



APPENDIX AVAILABLE ON REQUEST

Research Report 147

Atmospheric Transformation of Diesel Emissions

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Appendix E. Toxicological Dose Response Curves and Statistical Comparisons

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APPENDIX E

TOXICOLOGICAL DOSE RESPONSE CURVES AND STATISTICAL COMPARISONS

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Table 1. Statistically different pairs in rats

	LDH								
	D05wN_5	D05wN_6 *	Ld05s_1+2*	Dd05s_1+2	Dd05sN_1+2	L05s_2	Ld05sT_1+2	Ld05sF_1-4	L05_1+2(CB)
D05w_4	***	***	***	***	***	***	***	***	**
L05_1+2(CB)	***	***	***	***	***	***	***	ns	
Ld05sF_1-4	***	***	***	***	***	***	***		
Ld05sT_1+2	***	**	*	**	**	*			
L05s_2	*	ns	ns	ns	ns				
Dd05sN_1+2	ns	ns	ns	ns					
Dd05s_1+2	ns	ns	ns						
Ld05s_1+2*	ns	ns							
D05wN_6 *	ns								
	Protein								
	D05wN_5	Dd05s_1+2	Ld05s_1+2*	L05s_2	D05wN_6 *	Dd05sN_1+2	Ld05sT_1+2	Ld05sF_1-4	L05_1+2(CB)
D05w_4	***	***	***	***	***	***	***	***	ns
L05_1+2(CB)	***	***	***	***	***	***	***	**	
Ld05sF_1-4	***	***	***	***	***	***	ns		
Ld05sT_1+2	***	***	**	***	**	***			
Dd05sN_1+2	ns	ns	ns	ns	ns				
D05wN_6 *	ns	ns	ns	ns					
L05s_2	ns	ns	ns						
Ld05s_1+2*	ns	ns							
Dd05s_1+2	ns								

	AP ase								
	D05wN_5	Ld05s_1+2*	Dd05sN_1+2	L05_1+2(CB)	D05wN_6 *	Ld05sF_1-4	Ld05sT_1+2	D05w_4	Dd05s_1+2
L05s_2	***	***	***	**	**	**	**	*	ns
Dd05s_1+2	***	**	*	*	*	ns	ns	ns	
D05w_4	*	ns	ns	ns	ns	ns	ns		
Ld05sT_1+2	*	ns	ns	ns	ns	ns			
Ld05sF_1-4	*	ns	ns	ns	ns				
D05wN_6 *	ns	ns	ns	ns					
L05_1+2(CB)	ns	ns	ns						
Dd05sN_1+2	ns	ns							
Ld05s_1+2*	ns								
	total cells								
	D05wN_5	D05wN_6 *	Dd05s_1+2	Ld05s_1+2*	Dd05sN_1+2	L05s_2	Ld05sT_1+2	Ld05sF_1-4	L05_1+2(CB)
D05w_4	***	***	***	***	***	***	***	***	***
L05_1+2(CB)	***	***	***	***	***	***	***	ns	
Ld05sF_1-4	***	***	***	***	***	**	*		
Ld05sT_1+2	**	*	*	ns	ns	ns			
L05s_2	ns	ns	ns	ns	ns				
Dd05sN_1+2	ns	ns	ns	ns					
Ld05s_1+2*	ns	ns	ns						
Dd05s_1+2	ns	ns							
D05wN_6 *	ns								

	macs								
	D05wN_5	D05wN_6 *	Dd05s_1+2	Ld05s_1+2*	Dd05sN_1+2	L05s_2	L05_1+2(CB)	Ld05sT_1+2	Ld05sF_1-4
D05w_4	***	***	***	***	**	**	*	*	ns
Ld05sF_1-4	***	**	**	*	ns	ns	ns	ns	
Ld05sT_1+2	*	ns	ns	ns	ns	ns	ns		
L05_1+2(CB)	ns	ns	ns	ns	ns	ns			
L05s_2	ns	ns	ns	ns	ns				
Dd05sN_1+2	ns	ns	ns	ns					
Ld05s_1+2*	ns	ns	ns						
Dd05s_1+2	ns	ns							
D05wN_6 *	ns								
	pmn								
	D05wN_5	D05wN_6	Dd05s_1+2	Ld05s_1+2*	Ld05sT_1+2	Dd05sN_1+2	L05s_2	Ld05sF_1-4	L05_1+2(CB)
D05w_4	***	***	***	***	***	***	***	***	***
L05_1+2(CB)	***	***	***	***	***	***	***	***	
Ld05sF_1-4	***	***	***	**	**	***	**		
L05s_2	ns	ns	ns	ns	ns	ns			
Dd05sN_1+2	ns	ns	ns	ns	ns				
Ld05sT_1+2	ns	ns	ns	ns					
Ld05s_1+2*	ns	ns	ns						
Dd05s_1+2	ns	ns							
D05wN_6 *	ns								

	lymph								
	D05wN_5	Dd05s_1+2	Dd05sN_1+2	Ld05sT_1+2	D05wN_6 *	Ld05s_1+2*	L05s_2	Ld05sF_1-4	D05w_4
L05_1+2(CB)	***	***	***	***	***	***	***	***	ns
D05w_4	***	***	***	***	***	***	***	**	
Ld05sF_1-4	*	*	*	ns	ns	ns	ns		
L05s_2	*	*	*	ns	ns	ns			
Ld05s_1+2*	ns	ns	ns	ns	ns				
D05wN_6 *	ns	ns	ns	ns					
Ld05sT_1+2	ns	ns	ns						
Dd05sN_1+2	ns	ns							
Dd05s_1+2	ns								

Table 2. Statistically different pairs in mice

	Total Lavage cells								
	Ld06F_1	Ld06sFV_1	Ld06s_1	Ld06sT_1+2	Dd06sNV	Dd06s_1+2	L06s_1+3 (CB)	D06sN	Ld06sV_1
D06s_1+3	***	***	***	***	**	ns	ns	ns	ns
Ld06sV_1	***	***	***	**	ns	ns	ns	ns	
D06sN	***	***	**	*	ns	ns	ns		
L06s_1+3 (CB)	**	*	ns	ns	ns	ns			
Dd06s_1+2	***	***	ns	ns	ns				
Dd06sNV	**	*	ns	ns					
Ld06sT_1+2	ns	ns	ns						
Ld06s_1	ns	ns							
Ld06sFV_1	ns								
	Lavage Macrophages								
	Ld06sV_1	Ld06sFV_1	Ld06s_1	Ld06sT_1+2	L06s_1+3 (CB)	Dd06sNV	Dd06s_1+2	D06s_1+3	D06sN
Ld06sV_1	***	***	*	ns	ns	ns	ns	ns	ns
D06sN	***	***	*	ns	ns	ns	ns	ns	
D06s_1+3	***	***	*	ns	ns	ns	ns		
Dd06s_1+2	***	**	ns	ns	ns	ns			
Dd06sNV	***	**	ns	ns	ns				
L06s_1+3 (CB)	**	ns	ns	ns					
Ld06sT_1+2	*	ns	ns						
Ld06s_1	*	ns							
Ld06sFV_1	ns								

