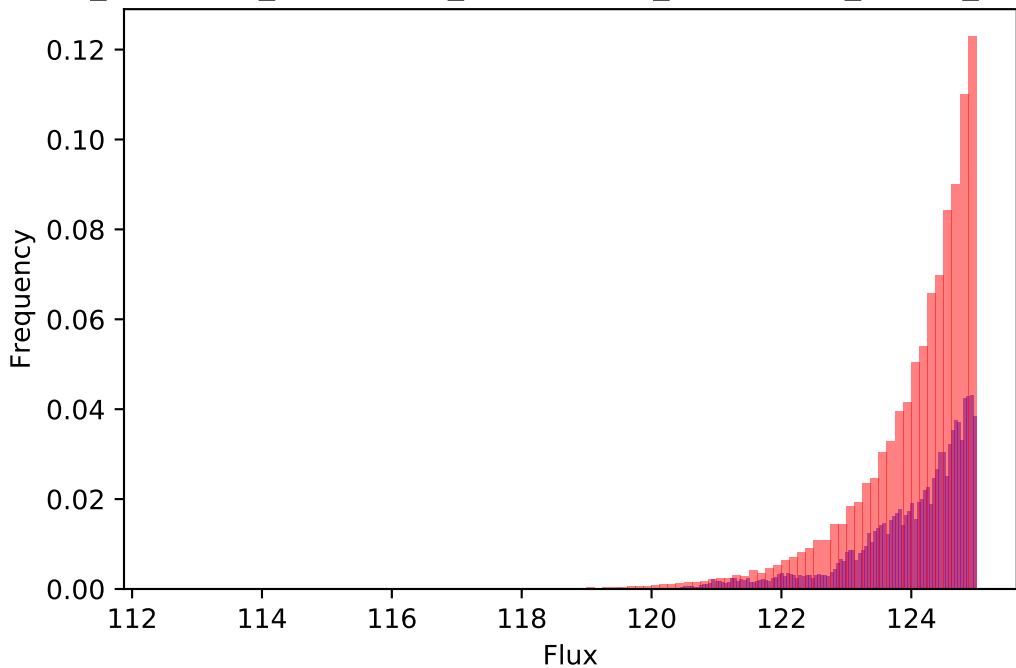
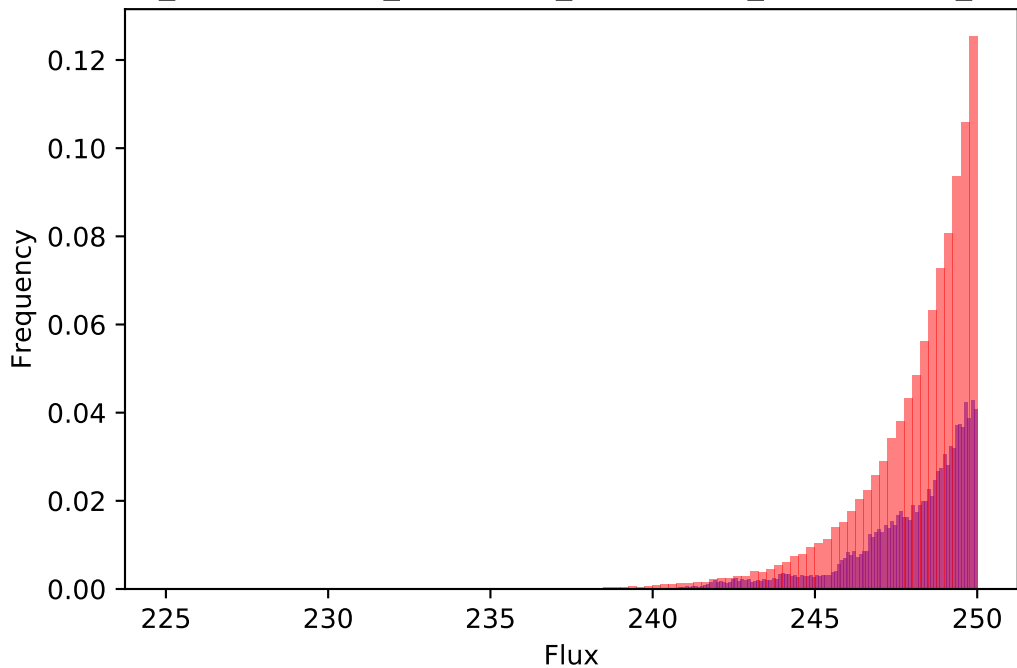


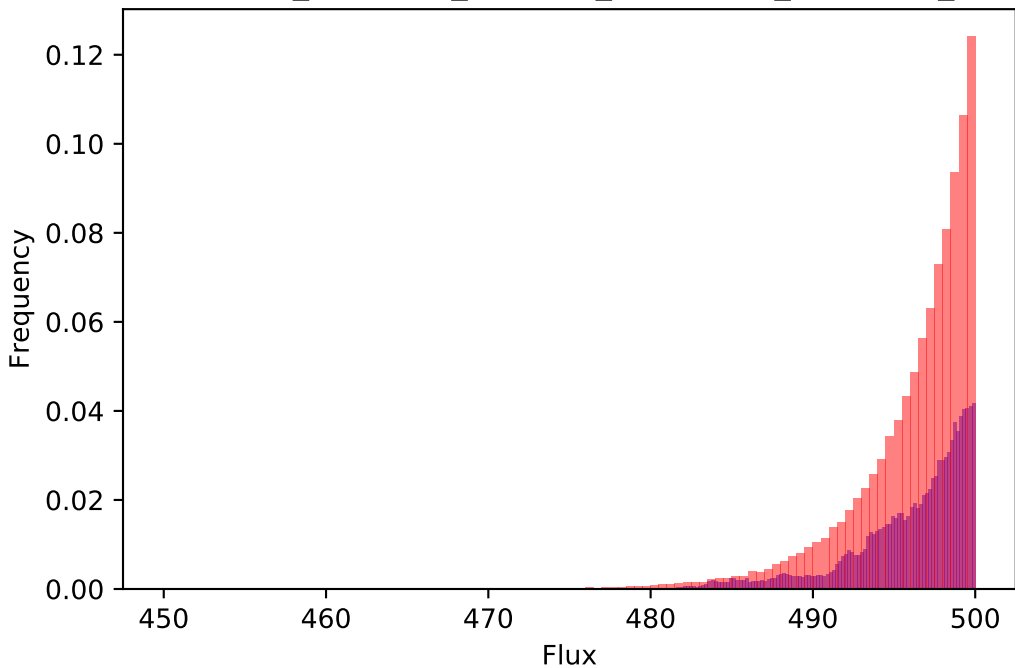
1.0 H2O\_h + 4.0 H\_h + 2.0 PQ\_h + 4.0 hnu\_h --> 4.0 H\_l + O2\_h + 2.0 PO\_h



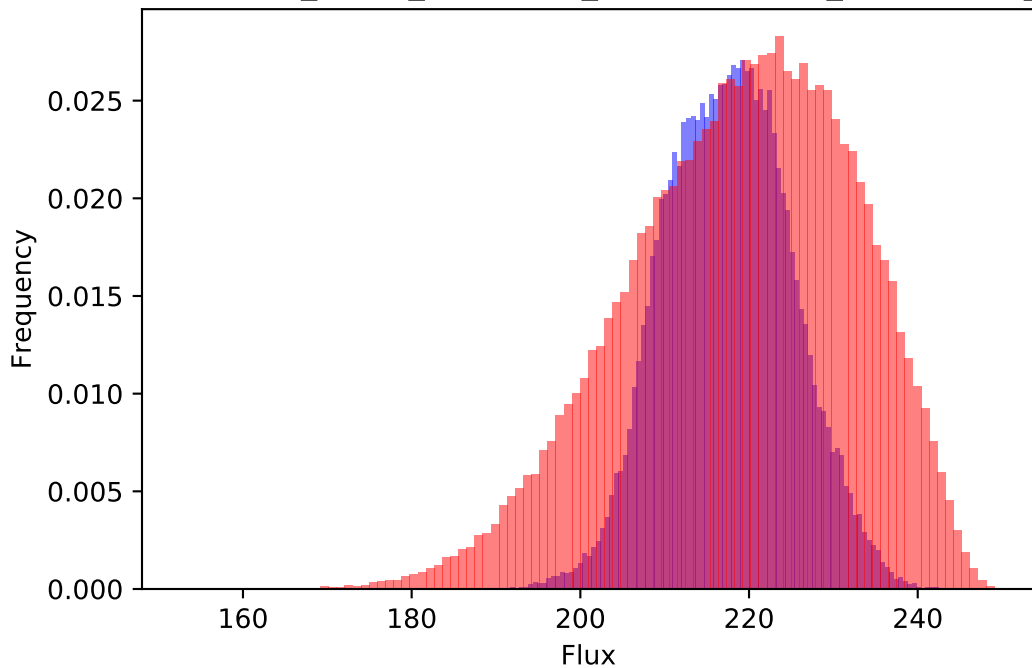
**\*\*1 : 2.0 H\_h + 2.0 PCox\_h + PQH2\_h --> 4.0 H\_l + 2.0 PCrd\_h + PQ\_h\***



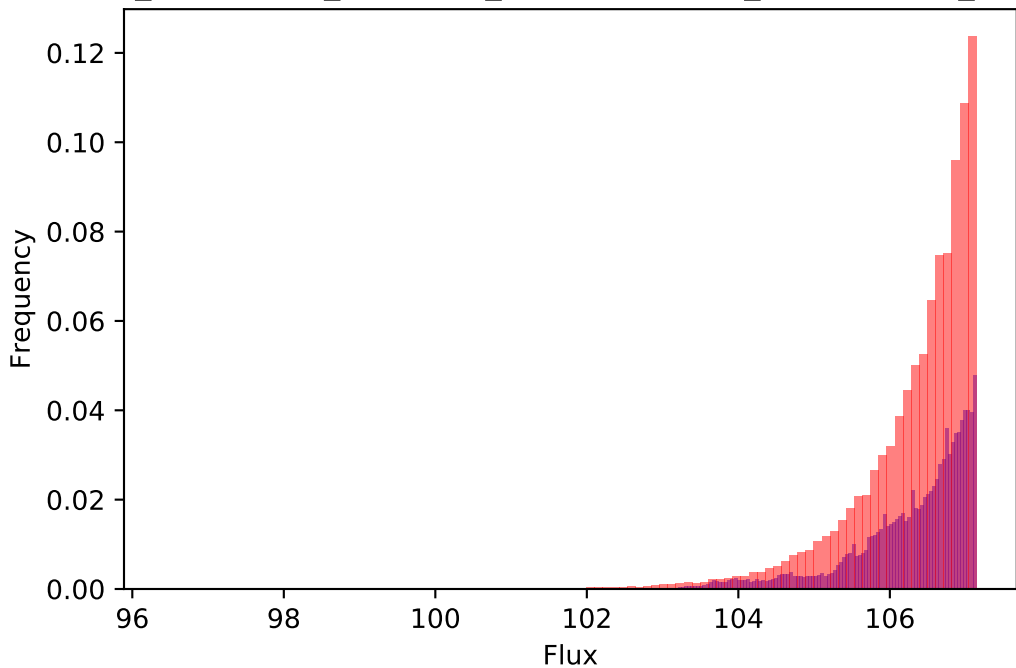
**\*\*2 : Fdcox\_h + PCrd\_h + hnu\_h --> Fdrd\_h + PCox\_h\*\***



