

Supplementary Information

Cytotoxicity profiling of deep eutectic solvents to human skin cells

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Table S1. ANOVA summary table for viability assays conducted for each HBA, HBD and DES. Test (*F*) statistics and degrees of freedom are shown. MS stands for the mean squares (= variance) of the error term in the ANOVA.

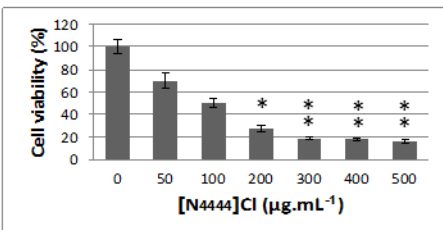
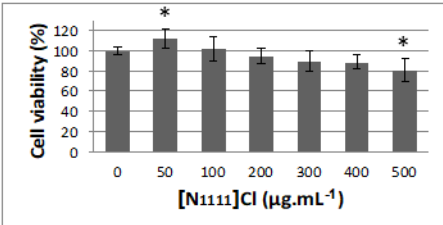
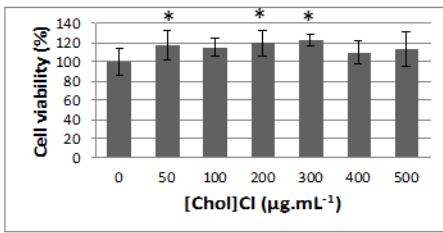
Chemical compound	Cell line	Source of variation	Degrees of freedom	Adjusted MS	Test statistic (F)	<i>P</i>
1-propanol	HaCaT	Treatment	6	242.814	2.399	< 0.05
		Error	56	101.234		
	MNT-1	Treatment	6	606.469	7.800	< 0.001
		Error	56	77.752		
[Chol]Cl	HaCaT	Treatment	6	473.349	2.754	< 0.05
		Error	56	171.892		
[N ₁₁₁₁]Cl	HaCaT	Treatment	6	957.494	11.330	< 0.001
		Error	56	84.506		
	MNT-1	Treatment	6	167.694	4.484	< 0.001
		Error	56	37.399		
[N ₄₄₄₄]Cl	MNT-1	Treatment	6	4165.981	87.661	< 0.001
		Error	56	47.524		
Hexanoic acid	HaCaT	Treatment	6	836.197	6.570	< 0.001
		Error	56	127.267		
	MNT-1	Treatment	6	1172.941	54.774	< 0.001
		Error	56	21.414		
Butanoic acid	MNT-1	Treatment	6	11659.994	508.086	< 0.001
		Error	56	22.949		
Urea	HaCaT	Treatment	6	303.124	4.158	< 0.05
		Error	56	72.897		
	MNT-1	Treatment	6	383.174	4.904	< 0.001
		Error	56	78.138		
[Chol]Cl: Hexanoic acid	MNT-1	Treatment	6	118.368	1.330	0.259
		Error	56	88.991		
[Chol]Cl: Butanoic acid	HaCaT	Treatment	6	3734.246	56.332	< 0.001
		Error	56	66.290		
	MNT-1	Treatment	6	537.069	9.339	< 0.001
		Error	56	57.510		
[Chol]Cl: Urea	HaCaT	Treatment	6	739.986	7.583	< 0.001
		Error	56	97.579		
[Chol]Cl: 1-propanol	HaCaT	Treatment	6	1060.256	4.818	< 0.001
		Error	56	220.060		
	MNT-1	Treatment	6	295.371	8.254	< 0.001
		Error	56	35.787		
[Chol]Cl: Ethylene glycol	HaCaT	Treatment	6	757.471	10.479	< 0.001
		Error	56	72.282		
[N ₁₁₁₁]Cl: Hexanoic acid	HaCaT	Treatment	6	2174.395		< 0.001
		Error	56	206.575		
	MNT-1	Treatment	6	448.110	17.329	< 0.001
		Error	56	25.860		