Lavage PMNS									
	D06s_1+3	Ld06sT_1+2	Ld06s_1	D06sN	Dd06s_1+2	Ld06sF_1	Ld06sFV_1	Ld06sV_1	L06s_1+3 (CB)
D06s_1+3	***	***	***	***	***	***	**	**	ns
L06s_1+3 (CB)	*	*	*	ns	ns	ns	ns	ns	
Ld06sV_1	ns	ns	ns	ns	ns	ns	ns		
Ld06sFV_1	ns	ns	ns	ns	ns	ns			
Ld06sF_1	ns	ns	ns	ns	ns				
Dd06s_1+2	ns	ns	ns	ns					
D06sN	ns	ns	ns						
Ld06s_1	ns	ns							
Ld06sT_1+2	ns								
Lavage APase									
	D06sN	Ld06sFV_1	Ld06sF_1	Ld06s_1	Dd06sNV	Ld06sV_1	L06s_1+2 (CB)	D06s_1+3	Dd06s_1+2
Ld06sT1+2	***	***	**	**	**	*	ns	ns	ns
Dd06s_1+2	***	**	**	**	**	*	ns	ns	
D06s_1+3	***	*	ns	ns	ns	ns	ns		
L06s_1+2 (CB)	ns	ns	ns	ns	ns	ns			
Ld06sV_1	ns	ns	ns	ns	ns				
Dd06sNV	ns	ns	ns	ns					
Ld06s_1	ns	ns	ns						
d06sF_1	ns	ns							
Ld06sFV_1	ns								

	Lavage LDH								
	D06sN	Ld06sFV_1	Ld06sV_1	D06s_1+3	Dd06sNV	Ld06s_1	Ld06sF_1	L06s_1+2 (CB)	Dd06s_1+2
Ld06sT1+2	***	*	ns	ns	ns	ns	ns	ns	ns
Dd06s_1+2	**	ns	ns	ns	ns	ns	ns	ns	
L06s_1+2 (CB)	ns	ns	ns	ns	ns	ns	ns		
Ld06sF_1	ns	ns	ns	ns	ns	ns			
Ld06s_1	ns	ns	ns	ns	ns				
Dd06sNV	ns	ns	ns	ns					
D06s_1+3	ns	ns	ns						
Ld06sV_1	ns	ns							
Ld06sFV_1	ns								
	Lavage protein								
	D06sN	Ld06sFV_1	Ld06sF_1	D06s_1+3	Ld06sV_1	Dd06sNV	L06s_1+2 (CB)	Ld06s_1	Ld06sT1+2
Dd06s_1+2	***	**	**	**	**	*	*	ns	ns
Ld06sT1+2	***	**	**	**	**	*	*	ns	
Ld06s_1	ns	ns	ns	ns	ns	ns	ns		
L06s_1+2 (CB)	ns	ns	ns	ns	ns	ns			
Dd06sNV	ns	ns	ns	ns	ns				
Ld06sV_1	ns	ns	ns	ns					
D06s_1+3	ns	ns	ns						
Ld06sF_1	ns	ns							
Ld06sFV_1	ns								

	Inflammatory Histopathology								
	Ld06s_1	L06s_1+2 (CB)	Ld06sV_1	Dd06s_1+2	Dd06s_1+3	Ld06sF_1	D06sN	Ld06sFV_1	Ld06sT_1
Dd06sNV	*	ns	ns	ns	ns	ns	ns	ns	ns
Ld06sT_1	ns	ns	ns	ns	ns	ns	ns	ns	
Ld06sFV_1	ns	ns	ns	ns	ns	ns	ns		
D06sN	ns	ns	ns	ns	ns	ns			
Ld06sF_1	ns	ns	ns	ns	ns				
D06s_1+3	ns	ns	ns	ns					
Dd06s_1+2	ns	ns	ns						
Ld06sV_1	ns	ns							
L06s_1+2 (CB)	ns								
	Cytotoxicity Histopathology								
	Ld06sV-1	D06s_1+3	L06s_1+2 (CB)	Ld06sT_1	Dd06s_1+2	D06sN	Ld06sFV_1	Ld06s_1	Ld06sF_1
Dd06sNV	*	*	*	*	*	**	**	ns	ns
Ld06sF_1	ns	ns	ns	ns	ns	ns	ns	ns	
Ld06s_1	ns	ns	ns	ns	ns	ns	ns		
Ld06sFV_1	ns	ns	ns	ns	ns	ns			
D06sN	ns	ns	ns	ns	ns				
Dd06s_1+2	ns	ns	ns	ns					
Ld06sT_1	ns	ns	ns						
L06s_1+2 (CB)	ns	ns							
D06s_1+3	ns								

	Parenchymal histopathology								
	Ld06sV-1	D06s_1+3	L06s_1+2 (CB)	Ld06sT_1+2	Dd06s_1+2	D06sN	Ld06sFV_1	Ld06s_1	Ld06sF_1
Dd06sNV	*	*	ns	ns	ns	ns	ns	ns	ns
Ld06sF_1	ns	ns	ns	ns	ns	ns	ns	ns	
Ld06s_1	ns	ns	ns	ns	ns	ns	ns		
Ld06sFV_1	ns	ns	ns	ns	ns	ns			
D06sN	ns	ns	ns	ns	ns				
Dd06s_1+2	ns	ns	ns	ns					
Ld06sT_1+2	ns	ns	ns						
06s_1+2 (CB)	ns	ns							
D06s_1+3	ns								
	HO-1								
	D06sN	Ld06sT_1+2	Ld06s_1	Dd06sNV	Dd06s_1+2	Ld06sF_1	D06s_1+3	Ld06sFV_1	Ld06sV_1
L06s_1+2 (CB)	***	***	***	***	*	ns	ns	ns	ns
D06s_1+3	***	***	***	**	ns	ns	ns	ns	
Ld06sV_1	***	***	***	**	ns	ns	ns		
Ld06s_1	**	**	**	*	ns	ns			
Ld06sT_1+2	**	**	*	*	ns				
D06sN	ns	ns	ns	ns					
Dd06s_1+2	ns	ns	ns						
Dd06sNV	ns	ns							
Ld06sF_1	ns								

	plasma TBARS								
	Ld06sFV_1	Ld06sF_1	D06s_1+3	Ld06sV_1	Dd06sNV	Ld06sT_1+2 v	Ld06s_1+2 (CB)	Dd06s_1+2	D06sN
Ld06s_1	***	***	***	***	**	ns	ns	ns	ns
D06sN	***	***	***	***	**	ns	ns	ns	
Dd06s_1+2	***	***	***	***	*	ns	ns		
Ld06s_1+2 (CB)	***	**	ns	ns	ns	ns			
Ld06sT_1	***	***	ns	ns	ns				
Dd06sNV	***	**	ns	ns					
Ld06sV_1	*	ns	ns						
D06s_1+3	*	ns							
Ld06sF_1	ns								
	Lung TBARS								
	Ld06T_1	Ld06s_1	Dd06sNV	Dd06s_1+2	Ld06sV_1	D06sN	D06s_1+3	L06s_1	Ld06sFV_1
Ld06sF_1	***	***	***	***	***	***	***	**	**
Ld06sFV_1	***	**	**	ns	ns	ns	ns	ns	
L06s_1 (CB)	*	ns	ns	ns	ns	ns	ns		
D06s_1+3	ns	ns	ns	ns	ns	ns			
D06sN	ns	ns	ns	ns	ns				
Ld06sV_1	ns	ns	ns	ns					
Dd06s_1+2	ns	ns	ns						
d06sNV	ns	ns							
Ld06s_1	ns								

