	3550	9352	71	0.001
	3650	787	13	0.001

Table 2- Voigtian fitting to gelatin phantom

	Peak Center (cm ⁻¹)	Peak Amplitude (a.u.)	Gaussian Width (cm ⁻¹)	Lorentzian Width (cm ⁻¹)
Nongravid	3072	146.46	7.47	0.001
	3242	4896.90	80	44.91
	3332	172.63	18.14	0.001
	3423	3254.24	80	5.08
	3547	131.17	39.89	0.001
	3654	824.37	9.37	80
Day 19	3072	1529.18	2.62	10.03
	3242	4342.24	74.32	31.08
	3330	327.72	21.28	0.002
	3423	3928.96	80	5.72
	3547	1192.59	0.51	29.23
	3654	5647.23	3.97	80.00

Table 3-Voigtian fitting to nongravid and day 19 cervices

	Wet Weight (mg)	Dry Weight (mg)	Percent Water
Nongravid	16.9	4.7	72.19
	16.1	4.7	70.81
	28.2	5.8	79.43

	22.1	4.8	78.28
	34.7	6.6	80.98
<i>Average</i>	<i>23.6</i>	<i>5.3</i>	<i>76.34</i>
Day 19	45.1	7.8	82.71
	43.9	8.1	81.55
	52.9	8.5	83.93
	65.2	10.8	83.44
	53.4	9.8	81.65
Average	<i>52.1</i>	<i>9.0</i>	<i>82.65</i>

Table 4-Percent water in nongravid and day 19 mouse cervixes