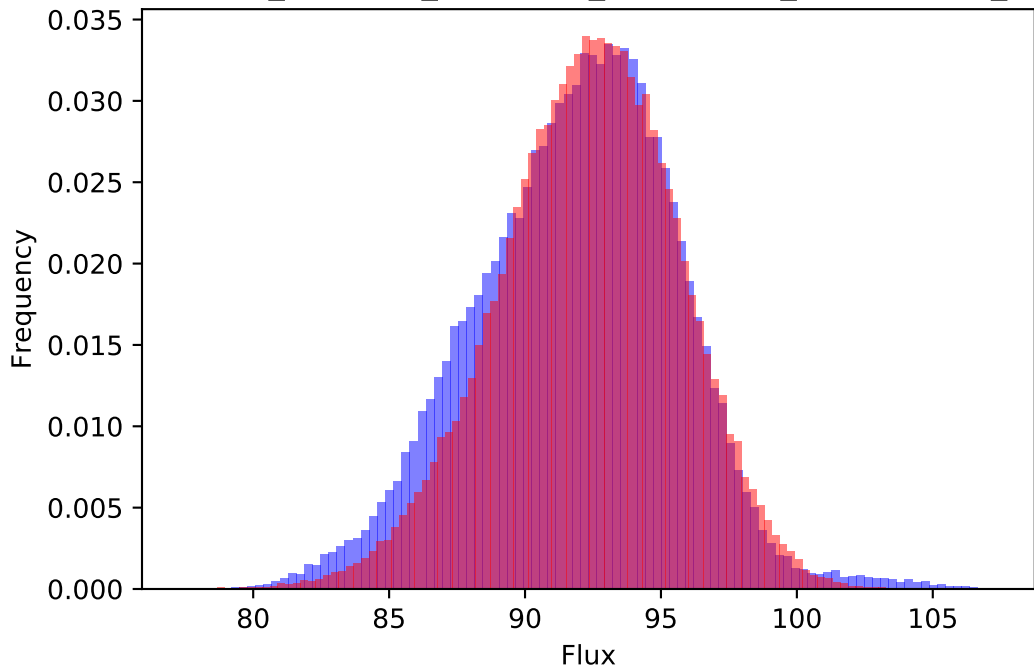
**\*\*3 : 2.0 Fdrd\_h + H\_h + NADP\_h --> 2.0 Fdox\_h + NADPH\_h\*\***



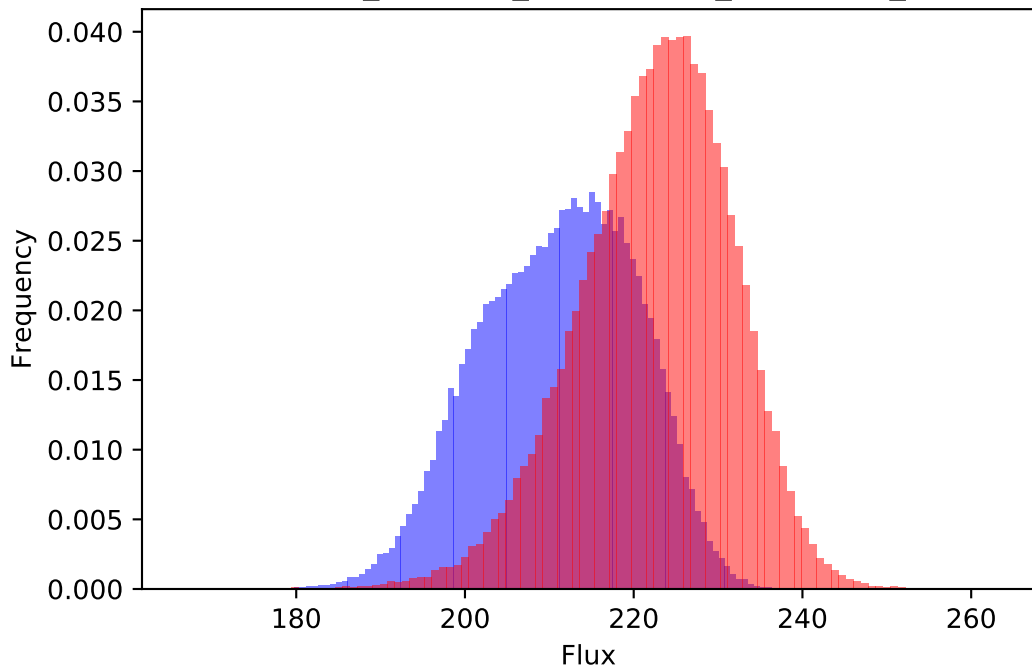
: 3.0 ADP\_h + 14.0 H\_l + 3.0 Pi\_h <=> 3.0 ATP\_h + 3.0 H2O\_h + 11.0 H



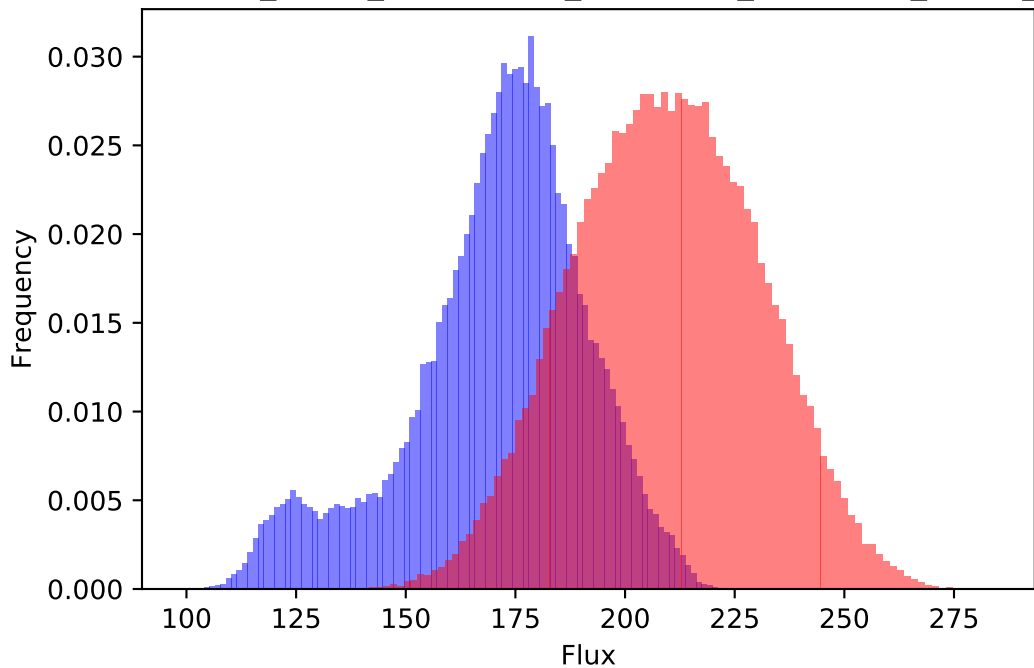
**\*\*5 : CO2\_h + H2O\_h + RuBP\_h --> 2.0 H\_h + 2.0 PGA\_h\*\***



