

Looking for an ideal HTS screening collection

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Background and outline of the research

• The number of new drugs approved per \$1 billion spent has been halving every 9 years since 19501.

• An average R&D spending per new pharmaceutical product surpassed \$2,7 billion in 2017².

• In order to increase economic efficiency of the process, we aimed to create an 'ideal' (in terms of diversity and druglikeness) screening collection of compounds³.



PARAMETER (X)	2010	2017	Δ <x> (2010-2017)</x>	<x>∆ (2010-2017)</x>	
MW	388.82	362.49	-26.33	339.59	
logP	3.64	2.96	-0.67	2.38	
Fsp3	-	0.40	—	-	
tPSA	94.23	71.84	-22.39	52.38	
Heavy Atoms	-	25.11	—	_	
HBA	6.18	4.61	-1.57	3.25	
HBD	0.96	1.16	0.20	1.33	
Rotatable Bonds	5.28	4.82	-0.47	4.41	
Rings	_	3.02			
Aromatic Rings	_	2.03	_	_	

• With ZINC database we analyzed distribution of the selected molecular properties (MW, log P, topological polar surface area, fraction of sp³-hybridized, number of heavy atoms etc.) of 17·10⁶ compounds in the purchasable chemical space.

• Comparison of mean values of the purchasable chemical space indicates decrease of average MW, logP and tPSA values over time.

• We aimed to find an "ideal" million of screening compounds: 50000 diverse scaffolds with 20 representatives each.

Can the "ideal million" collection be purchased?



Number of structures per scaffold	number of scaffolds			resulting number of structures		
	leadlike	3/75 rule	druglike	leadlike	3/75 rule	druglike
≥20	39 101	22 162	787 56	782 020	443 240	1 575 120
≥10	88 155	47 375	169 072	881 550	473 750	1 690 720
≥5	198 649	102 369	365 419	993 245	511 845	1 827 095
total number of structures	6 544 044	3 705 803	14191016			

• Collections of 33 suppliers were investigated.

• One million of leadlike compounds is not purchasable yet, 782k of the appropriate

compounds were found.
Half a million collection is available from six companies, and 350k set can be bought from just three suppliers.

Contact

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References

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