	Total Glutathione								
	Ld06sFV_1	Ld06sF_1	Dd06sNV	Dd06s_1+2	D06sN	Ld06sT_1	Ld06s_1	Ld06sV_1	D06s_1+3
L06s_1+2 (CB)	***	**	*	ns	ns	ns	ns	ns	ns
D06s_1+3	***	***	**	ns	ns	ns	ns	ns	
Ld06sV_1	***	***	*	ns	ns	ns	ns		
Ld06s_1	***	**	*	ns	ns	ns			
Ld06sT_1+2	***	*	ns	ns	ns				
D06sN	***	*	ns	ns					
Dd06s_1+2	***	*	ns						
Dd06sNV	*	ns							
Ld06sF_1	ns								
	Oxidized Glutathione								
	Dd06sNV	Dd06s_1+2	D06sN	Ld06sT_1+2	Ld06s_1	Ld06sFV_1	Ld06sV_1	Ld06sF_1	L06s_1+2 (CB)
D06s_1+3	***	***	**	*	*	*	*	ns	ns
L06s_1+2 (CB)	*	*	ns	ns	ns	ns	ns	ns	
Ld06sF_1	***	***	ns	ns	ns	ns	ns		
Ld06sV_1	*	ns	ns	ns	ns	ns			
Ld06sFV_1	*	ns	ns	ns	ns				
Ld06s_1	*	ns	ns	ns					
Ld06sT_1+2	*	ns	ns						
D06sN	ns	ns							
Dd06s_1+2	ns								

	Macrophage Phagocytosis								
	Ld06sT_1	Ld06s_1	Ld06sF_1	L06s_1+3 (CB)	Dd06s_1+2	Ld06sFV_1	Ld06sV_1	D06s_1+3	D06sN
Dd06sNV	***	***	**	ns	ns	ns	ns	ns	ns
D06sN	***	***	**	ns	ns	ns	ns	ns	
D06s_1+3	**	*	ns	ns	ns	ns	ns		
Ld06sV_1	ns	ns	ns	ns	ns	ns			
LdsFV_1	ns	ns	ns	ns	ns				
Dd06s_1+2	ns	ns	ns	ns					
L06s_1+3 (CB)	ns	ns	ns						
Ld06sF_1	ns	ns							
Ld06s_1	ns								

List of Figures

Figure 1. Results for LDH, Protein, and alkaline phosphatase in the cell-free lavage fluid from rats intratracheally instilled with samples collected in 2005 are shown: samples collected in the dark are shown on the left and those collected in light on the right. Samples tested at only one concentration are indicated in the legends with an asterisk. Numbers of animals that died (presumably as a result of the treatment) are indicated with a skull and crossbones in the color of the symbols associated with that sample, and no lavage fluid was collected from the animals that died.E-15

Figure 2. Results for cells in the lavage fluid from rats intratracheally instilled with samples collected in 2005 are shown: samples collected in the dark are shown on the left and those collected in light on the right. Samples tested at only one concentration are indicated in the legends with an asterisk. Numbers of animals that died (presumably as a result of the treatment) are indicated with a skull and crossbones in the color of the symbols associated with that sample, and no lavage fluid was collected from the animals that died.E-16

Figure 3. Results for histopathological analyses of rats intratracheally instilled with samples collected in 2005 are shown: samples collected in the dark are shown on the left and those collected in light on the right. Samples tested at only one concentration are indicated in the legends with an asterisk. Numbers of animals that died (presumably as a result of the treatment) are indicated with a skull and crossbones in the color of the symbols associated with that sample, and no lavage fluid was collected from the animals that died.E-17

Figure 4. Results for LDH, Protein, and alkaline phosphatase in the cell-free lavage fluid from mice intratracheally instilled with samples collected in 2006 are shown: samples collected in the dark are shown on the left and those collected in light on the right. Samples tested at only one concentration are indicated in the legends with an asterisk.E-18

Figure 5. Results for cells in the lavage fluid from mice intratracheally instilled with samples collected in 2006 are shown: samples collected in the dark are shown on the left and those collected in light on the right. Samples tested at only one concentration are indicated in the legends with an asterisk.E-19

Figure 6. Results for histopathological analyses of mice intratracheally instilled with samples collected in 2006 are shown: samples collected in the dark are shown on the left and those collected in light on the right. Samples tested at only one concentration are indicated in the legends with an asterisk.E-20

Figure 7. Results for lung tissue glutathione of mice intratracheally instilled with samples collected in 2006 are shown: samples collected in the dark are shown on the left and those collected in light on the right. Total glutathione is indicated as "GSH" in the upper panels and oxidized glutathione (GSSG) is shown in the lower panels. Samples tested at only one concentration are indicated in the legends with an asterisk.E-21

Figure 8. Results for lung tissue TBARS from mice intratracheally instilled with samples collected in 2006 are shown: samples collected in the dark are shown on the left and those collected in light on the right. Samples tested at only one concentration are indicated in the legends with an asterisk.E-22

Figure 9. Results for plasma TBARS from mice intratracheally instilled with samples collected in 2006 are shown: samples collected in the dark are shown on the left and those collected in light on the right. Samples tested at only one concentration are indicated in the legends with an asterisk.E-23

Figure 10. Results for lung tissue HO-1 from mice intratracheally instilled with samples collected in 2006 are shown: samples collected in the dark are shown on the left and those collected in light on the right. Samples tested at only one concentration are indicated in the legends with an asterisk.E-24

Figure 11. Results for macrophage phagocytosis in mice intratracheally instilled with samples collected in 2006 are shown: samples collected in the dark are shown on the left and those collected in light on the right. Samples tested at only one concentration are indicated in the legends with an asterisk.E-25