**\*\*6 : ATP\_h + PGA\_h <=> ADP\_h + DPGA\_h\*\***

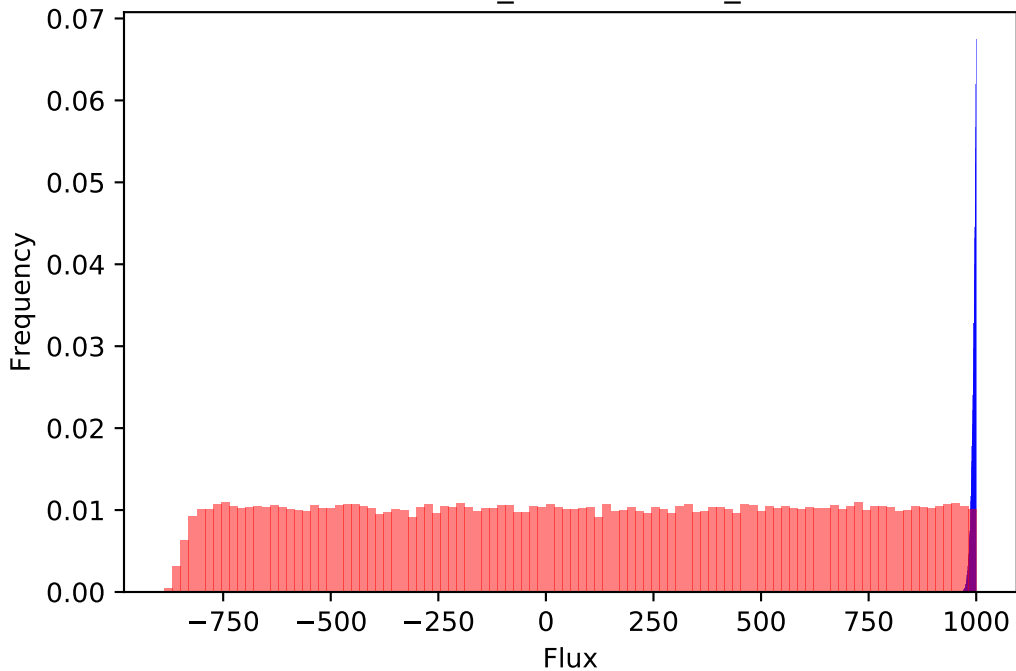


**\*\*7 : DPGA\_h + H\_h + NADPH\_h --> GAP\_h + NADP\_h + Pi\_h\*\***

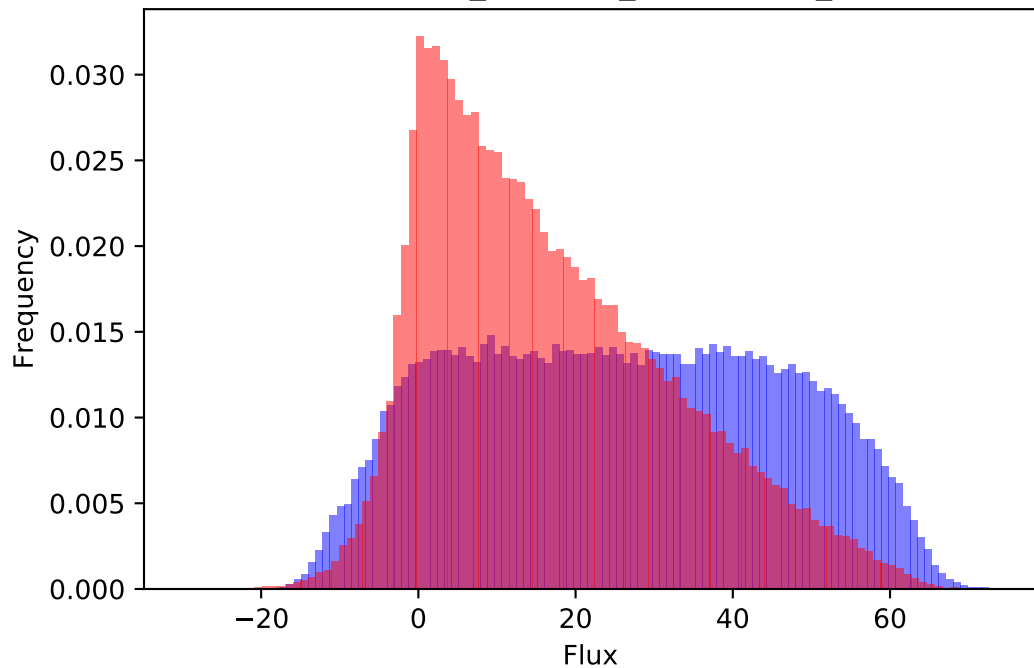




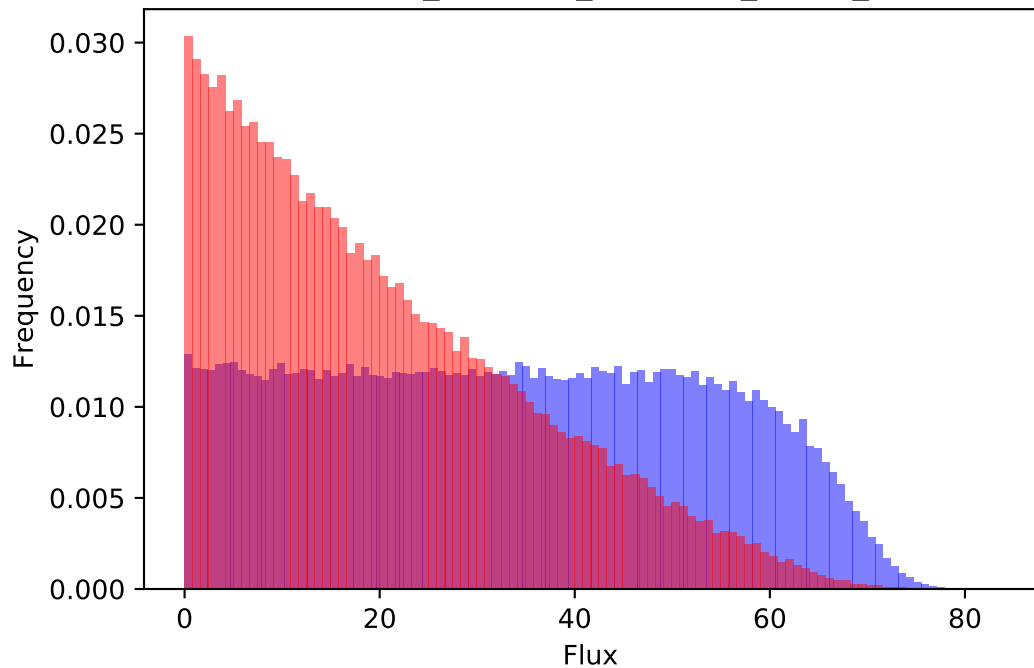
**\*\*8 : GAP\_h <=> DHAP\_h\*\***



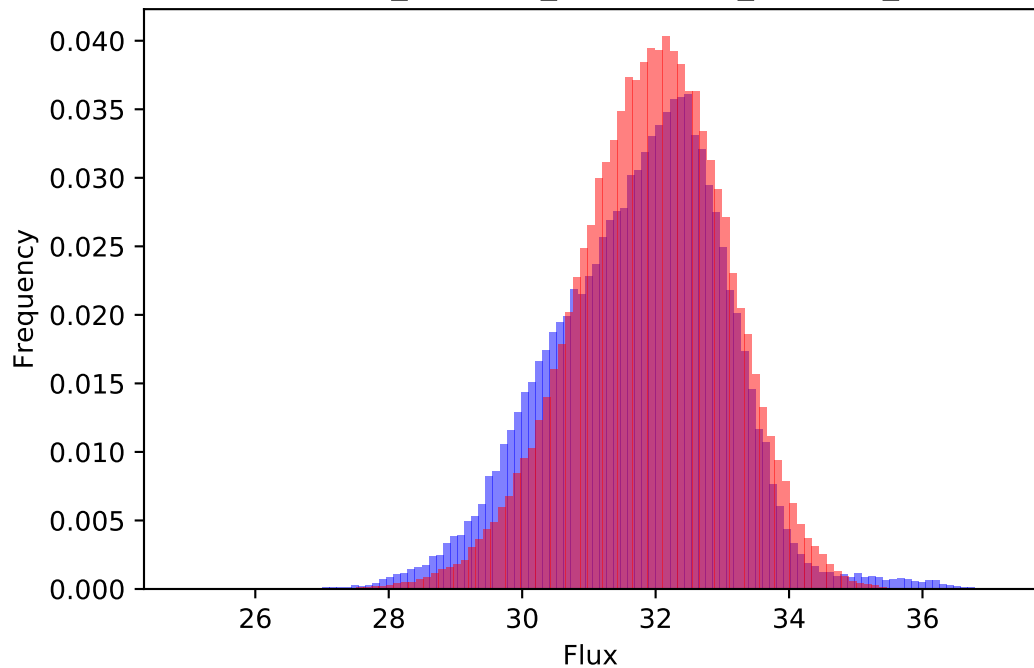
**\*\*9 : DHAP\_h + GAP\_h <=> FBP\_h\*\***



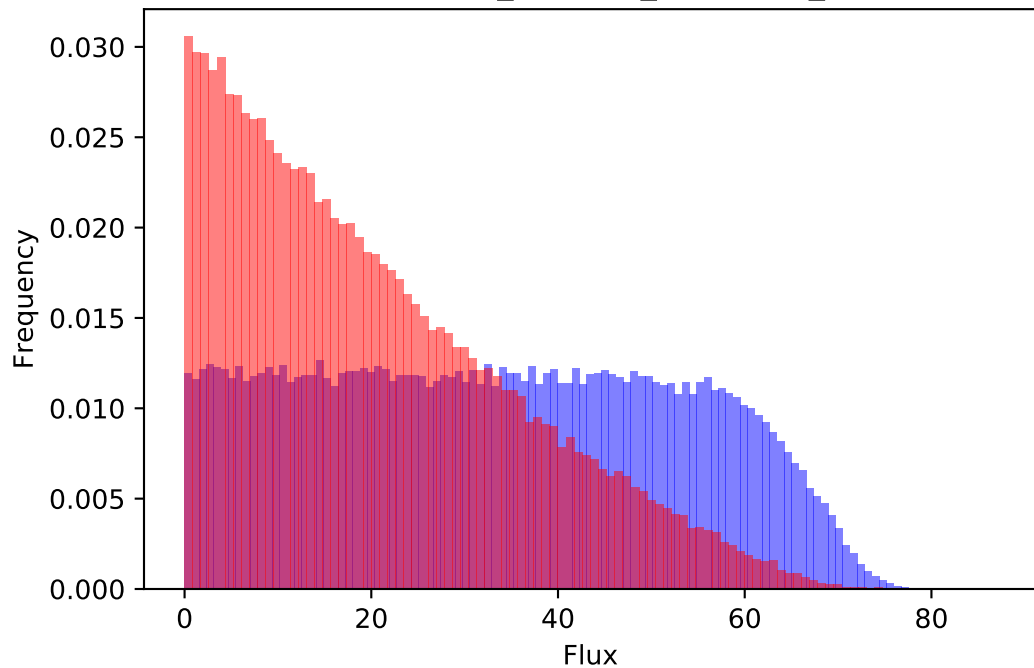
**\*\*10 : FBP\_h + H2O\_h --> F6P\_h + Pi\_h\*\***



