Supporting Information

Table S1. Information from literature mining used to draw the landscape graphs in Figure 1.

Reference	Lateral Dimension (nm)	Thickness (nm)	Graphene Type	Route of Administration	Dose	Exposure Time	Organ Accumulation	Adverse Effects	Adverse Type	Pulmonary Adverse
[1]	480	1	GO	IP	Medium	Medium	Other	None		
[2]	2000	1	GO	IV	High	Long	Lung	Adverse	Inflammatory	Chronic
[3]	2600	2	GO	IV	Low	Short	Lung	Adverse	Thrombogenic	Thrombogenic
[4]	500	5	GO	Other	Low	Long	Other	None		
[5]	400	1	GO	IV	High	Medium	Lung	Adverse	Inflammatory	Chronic
[6]	80	1.25	GO	Pulmonary	Medium	Short	Lung	Adverse	Inflammatory	Chronic
[6]	25	3.1	G	Pulmonary	Medium	Short	Lung	Adverse	Inflammatory	Minimal
[7]	5600	5	G	Pulmonary	Medium	Medium	Lung	Adverse	Inflammatory	Acute
[7]	5600	5	G	Other	Medium	Medium	Lung	Adverse	Inflammatory	Acute
[8]	420	1	GO	Pulmonary	High	Long	Lung	Adverse	Inflammatory	Chronic
[9]	450	1	GO	IP	High	Long	Other	None		
[9]	25	1.4	fG	IP	High	Long	Liver	None		
[9]	50	4.5	fG	IP	High	Long	Spleen	None		
[9]	25	6	fG	IP	High	Long	Spleen	None		
[10]	180	1	GO	IV	High	Long	Lung	Adverse	Inflammatory	Minimal
[11]	220	1	GO	IV	High	Short	Liver	None		
[12]	10000	9	rGO	Pulmonary	High	Medium	Lung	Adverse	Inflammatory	Chronic
[13]	5600	5	G	Pulmonary	Medium	Long	Lung	Adverse	Inflammatory	Minimal
[14]	300	0.9	GO	IV	High	Short	Liver	None		
[14]	3000	0.9	GO	IV	High	Short	Lung	None		
[15]	2000	5	fG	IV	Low	Short	Lung	None		
[16]	2000	2	G	IV	Low	Medium	Lung	Adverse	Inflammatory	Acute
[16]	5000	5	G	IV	Low	Medium	Lung	Adverse	Inflammatory	Acute
[17]	75	2.8	fG	IV	High	Medium	Liver	None		
[18]	20	1.5	fG	IV	High	Long	Spleen	None		
[19]	30	1.5	fG	IV	High	Short	Kidney	None		
[20]	23	1.5	fG	IV	Medium	Short	Liver	Not Reported		
[20]	65	5	fG	IV	Medium	Short	Spleen	Not Reported		
[20]	27	5	fG	IV	High	Long	Liver	None		
[21]	27	3	fG	IV	Medium	Short	Liver	None		
[22]	27	3	fG	IV	Medium	Short	Liver	None		
[23]	64	12	fG	IV	Low	Short	Other	Not Reported		
[24]	5	2	GO	IV	High	Medium	Liver	None		
[25]	450	1	GO	IV	Medium	Short	Lung	Not Reported		
[25]	40	1.5	fG	IV	Medium	Short	Spleen	Not Reported		
[26]	80	3	fG	Other	High	Short	Other	Adverse	Vasodilation	
[27]	650	1	GO	IV	High	Short	Lung	None		
[27]	650	1	fG	IV	High	Short	Liver	None		
[28]	70	4	fG	IV	High	Long	Other	None		
[29]	77	9.5	fG	IV	Low	Short	Liver	None		
[30]	20	1.3	fG	IP	High	Long	Liver	Adverse	Other	
[31]	195	3.5	fG	IV	High	Medium	Other	None		
[32]	100	3.5	fG	IV	High	Long	Liver	Adverse	Other	
[33]	55	2	GO	IV	High	Long	Lung	None		
[33]	55	2	GO	IP	High	Long	Spleen	None		
[33]	238	4	GO	IV	High	Long	Other	None		
[33]	238	4	GO	IP	High	Long	Other	None		
[34]	2000	3.5	G	Pulmonary	Medium	Medium	Lung	Adverse	Inflammatory	Subchronic