Figure 1

Lavage Biochemistry in Rats Treated with Samples from 2005

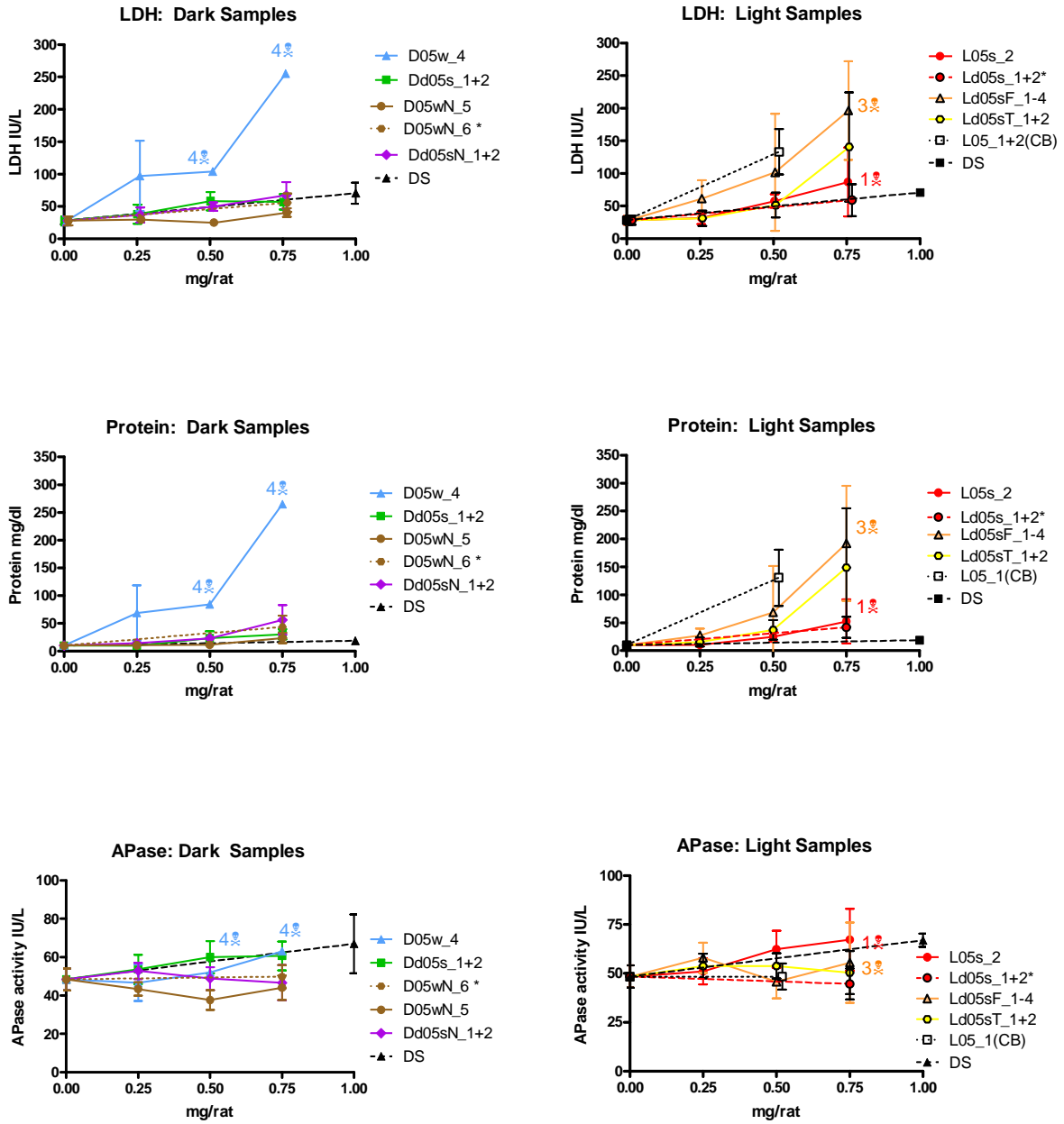


Figure 2

Lavage Cells in Rats Treated with Samples from 2005

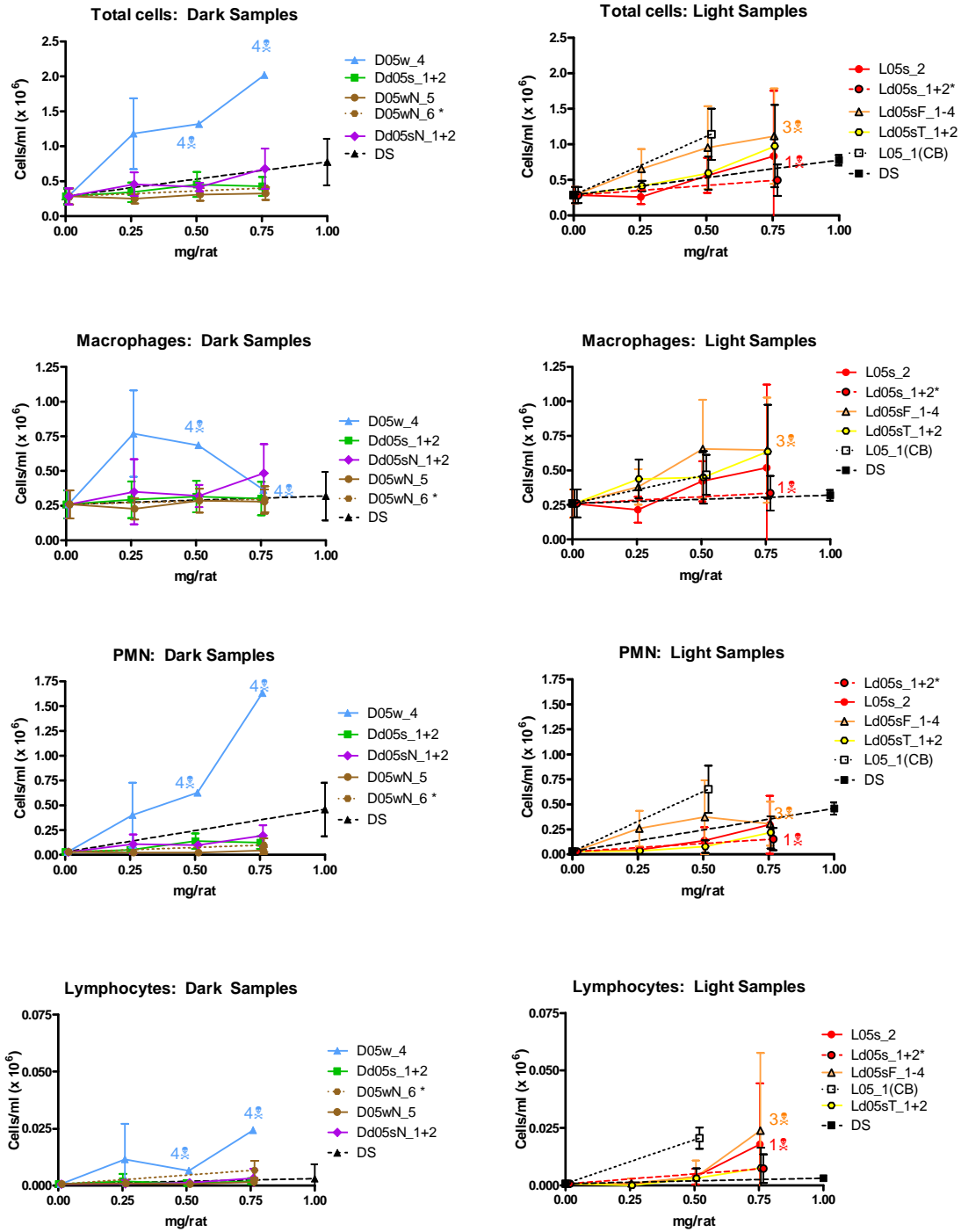