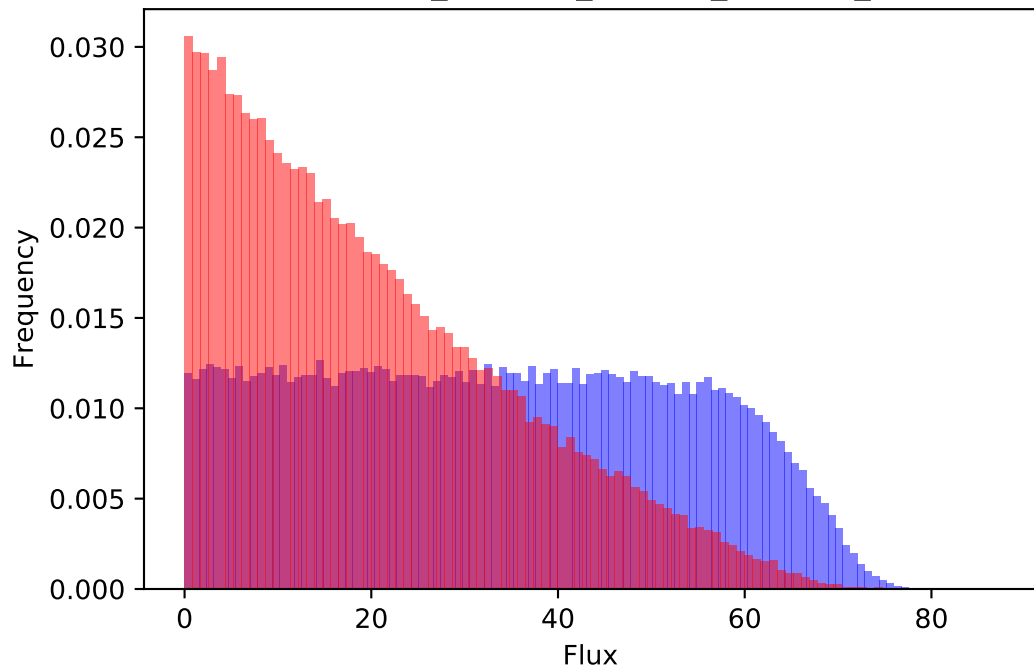
**\*\*11 : F6P\_h + GAP\_h <=> E4P\_h + X5P\_h\*\***



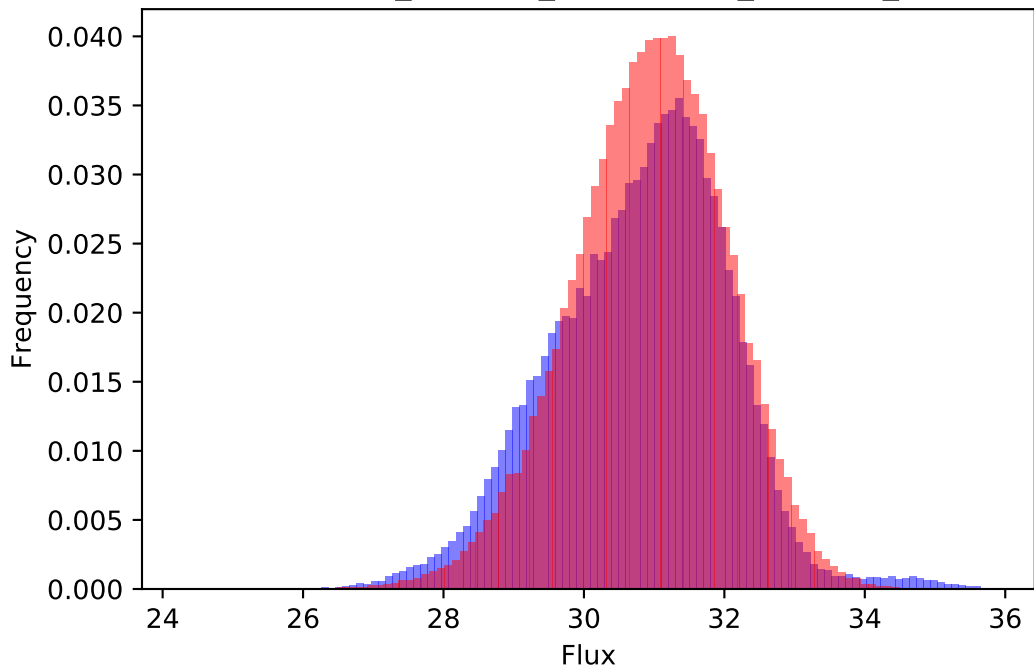
**\*\*12 : DHAP\_h + E4P\_h --> SBP\_h\*\***



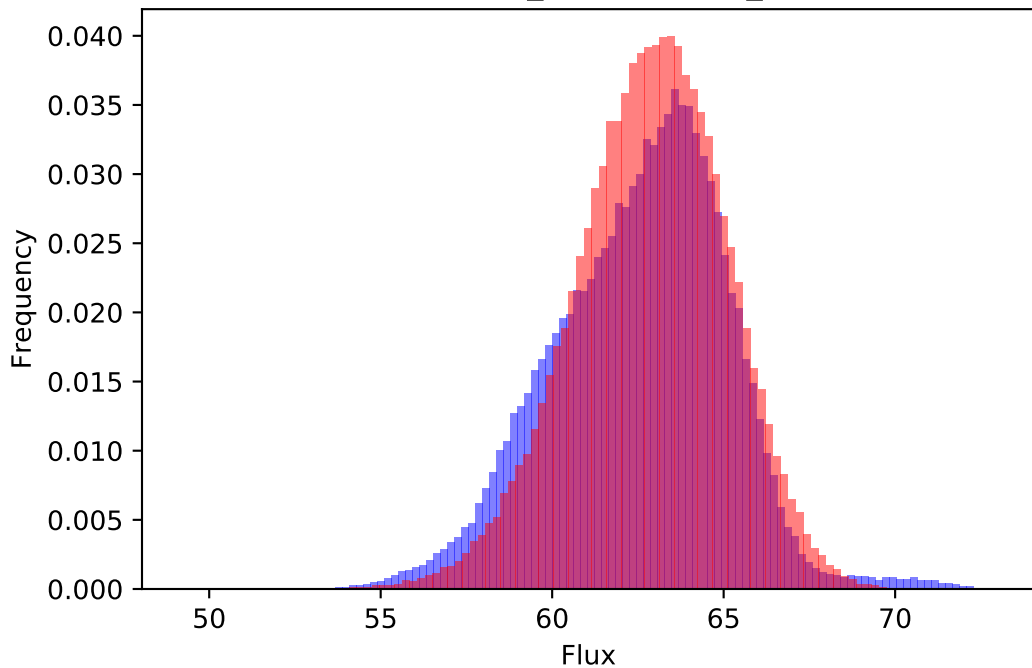
**\*\*13 : H2O\_h + SBP\_h --> Pi\_h + S7P\_h\*\***