Primary Research Reports used in Literature Mining (references in Table S1)

[1] H. Ali-Boucetta, D. Bitounis, R. Raveendran-Nair, A. Servant, J. Van den Bossche, K. Kostarelos, *Adv Healthc Mater.,* 2013, **2**, 433.
[2] K. Wang, J. Rua, S. H., J. Zhang, Y. Wo, S. Guo, C. D., *Nanoscale Res Lett,* 2011, **6**, 1.
[3] S.K. Singh, M.K. Singh, M.K. Nayak, S. Kumari, S. Shrivastava, J.J.A. GrÃ¡cio, D. Dash, *ACS Nano*, 2011, **5**, 4987.
[4] L. Yan, Y. Wang, X. Xu, C. Zeng, J. Hou, M. Lin, J. Xu, F. Sun, X. Huang, L. Dai, F. Lu, Y. Liu, *Chem Res Toxicol*, 2012, **25**, 1265.
[5] X. Zhang, J. Yin, C. Peng, W. Hu, Z. Zhu, W. Li, C. Fan, Q. Huang, *Carbon*, 2011, **49**, 986.
[6] M.C. Duch, G.R.S. Budinger, Y.T. Liang, S. Soberanes, D. Urich, S.E. Chiarella, L.A. Campochiaro, A. Gonzalez, N.S. Chandel, M.C. Hersam, G.M. Mutlu, *Nano Letters*, 2011, **11**, 5201.
[7] A. Schinwald, F.A. Murphy, A. Jones, W. MacNee, K. Donaldson, *ACS Nano*, 2011, **6**, 736.
[8] B. Li, J. Yang, Q. Huang, Y. Zhang, C. Peng, Y. Zhang, Y. He, J. Shi, W. Li, J. Hu, C. Fan, *NPG Asia Mater*, 2013, **5**, e44.
[9] K. Yang, H. Gong, X. Shi, J. Wan, Y. Zhang, Z. Liu, *Biomaterials*, 2013, **34**, 2787.
[10] C.M. Girish, A. Sasidharan, G.S. Gowd, S. Nair, M. Koyakutty, *Adv Healthc Mater*, 2013, **2**, 1489.
[11] L. Zhan, G. Yanxia, Z. Xiaoyong, Q. Wei, F. Qiaohui, L. Yan, J. Zongxian, W. Jianjun, T. Yuqin, D. Xiaojiang, W. Wangsuo, *J Nanopart Res*, 2011, **13**, 2939.
[12] L. Ma-Hock, V. Strauss, S. Treumann, K. Kuttler, W. Wohlleben, T. Hofmann, S. Groters, K. Wiench, B. van Ravenzwaay, R. Landsiedel, *Part Fibre Toxicol*, 2013, **10**, 23.
[13] A. Schinwald, F. Murphy, A. Askounis, V. Koutsos, K. Sefiane, K. Donaldson, C.J. Campbell, *Nanotoxicology*, 2014, **8**, 824.
[14] J.H. Liu, S.T. Yang, H. Wang, Y. Chang, A. Cao, Y. Liu, *Nanomedicine (Lond)*, 2012, **7**, 1801.
[15] S.K. Singh, M.K. Singh, P.P. Kulkarni, V.K. Sonkar, J.J. Gracio, D. Dash, *ACS Nano*, 2012, **6**, 2731.
[16] X.J. Wang, R. Podila, J.H. Shannahan, A.M. Rao, J.M. Brown, *Int J Nanomedicine*, 2013, **8**, 1733.
[17] S. Zhang, K. Yang, L. Feng, Z. Liu, *Carbon*, 2011, **49**, 4040.