Figure 3

Histopathology Induced by Samples from 2005 Tested in Rats

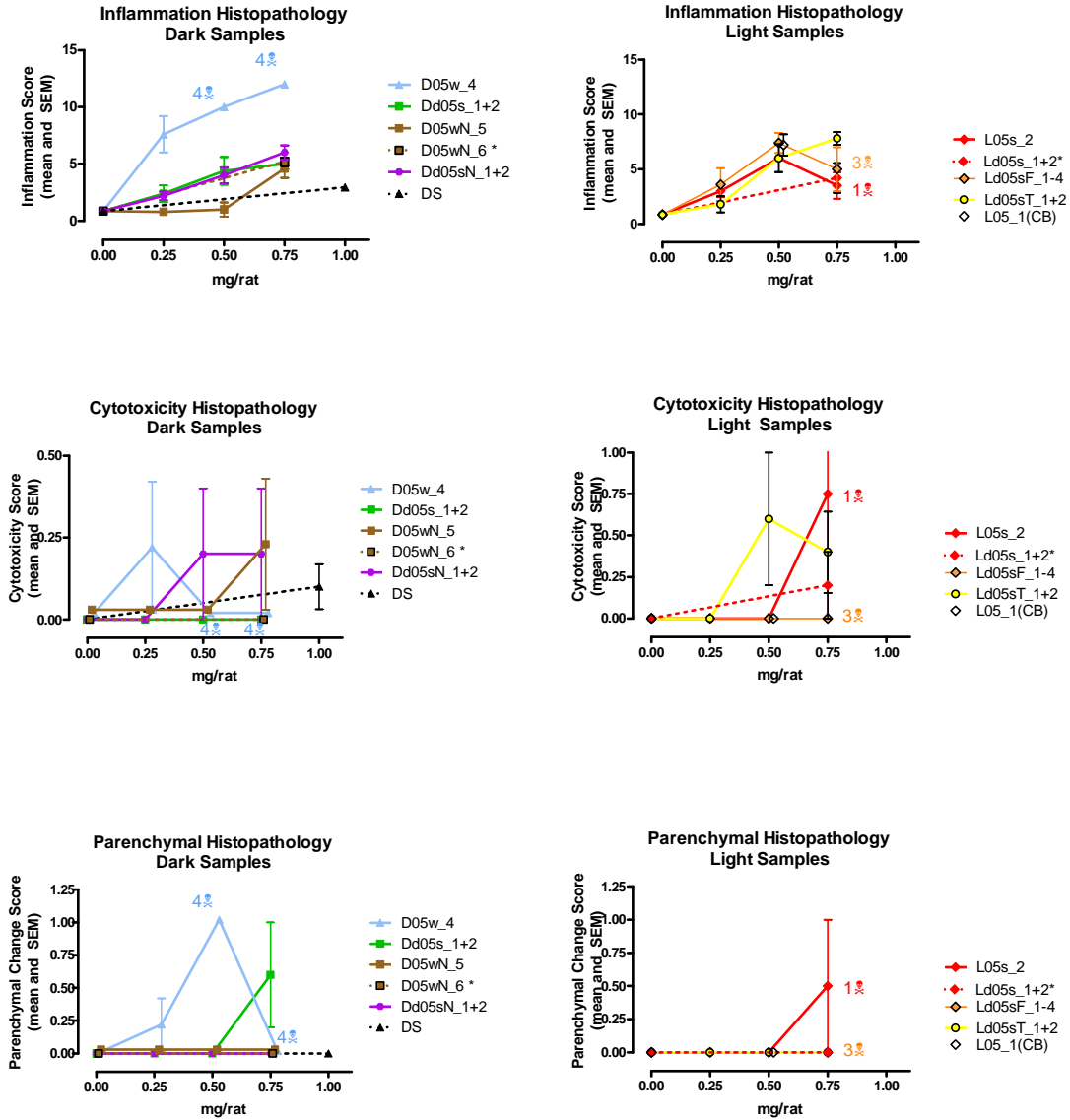


Figure 4

Lavage Biochemistry from 2006 Samples Tested in Mice

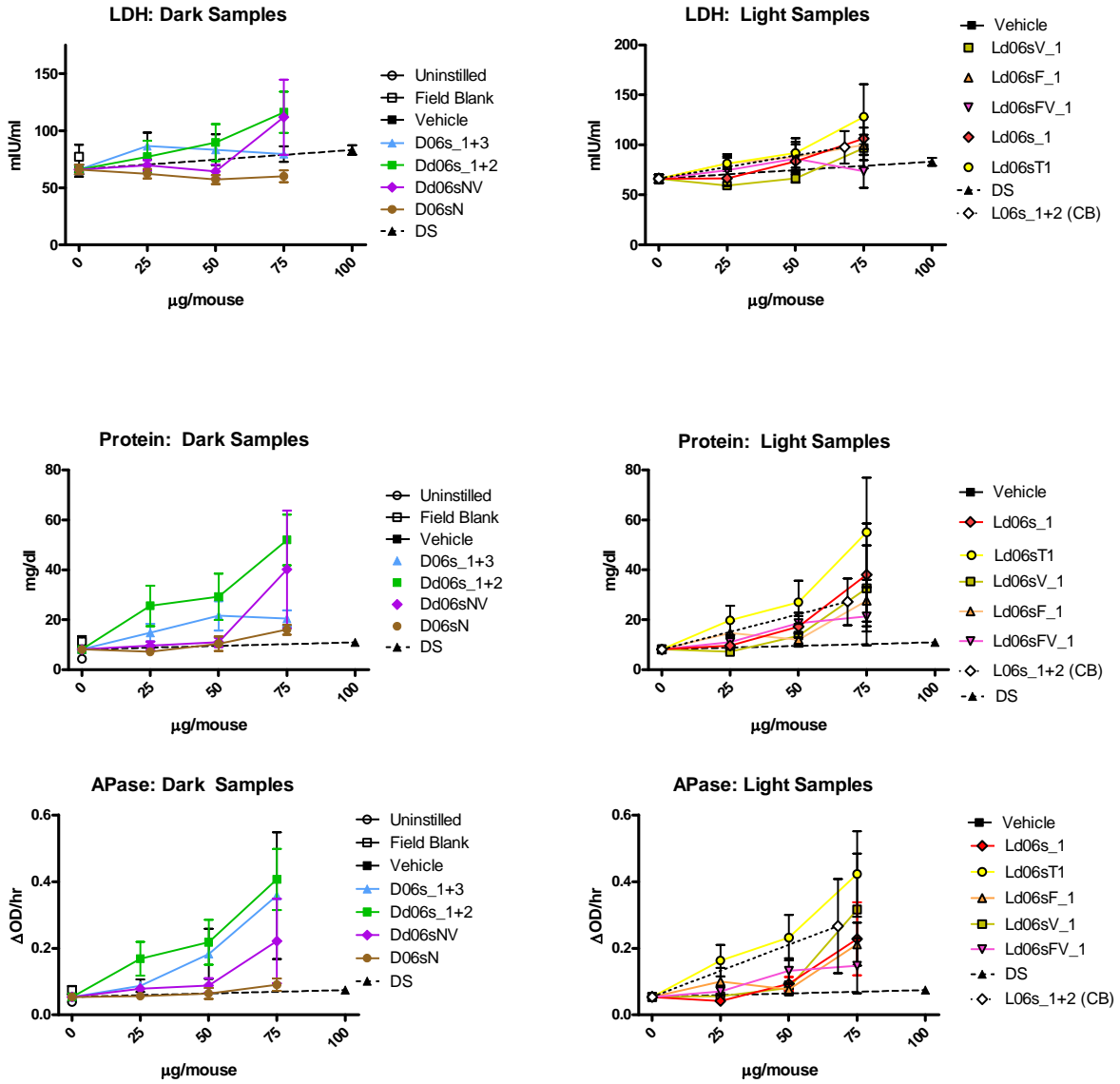