**\*\*14 : GAP\_h + S7P\_h <=> R5P\_h + X5P\_h\*\***

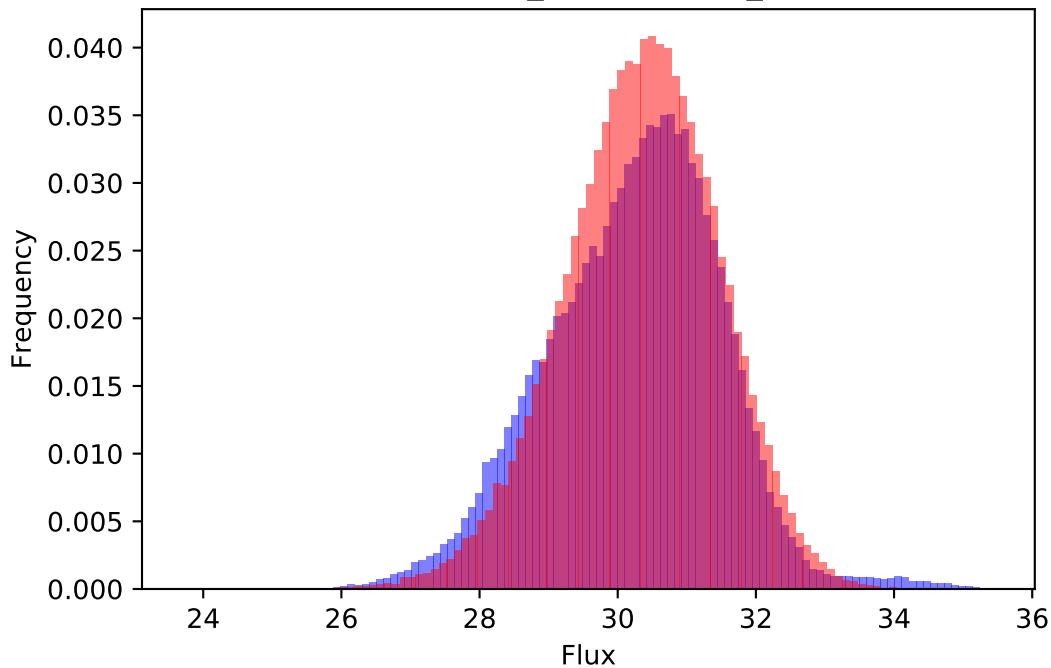


**\*\*15 : X5P\_h <=> Ru5P\_h\*\***

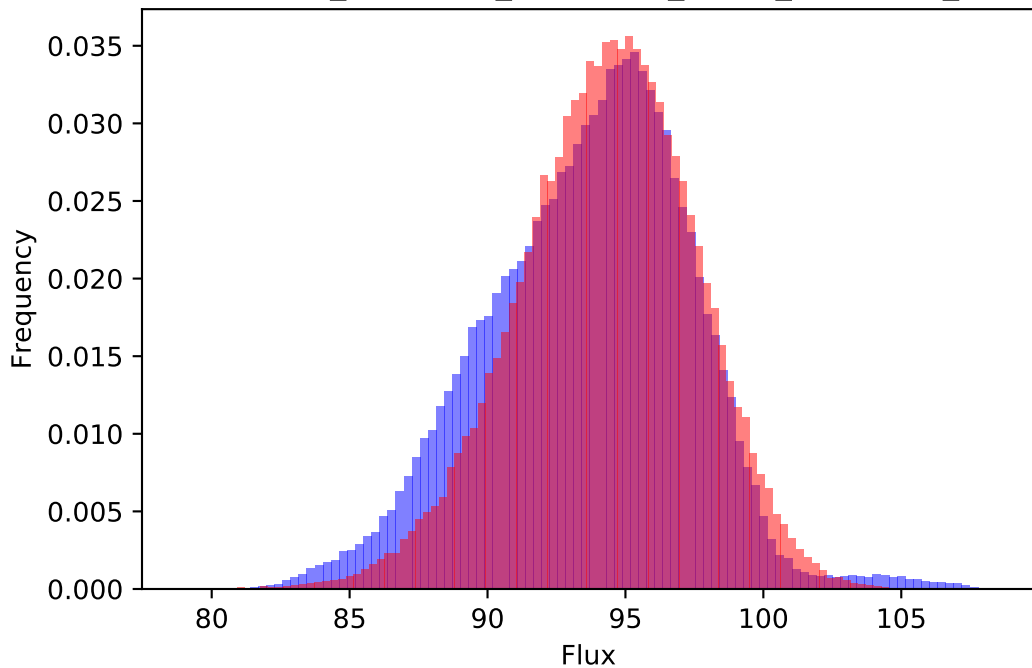




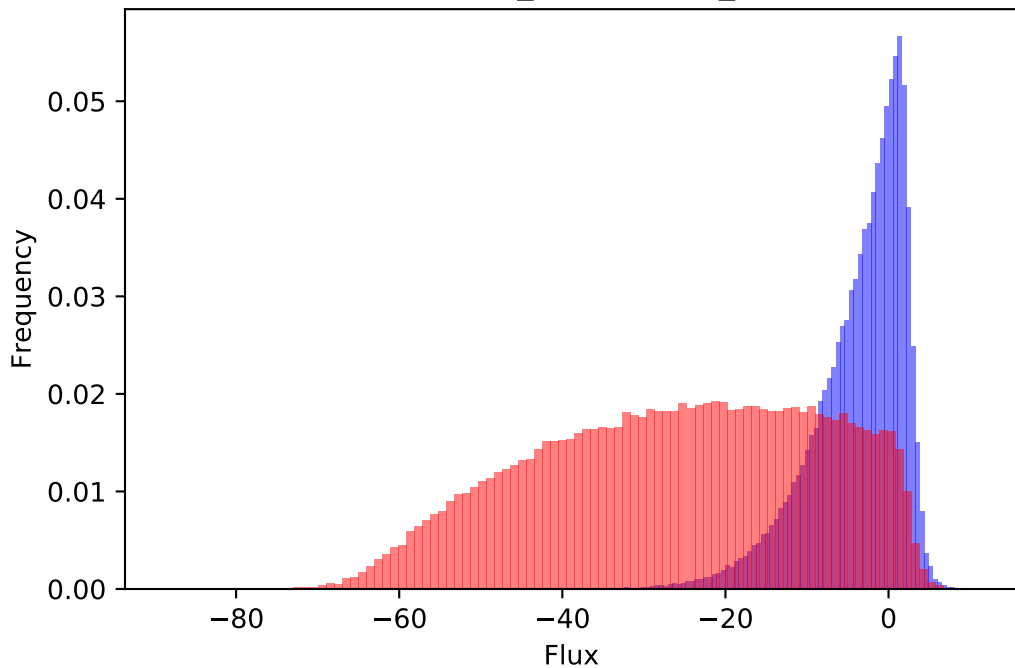
**\*\*16 : R5P\_h <=> Ru5P\_h\*\***



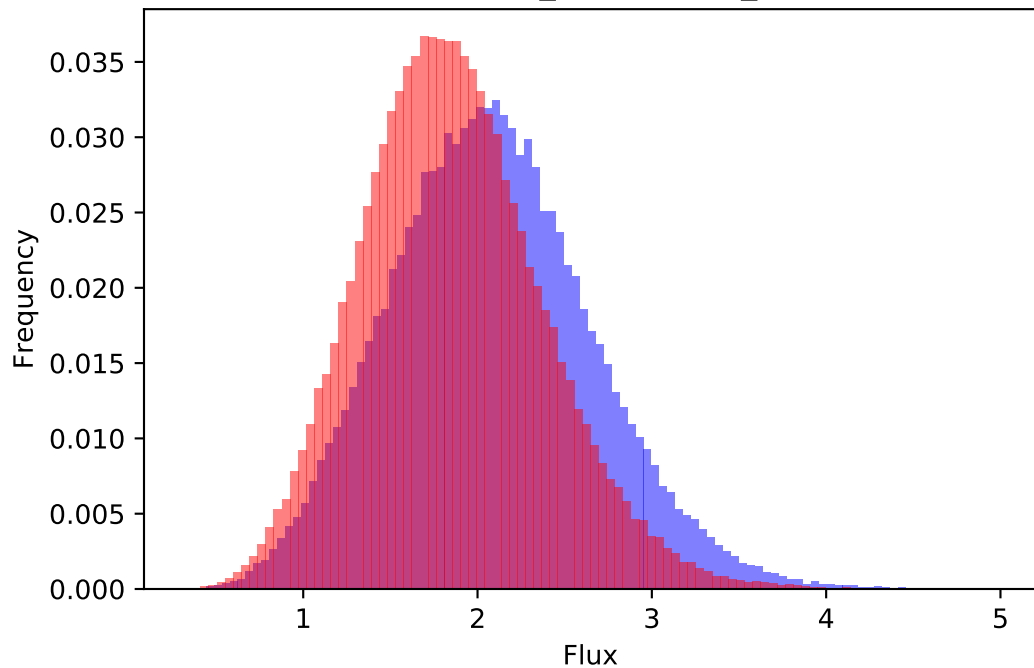
**\*\*17 : ATP\_h + Ru5P\_h --> ADP\_h + H\_h + RuBP\_h\*\***



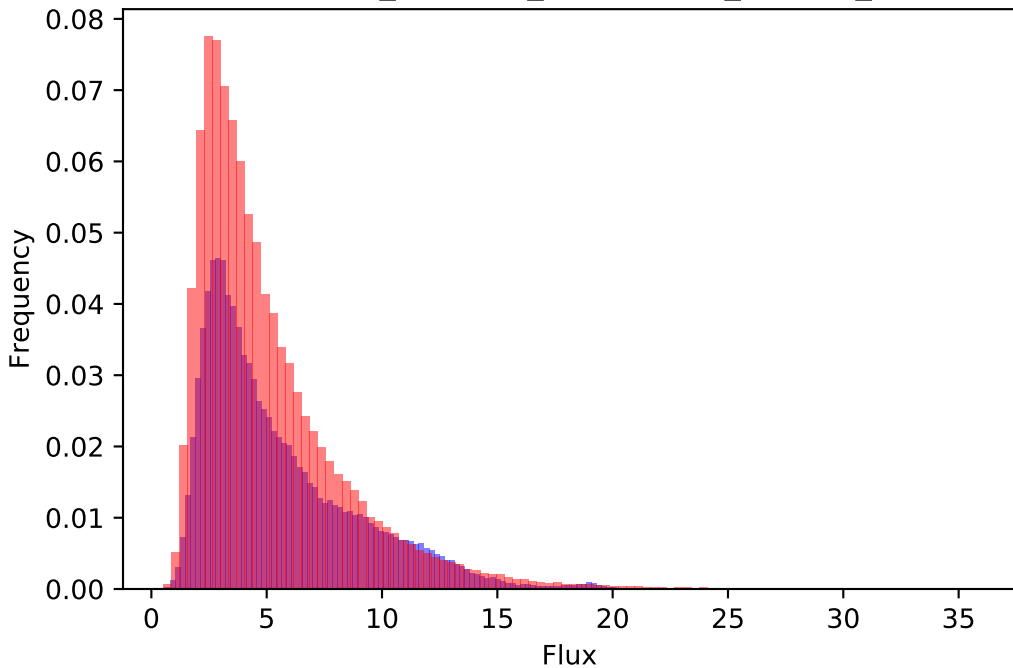
**\*\*18 : F6P\_h <=> G6P\_h\*\***



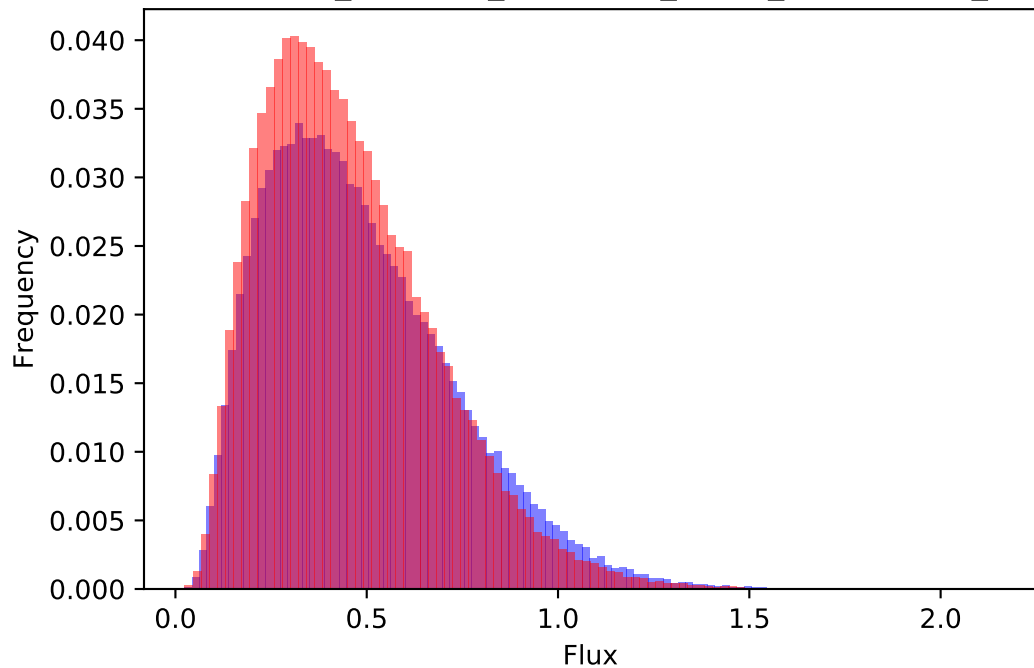
**\*\*19 : G6P\_h <=> G1P\_h\*\***



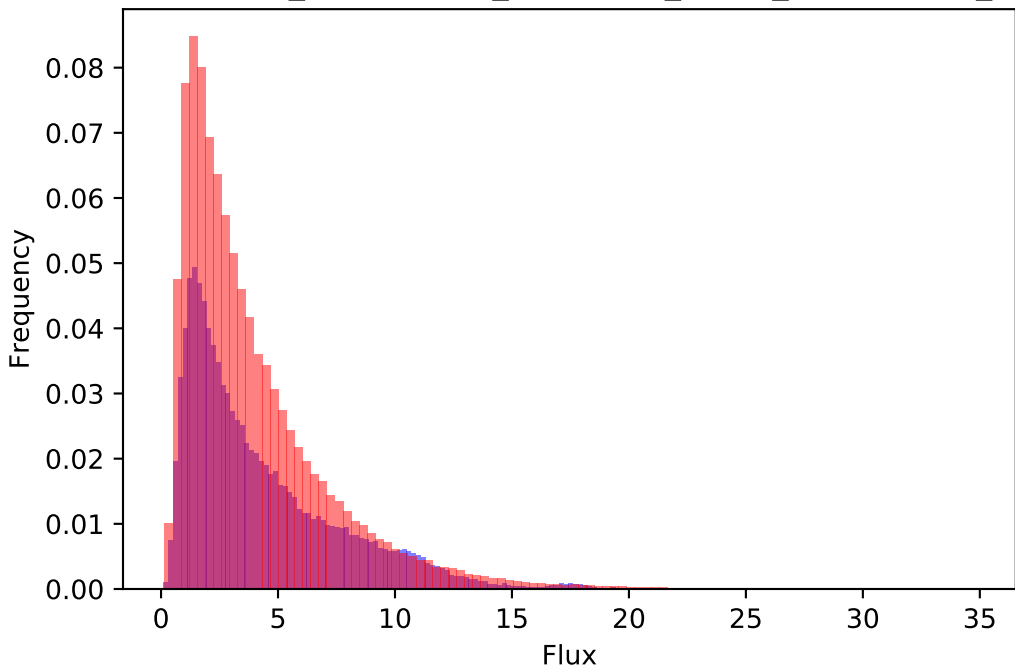
**\*\*20 : ATP\_h + G1P\_h --> ADPG\_h + PPI\_h\*\***