[N ₁₁₁₁]Cl: Butanoic acid	HaCaT	Treatment	6	3109.968	99.597	< 0.001
		Error	56	31.226		
	MNT-1	Treatment	6	513.288	5.971	< 0.001
		Error	56	85.966		
[N ₁₁₁₁]Cl: Urea	HaCaT	Treatment	6	847.578	6.185	< 0.001
		Error	56	137.030		
	MNT-1	Treatment	6	518.435	2.445	< 0.05
		Error	56	212.003		
[N ₁₁₁₁]Cl: Ethylene glycol	HaCaT	Treatment	6	412.118	5.986	< 0.001
		Error	56	68.846		
[N ₄₄₄₄]Cl: Hexanoic acid	MNT-1	Treatment	6	3817.235	84.844	< 0.001
		Error	56	44.991		
[N ₄₄₄₄]Cl: Butanoic acid	MNT-1	Treatment	6	3364.697	199.669	< 0.001
		Error	56	16.851		
N ₄₄₄₄]Cl: 1-propanol	MNT-1	Treatment	6	7321.778	463.362	< 0.001
		Error	56	15.801		
N ₄₄₄₄]Cl: Urea	HaCaT	Treatment	5	10521.082	585.114	< 0.001
		Error	48	17.981		

Table S2. One-way ANOVA on ranks summary table for viability assays conducted for each HBA, HBD and DES. Test (*H*) statistics and degrees of freedom are shown.

Chemical compound	Cell line	Degrees of freedom	Test statistics (H)	<i>P</i>
Ethylene glycol	HaCaT	6	36.060	< 0.001
	MNT-1	6	32.135	< 0.001
[Chol]Cl	MNT-1	6	17.750	< 0.05
[N ₄₄₄₄]Cl	HaCaT	6	57.909	< 0.001
Butanoic acid	HaCaT	6	56.876	< 0.001
[Chol]Cl: Hexanoic acid	HaCaT	6	21.917	< 0.05
[Chol]Cl: Urea	MNT-1	6	12.567	0.05
[Chol]Cl: Ethylene glycol	MNT-1	6	31.128	< 0.001
[N ₁₁₁₁]Cl: 1-propanol	HaCaT	6	22.018	< 0.05
	MNT-1	6	25.649	< 0.001
	MNT-1	6	36.875	< 0.001
[N ₁₁₁₁]Cl: Ethylene glycol				
[N ₄₄₄₄]Cl: Hexanoic acid	HaCaT	6	57.981	< 0.001
[N ₄₄₄₄]Cl: Butanoic acid	HaCaT	6	60.187	< 0.001
[N ₄₄₄₄]Cl: 1-propanol	HaCaT	6	52.086	< 0.001
[N ₄₄₄₄]Cl: Ethylene glycol	HaCaT	6	48.516	< 0.001
[N ₄₄₄₄]Cl: Urea	MNT-1	6	50.356	< 0.001

HBA



HBD

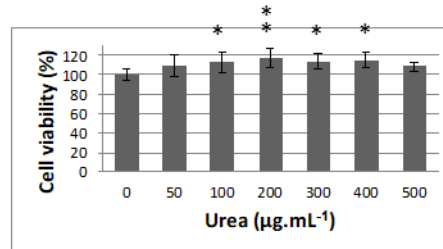
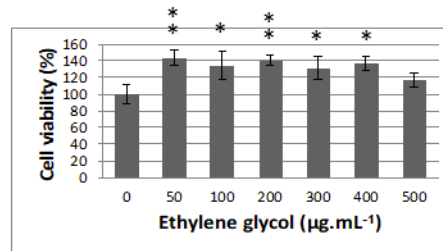
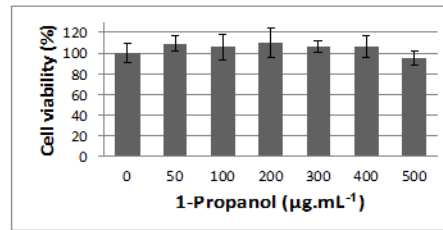
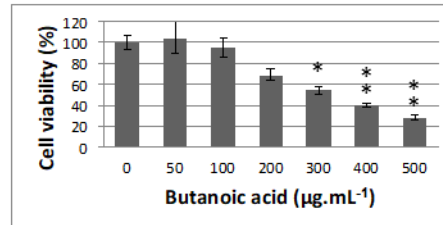
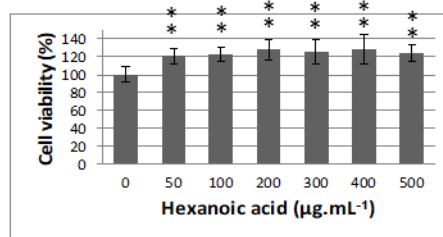