Figure 5

Inflammatory Cells in BALF Induced by Samples Collected in 2006 Tested in Mice

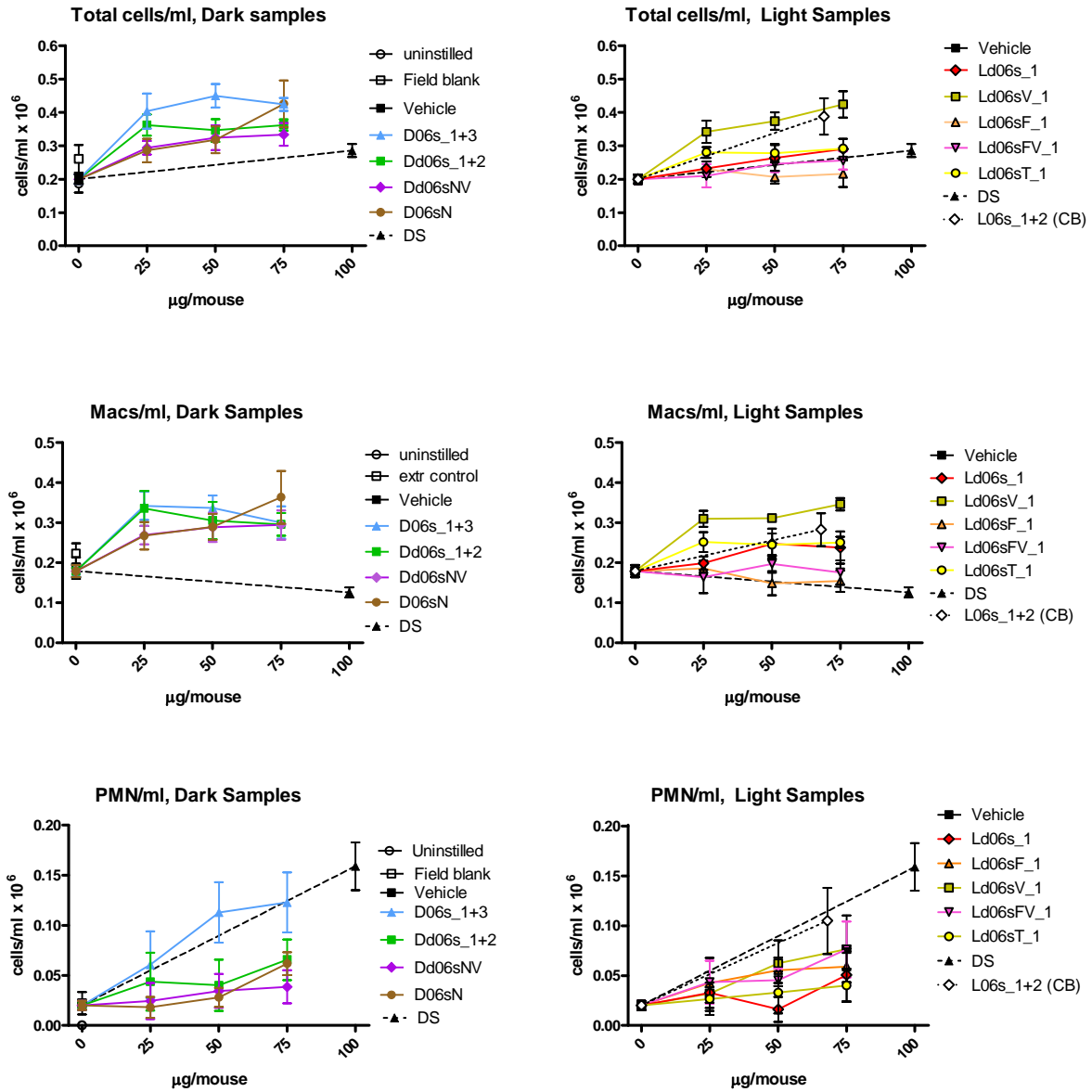


Figure 6

Histopathology Induced by Samples Collected in 2006 Tested in Mice