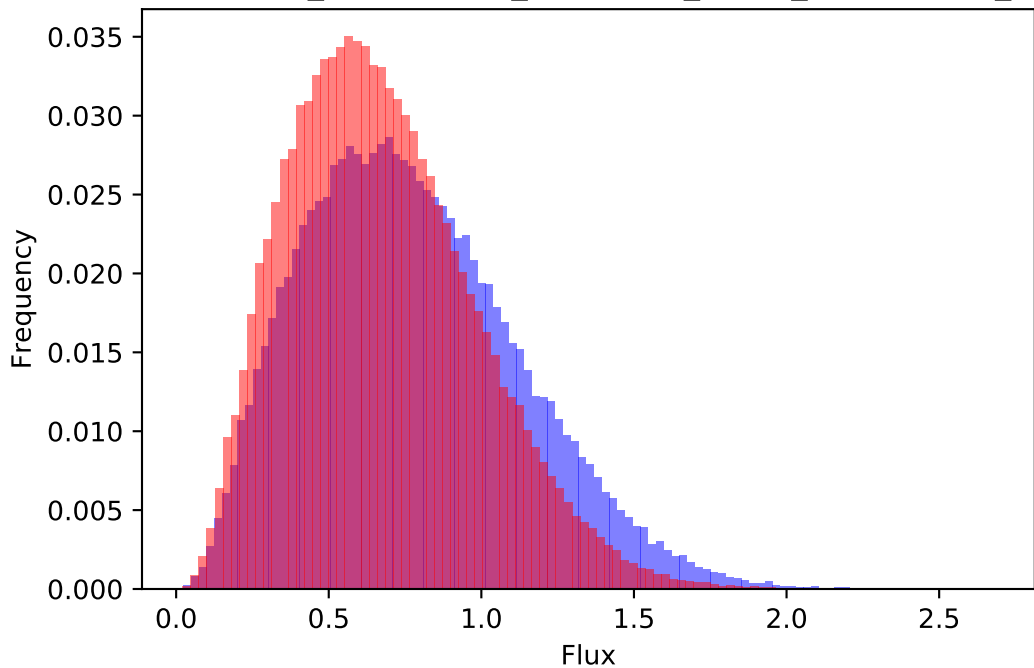
**\*\*21 : ADPG\_h + H2O\_h --> ADP\_h + H\_h + starch1\_h\*\***



**\*\*22 : ADPG\_h + starch1\_h --> ADP\_h + H\_h + starch2\_h\*\***

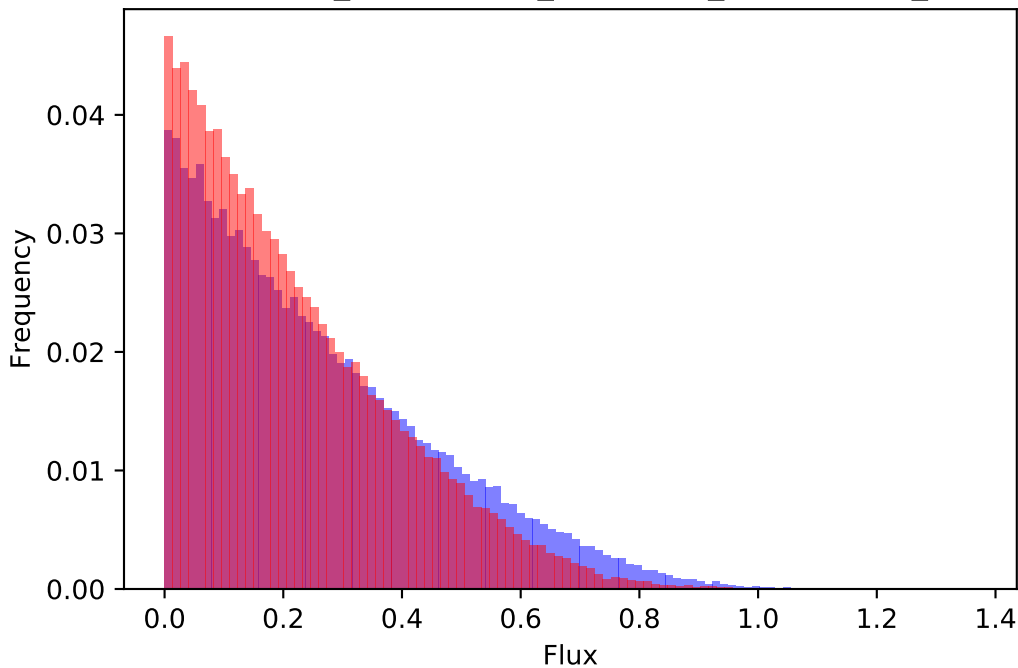


**\*\*23 : ADPG\_h + starch2\_h --> ADP\_h + H\_h + starch3\_h\*\***

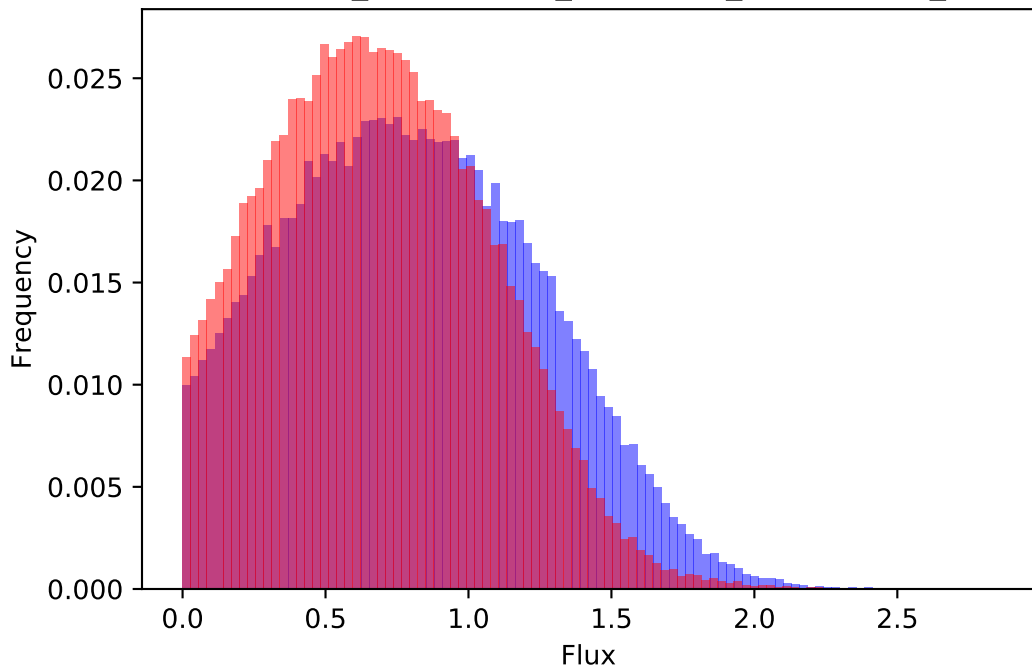




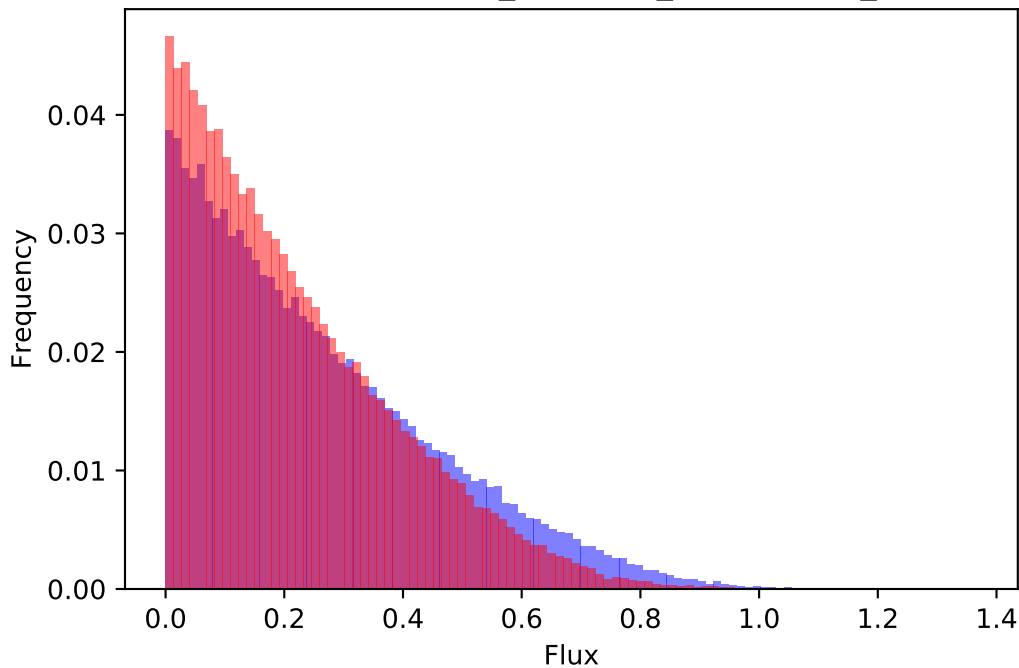
**\*\*24 : H2O\_h + starch5\_h --> Mas\_h + starch3\_h\*\***