Figure S1: Cell viability of HaCaT cell line after 72h of exposure to starting materials. Results are expressed as mean \pm SD of three independent experiments. Statistical analysis: * $p < 0.05$ vs control; ** $p < 0.001$ vs control

HBA:HBD 1:1

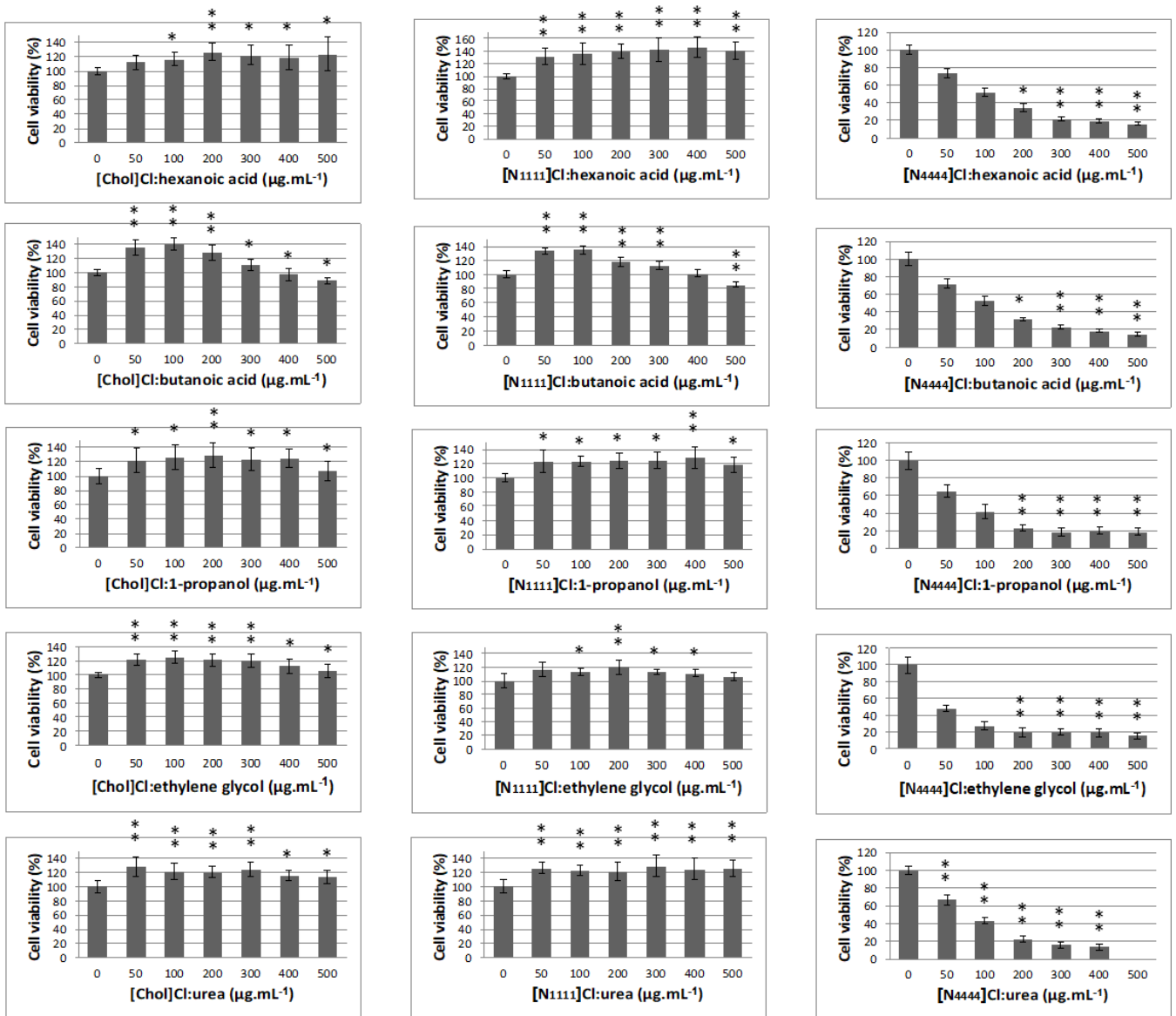
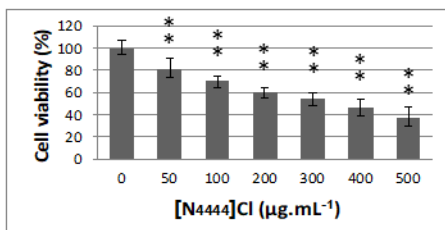
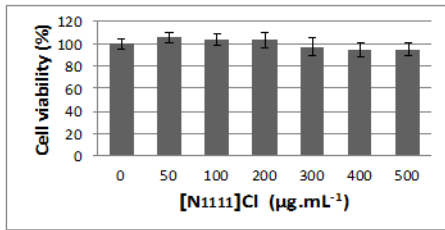
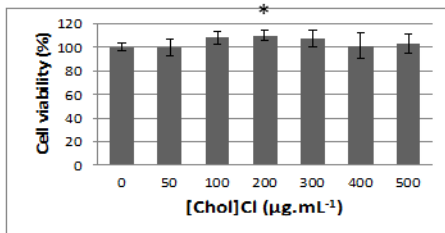