[18] K. Yang, J. Wan, S. Zhang, Y. Zhang, S.-T. Lee, Z. Liu, *ACS Nano*, 2010, **5**, 516.
[19] K. Yang, S. Zhang, G. Zhang, X. Sun, S.-T. Lee, Z. Liu, *Nano Letters*, 2010, **10**, 3318.
[20] K. Yang, J. Wan, S. Zhang, B. Tian, Y. Zhang, Z. Liu, *Biomaterials*, 2012, **33**, 2206.
[21] H. Hong, Y. Zhang, J.W. Engle, T.R. Nayak, C.P. Theuer, R.J. Nickles, T.E. Barnhart, W. Cai, *Biomaterials*, 2012, **33**, 4147.
[22] H. Hong, K. Yang, Y. Zhang, J.W. Engle, L. Feng, Y. Yang, T.R. Nayak, S. Goel, J. Bean, C.P. Theuer, T.E. Barnhart, Z. Liu, W. Cai, *ACS Nano*, 2012, **6**, 2361.
[23] B. Cornelissen, S. Able, V. Kersemans, P.A. Waghorn, S. Myhra, K. Jurkshat, A. Crossley, K.A. Vallis, *Biomaterials*, 2013, **34**, 1146.
[24] M. Nurunnabi, Z. Khatun, K.M. Huh, S.Y. Park, D.Y. Lee, K.J. Cho, Y.-k. Lee, *ACS Nano*, 2013, **7**, 6858.
[25] Y. Li, L. Feng, X. Shi, X. Wang, Y. Yang, K. Yang, T. Liu, G. Yang, Z. Liu, *Small*, 2014, **10**, 1544.
[26] S.M. Chowdhury, S. Kanakia, J.D. Toussaint, M.D. Frame, A.M. Dewar, K.R. Shroyer, W. Moore, B. Sitharaman, *Sci Rep*, 2013, **3**, 2584.
[27] G. Qu, X. Wang, Q. Liu, R. Liu, N. Yin, J. Ma, L. Chen, J. He, S. Liu, G. Jiang, *J Environ Sci (China)*, 2013, **25**, 873.
[28] Z. Sheng, L. Song, J. Zheng, D. Hu, M. He, M. Zheng, G. Gao, P. Gong, P. Zhang, Y. Ma, L. Cai, *Biomaterials*, 2013, **34**, 5236.
[29] Y.J. Lu, C.W. Lin, H.W. Yang, K.J. Lin, S.P. Wey, C.L. Sun, K.C. Wei, T.C. Yen, C.I. Lin, C.C.M. Ma, J.P. Chen, *Carbon*, 2014, **74**, 83.
[30] Y. Chong, Y.F. Ma, H. Shen, X.L. Tu, X. Zhou, J.Y. Xu, J.W. Dai, S.J. Fan, Z.J. Zhang, *Biomaterials*, 2014, **35**, 5041.
[31] H.X. Wu, H.L. Shi, Y.P. Wang, X.Q. Jia, C.Z. Tang, J.M. Zhang, S.P. Yang, *Carbon*, 2014, **69**, 379.
[32] S. Kanakia, J.D. Toussaint, S. Mullick Chowdhury, T. Tembulkar, S. Lee, Y.P. Jiang, R.Z. Lin, K.R. Shroyer, W. Moore, B. Sitharaman, *Biomaterials*, 2014, **35**, 7022.
[33] S. Liang, S. Xu, D. Zhang, J. He, M. Chu, *Nanotoxicology*, 2014, doi:10.3109/17435390.2014.893380
[34] E.J. Park, G.H. Lee, B.S. Han, B.S. Lee, S. Lee, M.H. Cho, J.H. Kim, D.W. Kim, *Arch Toxicol*, 2014, doi:10.1007/s00204-014-1303-x