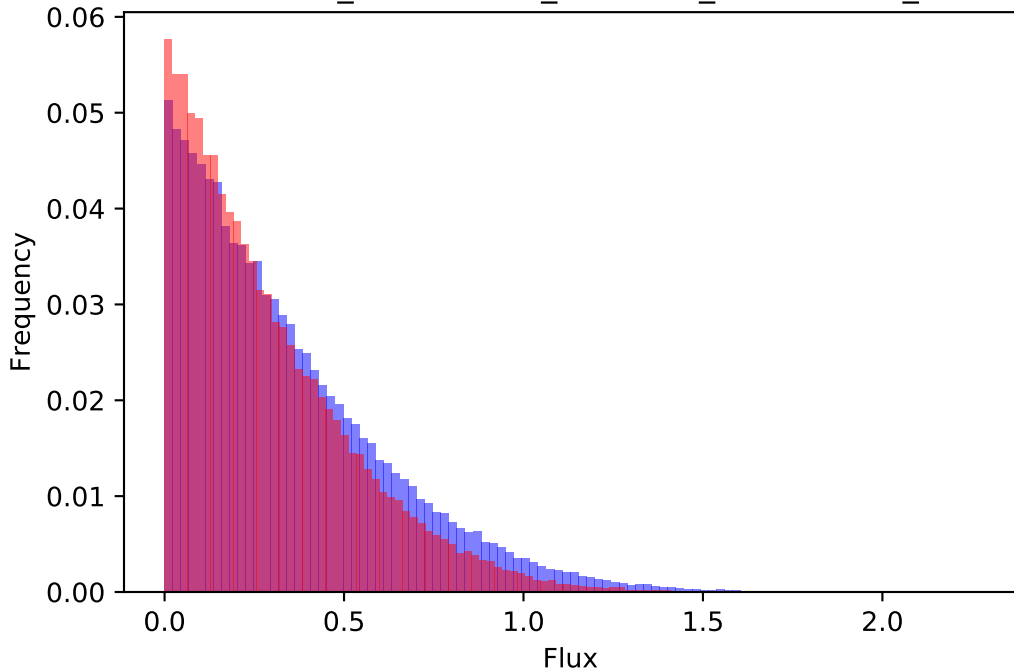
**\*\*25 : H2O\_h + starch3\_h --> Mas\_h + starch1\_h\*\***



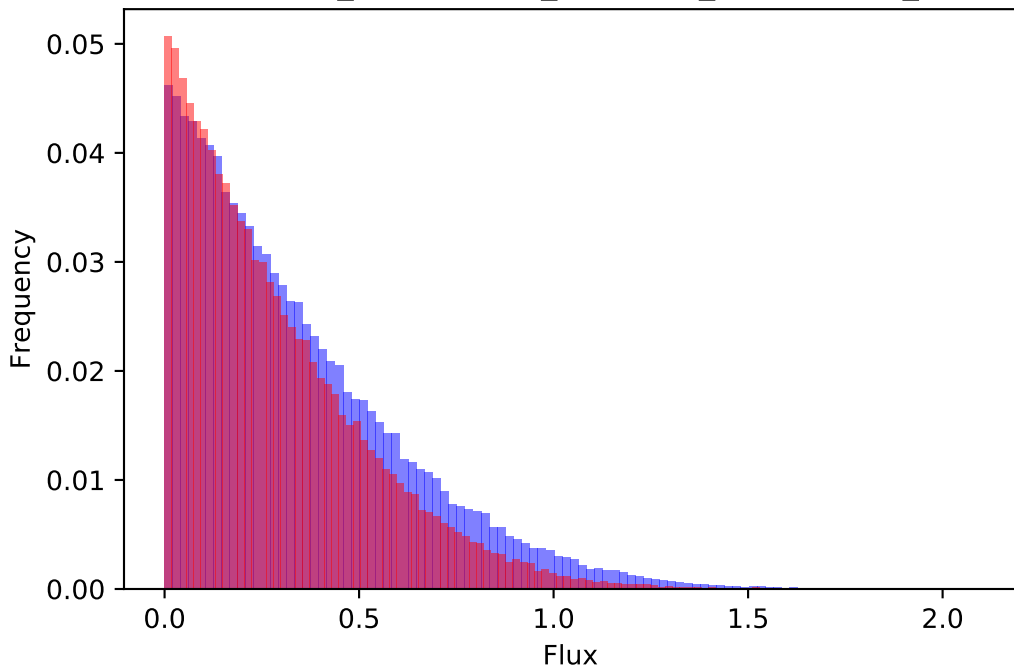
**\*\*26 : 2.0 starch3\_h --> Glc\_h + starch5\_h\*\***



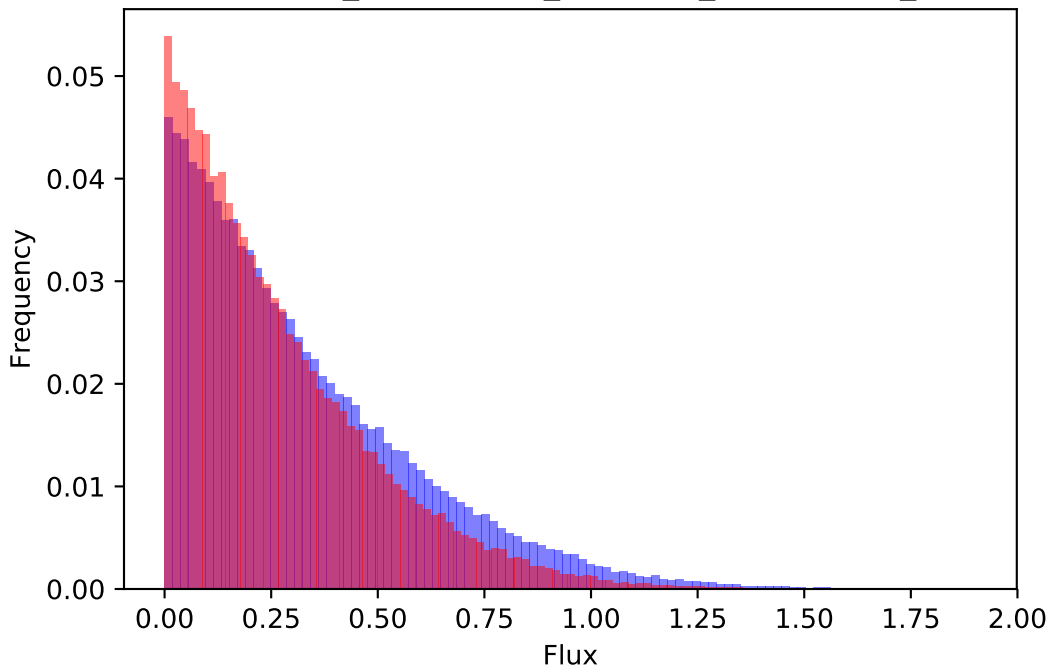
**\*\*27 : Mas\_h + starch1\_h --> Glc\_h + starch2\_h\*\***



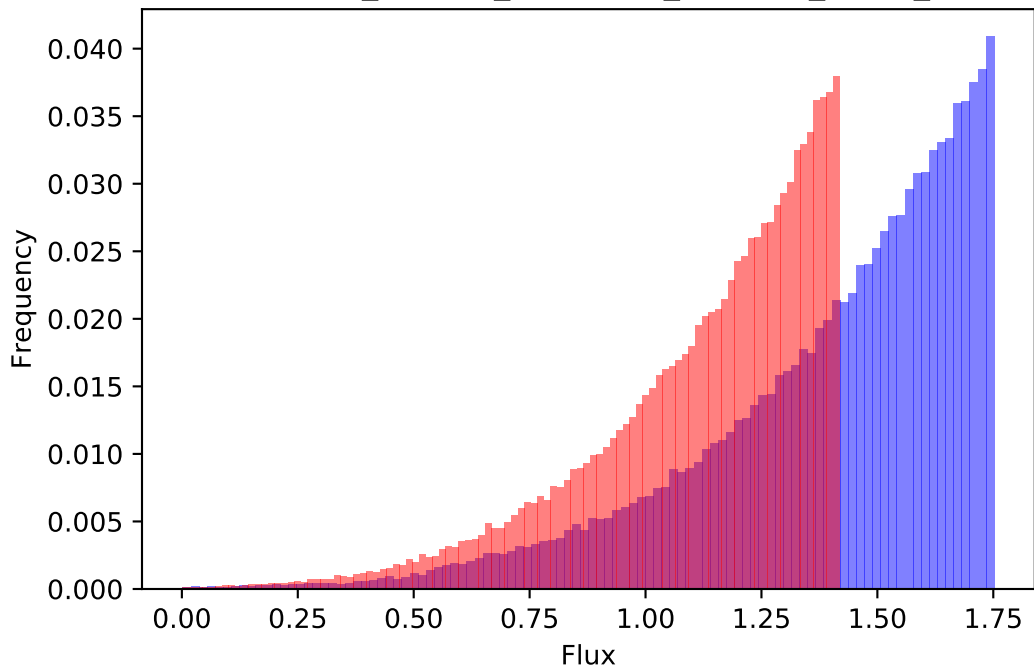
**\*\*28 : Mas\_h + starch2\_h --> Glc\_h + starch3\_h\*\***



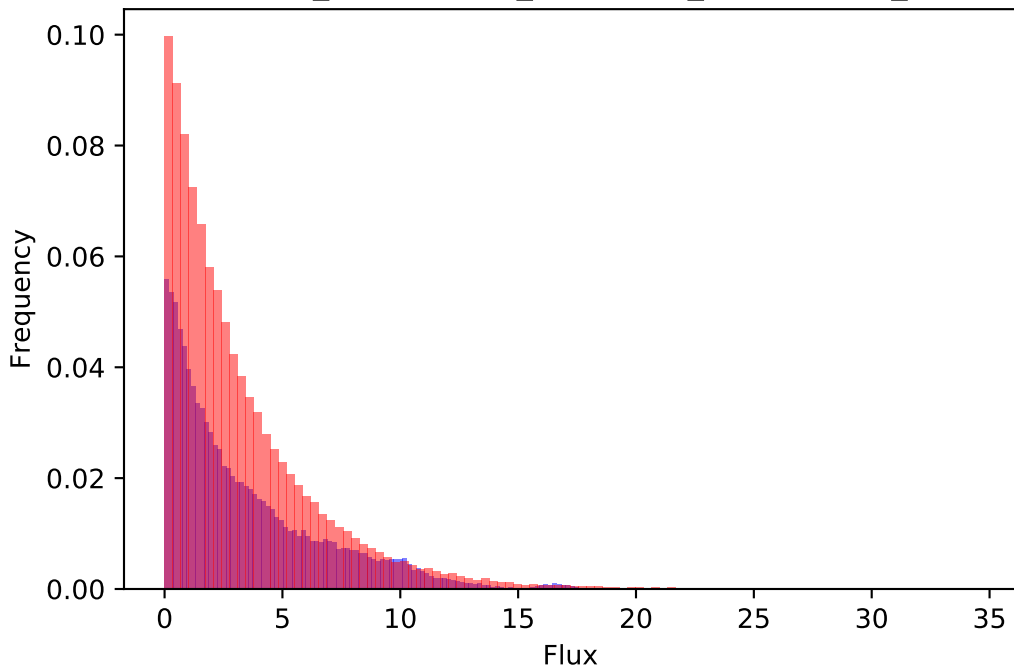
**\*\*29 : Mas\_c + starch1\_c --> Glc\_c + starch2\_c\*\***