Figure S2: Cell viability of HaCaT cell line after 72h of exposure to DES. Results are expressed as mean \pm SD of three independent experiments. Statistical analysis: *p < 0.05 vs control; **p < 0.001 vs control

HBA



HBD

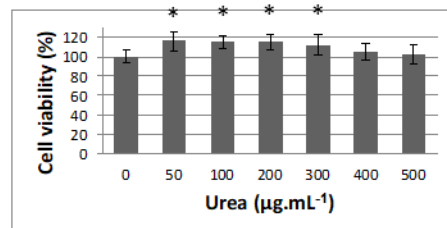
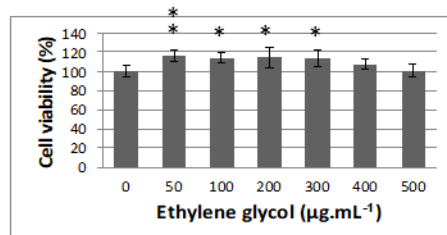
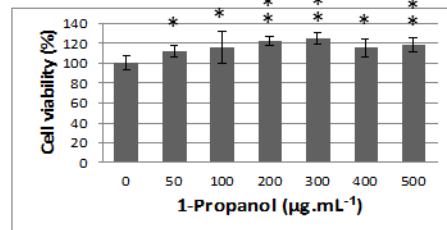
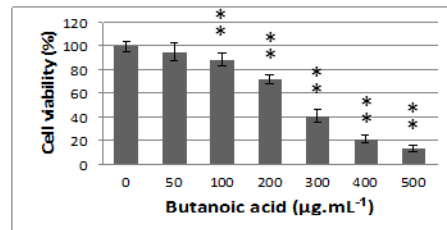
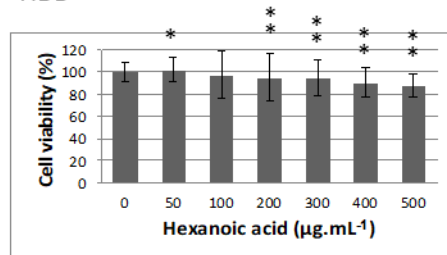


Figure S3: Cell viability of MNT-1 cell line after 72h of exposure to starting materials. Results are expressed as mean \pm SD of three independent experiments. Statistical analysis: * $p < 0.05$ vs control; ** $p < 0.001$ vs control