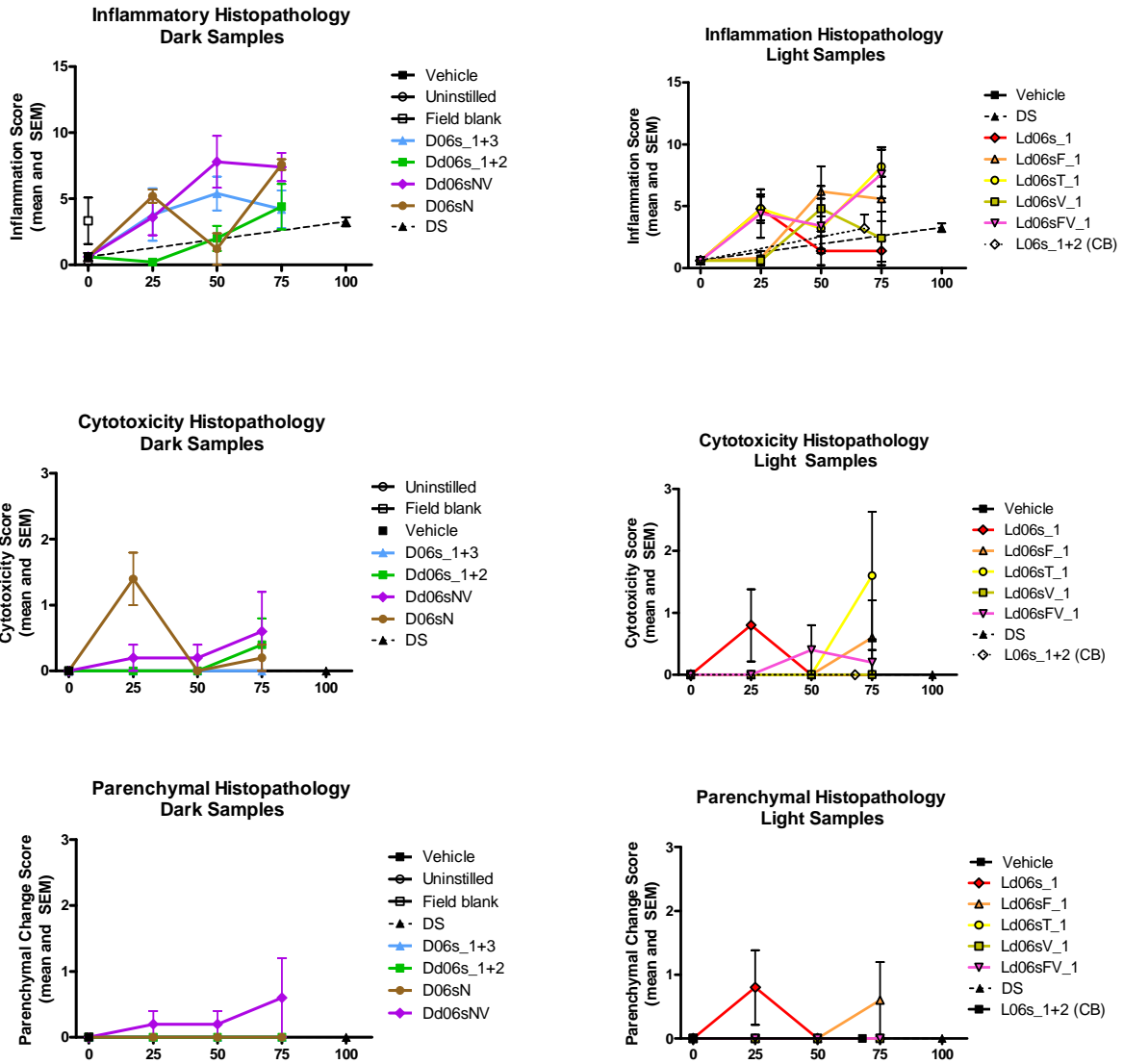


Figure 7

Tissue Glutathione in Mouse Lungs After Treatment with 2006 Samples

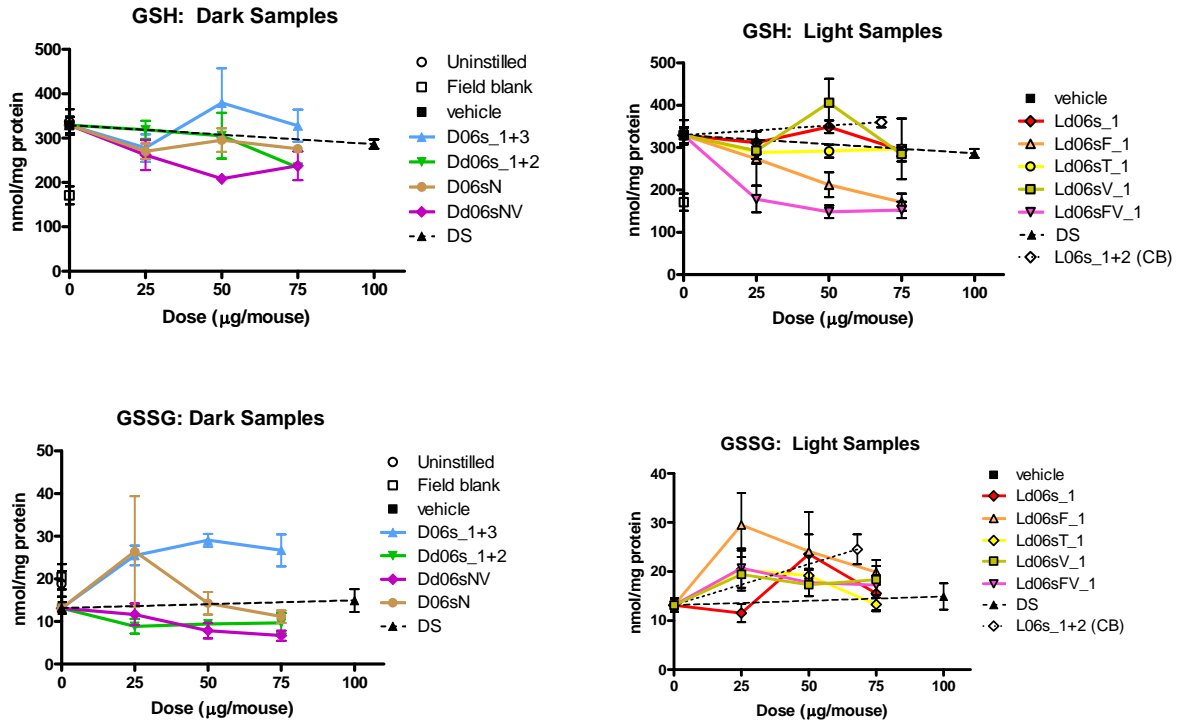
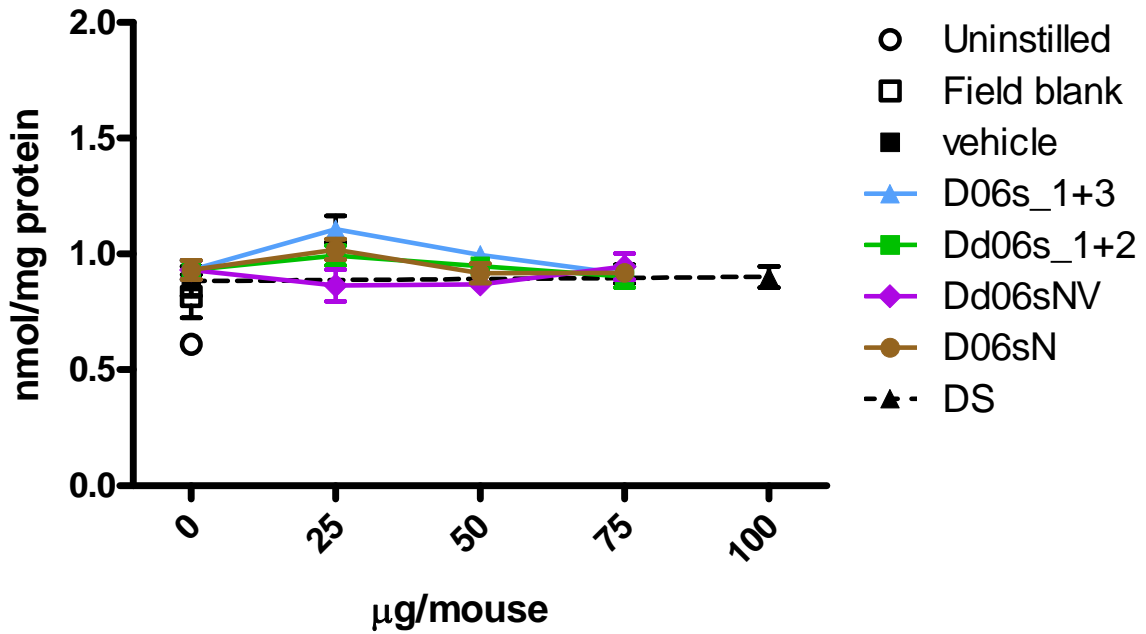


