Subject: Functionality request: MPO score
Posted by mvamos on Thu, 19 Dec 2019 20:19:55 GMT
View Forum Message <> Reply to Message

Hello. Pfizer's MPO score seems to be a popular metric these days. Is it possible to add this to the physicochemical properties options in DW? Here is the paper describing it:
https://pubs.acs.org/doi/10.1021/acschemneuro.6b00029
And the link to the worksheet for calculation:
https://pubs.acs.org/doi/media/10.1021/acschemneuro.6b00029/ cn6b00029_weo_001.docx

Thanks for making great cheminformatics software possible for us!

Subject: Re: Functionality request: MPO score
Posted by thomas on Sun, 29 Dec 2019 14:09:44 GMT
View Forum Message <> Reply to Message

Thanks for the suggestions. Apart from bug fixing, the functionality is frozen till the next release. After that I will study the papers and consider, but cannot promise yet...

Subject: Re: Functionality request: MPO score
Posted by mvamos on Tue, 28 Apr 2020 22:57:20 GMT
View Forum Message <> Reply to Message

Thanks!
Wanted to update this posting with an improved CNS-related score: BBB Score. Apparently this one is better at predicting brain penetration.

BBB Score paper: https://doi.org/10.1021/acs.jmedchem.9b01220
A Vortex script to calculate the Blood-Brain Barrier (BBB) SCORE:
https://www.macinchem.org/reviews/vortex/tut48/scripting_vor tex48.php

Subject: Re: Functionality request: MPO score
Posted by thomas on Sun, 10 May 2020 18:48:22 GMT
View Forum Message <> Reply to Message

thank you for the suggestion. I will be happy to implement it. The problem is that the BB score needs a pKa value as input and most DataWarrior installations don't include a pKa-prediction. DataWarrior still uses the ChemAxon pKa prediction, if licensed and installed, which typically is not the case outside Idorsia. This reiterates the need for an open-source pKa prediction...

Subject: Re: Functionality request: MPO score
Posted by mcmc on Thu, 17 Sep 2020 15:59:39 GMT

Below is a macro that will calculate the MPO score, based on the six underlying parameters that should already be present in DW.
cLogP, TPSA, HB donor and MW can be calculated within DW. But the most_basic_pKa and cLogD will have to be calculated elsewhere (unless you are one of the happy few to have that unlocked in DW).
The property names need to match exactly of course, so you may need to have to edit the names in the macro before executing it (or change the column aliases to match the macro).

EDIT: update 5 jan 2022. There was a typo in the original post, affecting MPO calculations for compounds with 40 < PSA < 60. Now corrected.

```
<macro name="MPO_score">
<task name="addCalculatedValues">
columnName=MPO_cLogP
isOverwrite=false
formula=min(1,max(0,2.5-0.5*cLogP_DW))
</task>
<task name="addCalculatedValues">
columnName=MPO_TPSA
isOverwrite=false
formula=if(PSA_DW > 40, min(1, max(0, 1 + (1/(120-90))*(90-PSA_DW))), min(1, max(0,
1-0.05*(40-PSA_DW))))
</task>
<task name="addCalculatedValues">
columnName=MPO_cLogD
isOverwrite=false
formula=min(1, max(0, 1 + (1/(4-2))*(2 - cLogD_74)))
</task>
<task name="addCalculatedValues">
columnName=MPO_MW
isOverwrite=false
formula=min(1, max(0, 1 + (1/(500-360))*(360 - MW)))
</task>
<task name="addCalculatedValues">
columnName=MPO_HBD
isOverwrite=false
formula=min(1, max(0, 1 + (1/(3.5-0.5))*(0.5 - HDonors)))
</task>
<task name="addCalculatedValues">
columnName=MPO_pKa
isOverwrite=false
formula=min(1, max(0, 1 + (1/(10-8))*(8 - MostBasicpKa)))
</task>
<task name="addCalculatedValues">
columnName=MPO_Score
isOverwrite=false
formula=MPO_HBD+MPO_MW+MPO_TPSA+MPO_cLogD+MPO_cLogP+MPO_pKa
```