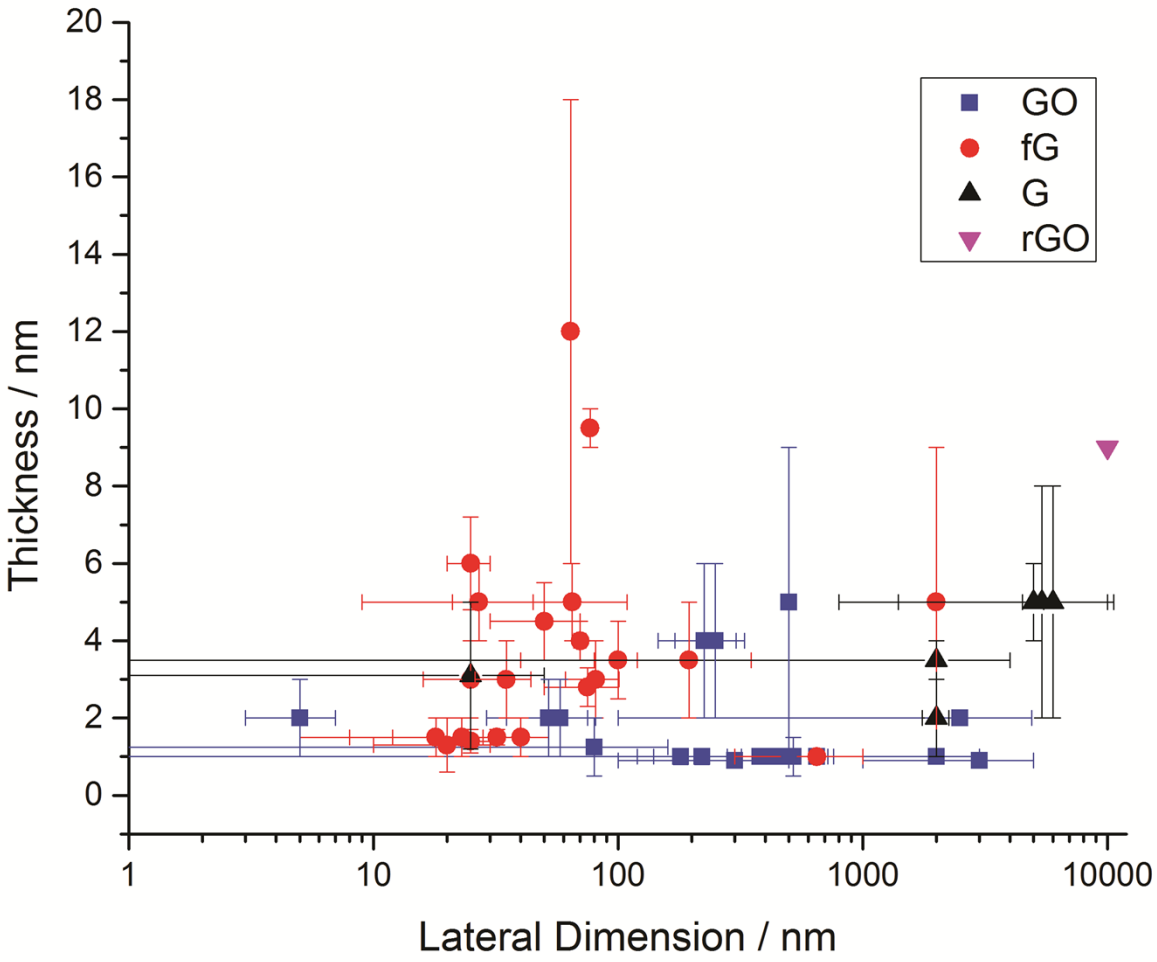

Figure S1. ***Size distribution of the graphene-based materials as reported in primary research reports including errors (when reported).*** Thickness (nm) against lateral dimension (nm) for all of the graphene-based materials extracted from the literature mining exercise. Errors were also included for the materials as reported in the original articles. Errors in lateral dimension and thickness data were not provided for 13% and 22% of described materials, respectively.

SEE UPLOADED ANIMATED GIF FILE (OPENS WITH INTERNET EXPLORER)

Supporting Video V1. ***Animated version of the Current Landscape of in vivo Safety for Graphene-based Materials.*** All six 3-D maps representing the distribution of materials in Fig. 1 were animated. The animation starts with the maps in their initial position as shown in Fig. 1, then rotate to depict the thickness against the graphene type. Lastly, the maps rotate to their final position to demonstrate the lateral dimension against the graphene type. (Note: the file is best viewed, whilst retaining good image quality, using Windows Internet Explorer).