Figure 8

Lung Tissue TBARS: Dark Samples



Lung Tissue TBARS: Light Samples

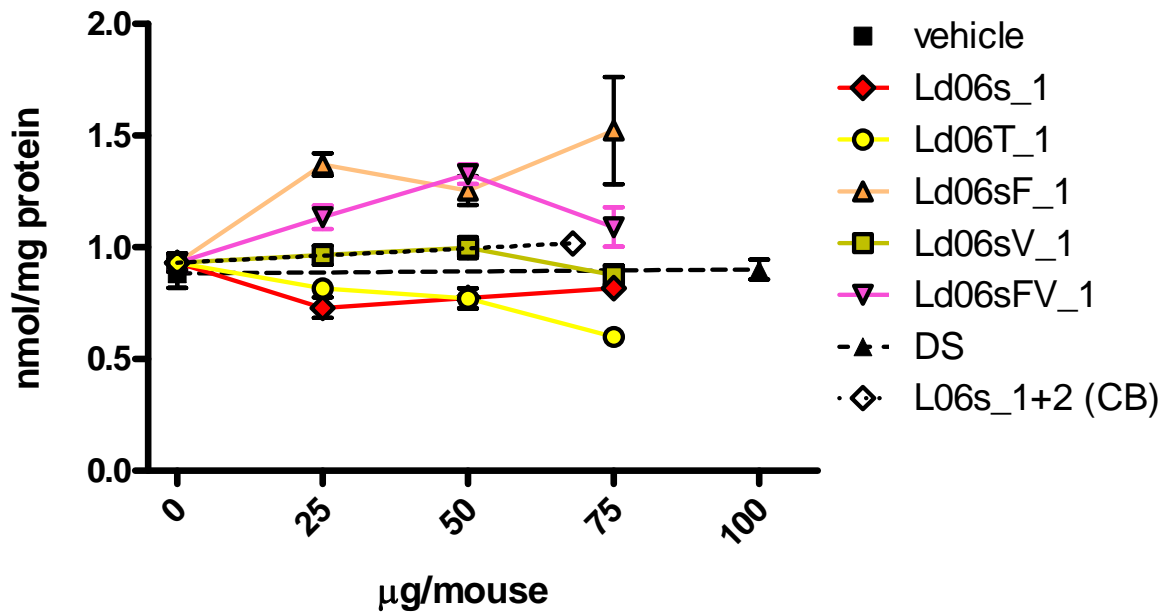


Figure 9

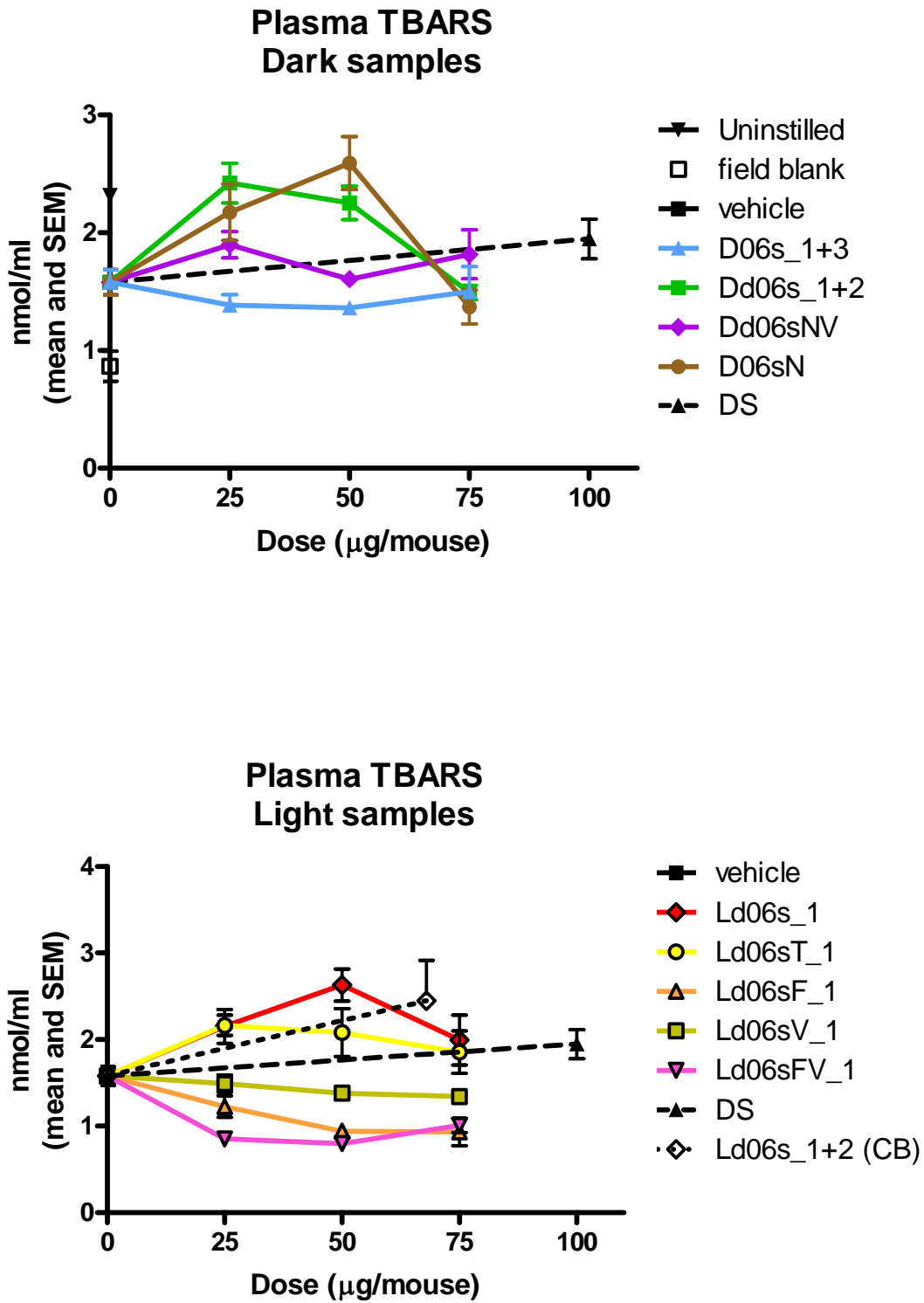
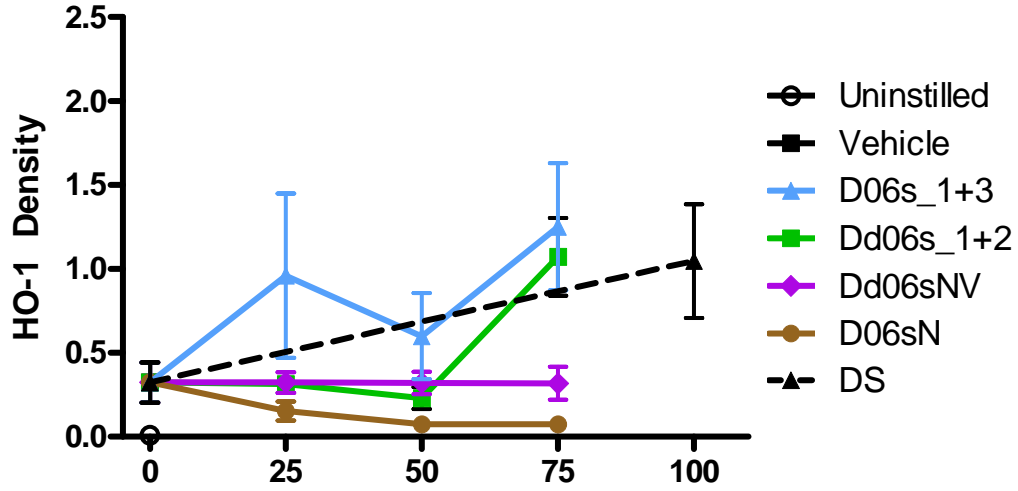


Figure 10

HO-1: Dark Samples



HO-1: Light Samples

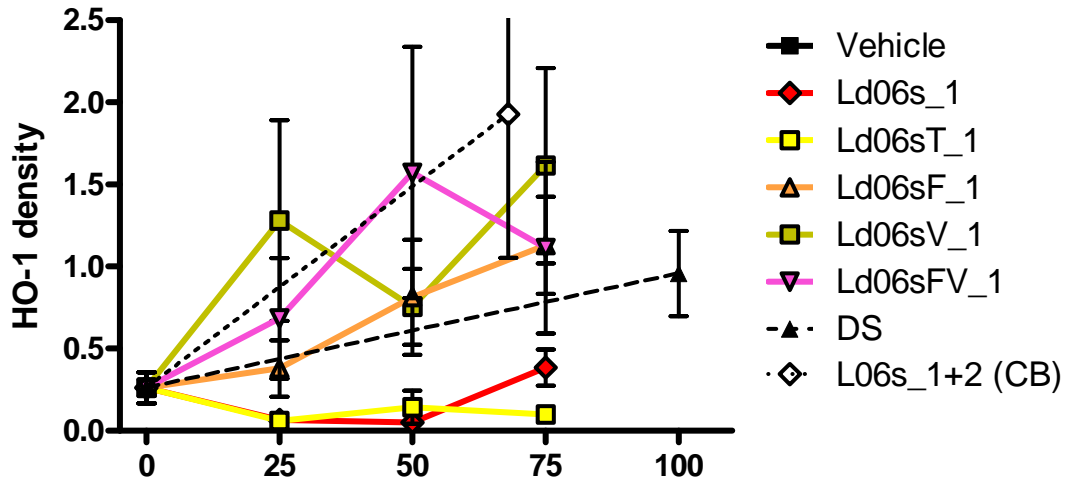


Figure 11

Macrophage Phagocytosis Effects of Samples Collected in 2006 Tested in Mice