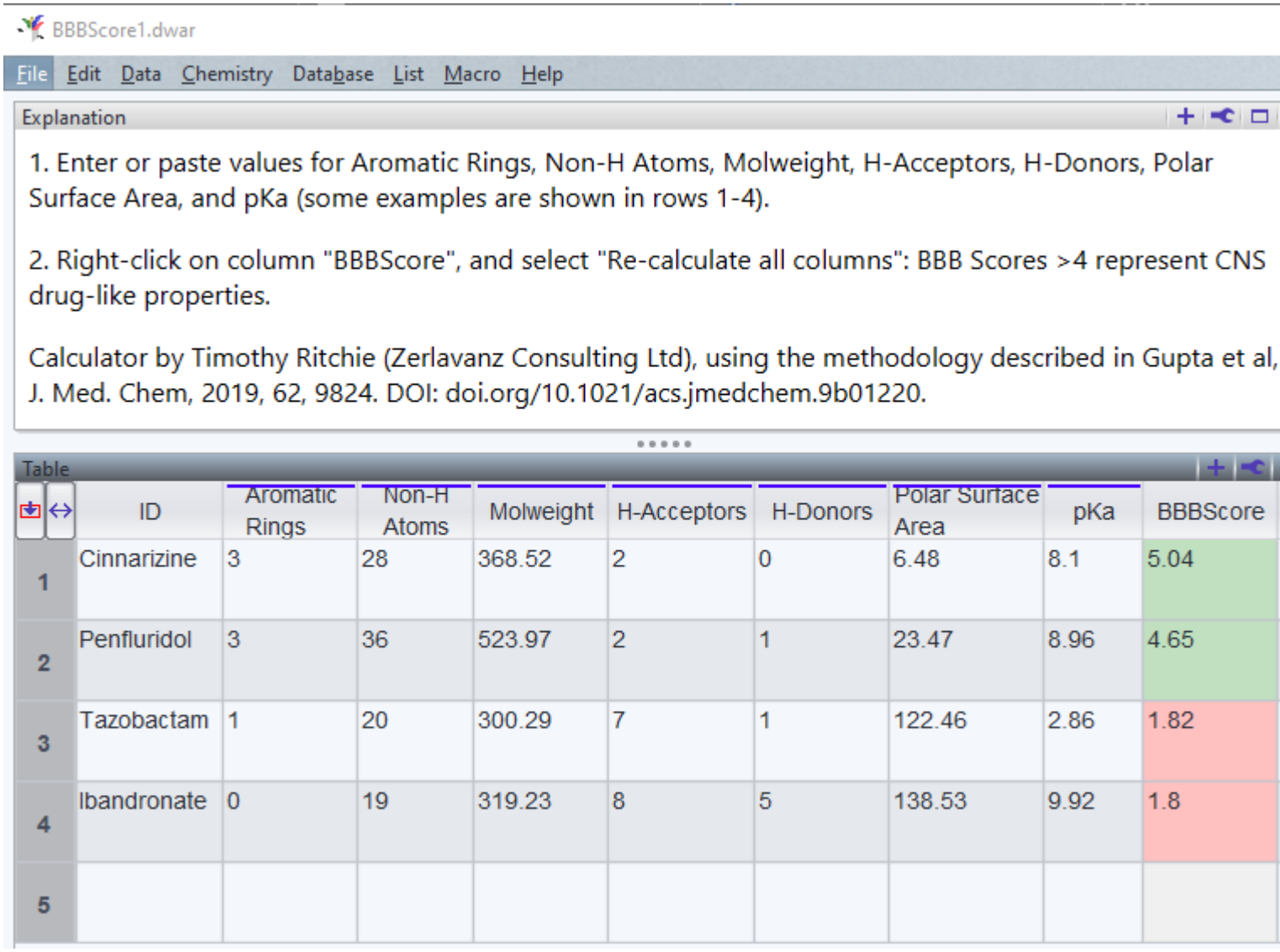
</task>
</macro>

Subject: Re: Functionality request: MPO score
Posted by timritchie on Mon, 21 Feb 2022 12:30:27 GMT
View Forum Message <> Reply to Message

Hi,
If it's of use, I have created a formula in DataWarrior that calculates the BBB Score using the methodology from the original published article.
One has to enter or paste values for 'Aromatic Rings', 'Non-H Atoms', 'Molweight', 'H-Acceptors', 'H-Donors', 'Polar Surface Area', and 'pKa', and then update the formula and re-calculate the score.
Regards,
Tim Ritchie.

File Attachments

1) BBBScore.png, downloaded 2786 times



	ID	Aromatic Rings	Non-H Atoms	Molweight	H-Acceptors	H-Donors	Polar Surface Area	pKa	BBBScore
1	Cinnarizine	3	28	368.52	2	0	6.48	8.1	5.04
2	Penfluridol	3	36	523.97	2	1	23.47	8.96	4.65
3	Tazobactam	1	20	300.29	7	1	122.46	2.86	1.82
4	Ibandronate	0	19	319.23	8	5	138.53	9.92	1.8
5									

Subject: Re: Functionality request: MPO score
Posted by mcmc on Wed, 23 Feb 2022 09:39:45 GMT
View Forum Message <> Reply to Message

Hi Tim, I think a lot of people would find this interesting. Could you paste the formula in here somewhere?

Subject: Re: BBB Score in DataWarrior.
Posted by timritchie on Thu, 17 Mar 2022 12:28:45 GMT
View Forum Message <> Reply to Message

Hi, I've uploaded a working example of the BBB Score calculator in DataWarrior.

Regards, Tim.

File Attachments

1) BBBScore1.dwar, downloaded 869 times