HBA:HBD 1:1

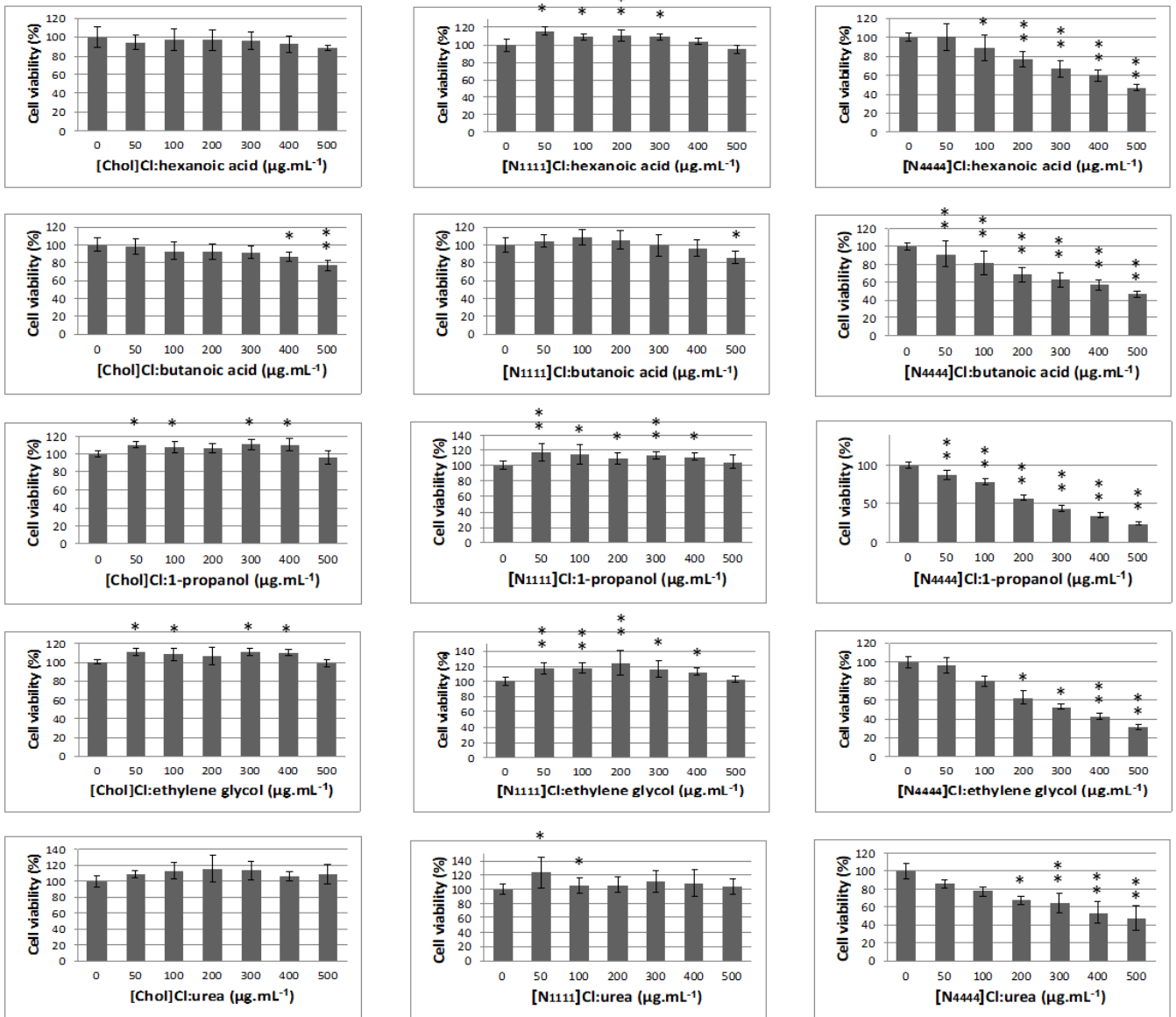


Figure S4: Cell viability of MNT-1 cell line after 72h of exposure to DES. Results are expressed as mean \pm SD of three independent experiments. Statistical analysis: *p < 0.05 vs control; **p < 0.001 vs control