**\*\*30 : ATP\_c + Glc\_c --> ADP\_c + G6P\_c + H\_c\*\***

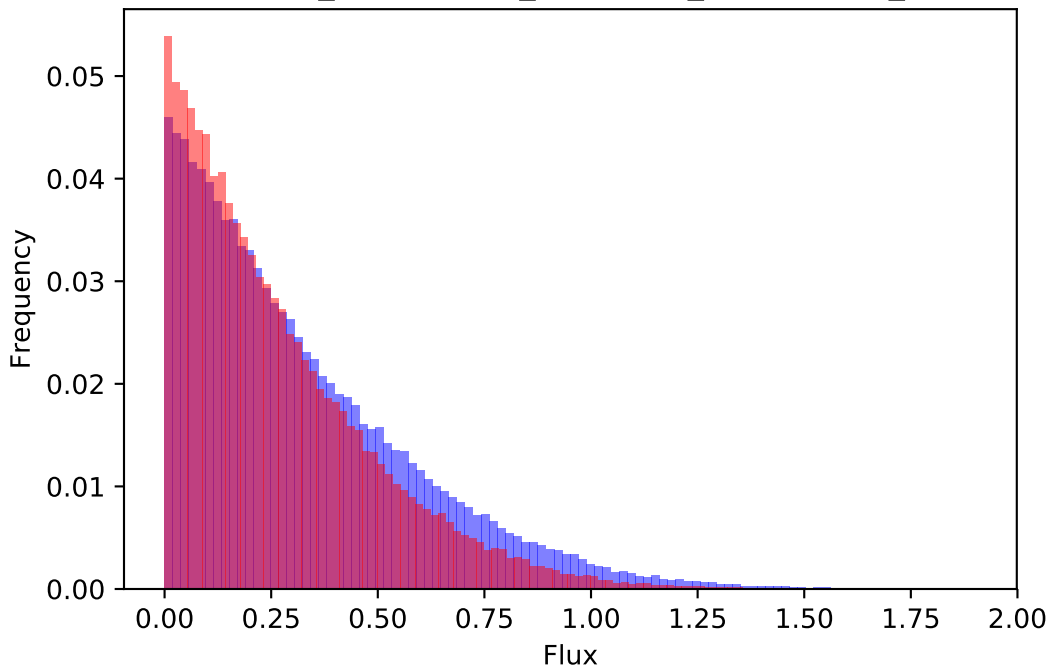


**\*\*31 : Pi\_h + starch2\_h --> G1P\_h + starch1\_h\*\***

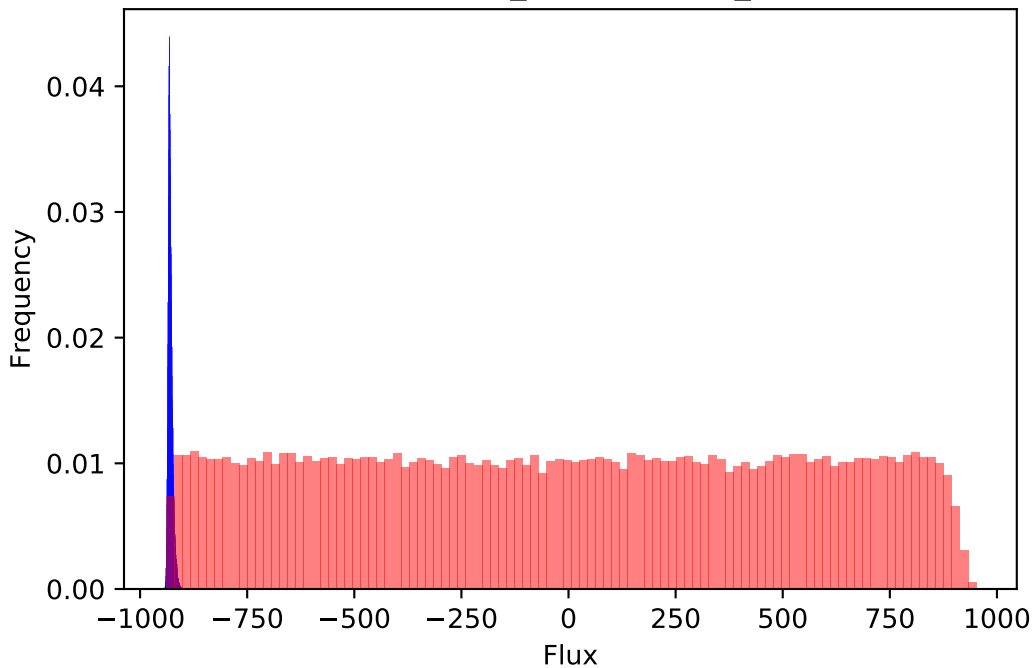




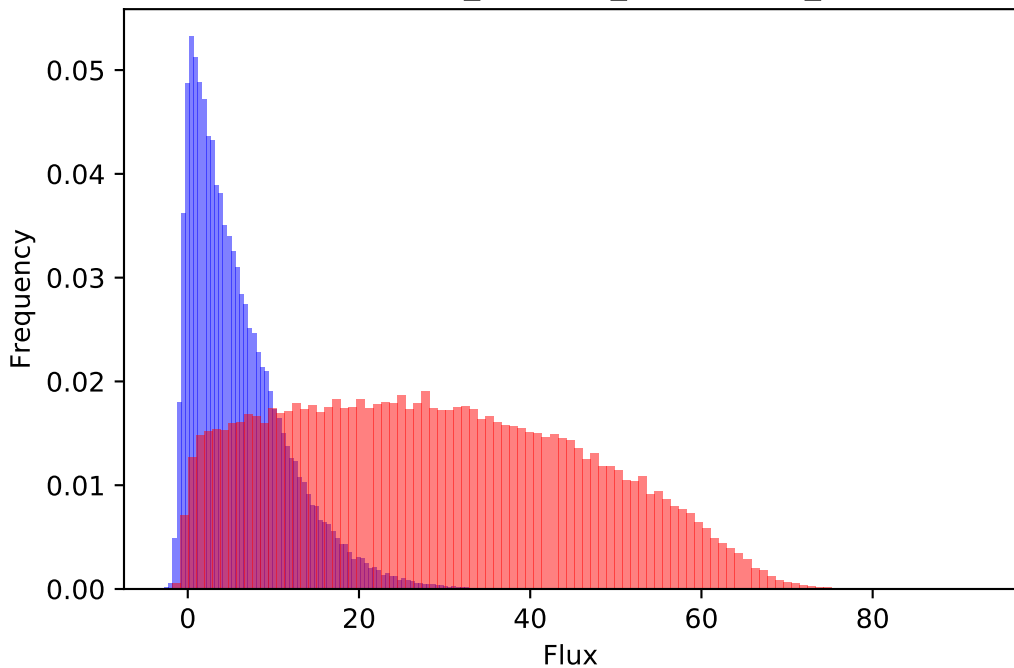
**\*\*32 : Pi\_c + starch2\_c --> G1P\_c + starch1\_c\*\***



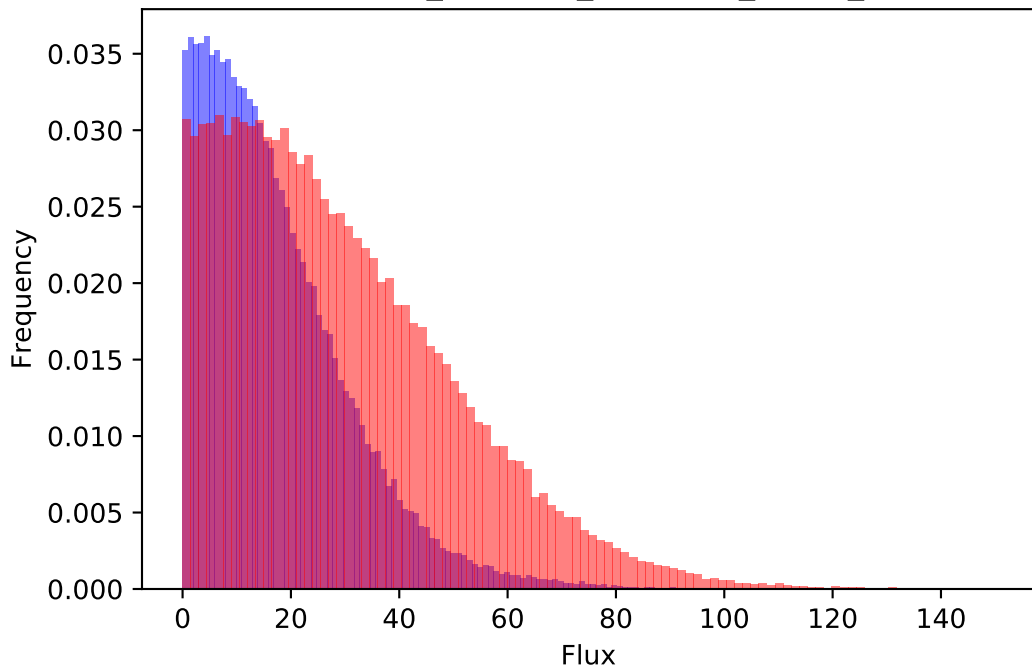
**\*\*33 : GAP\_c <=> DHAP\_c\*\***



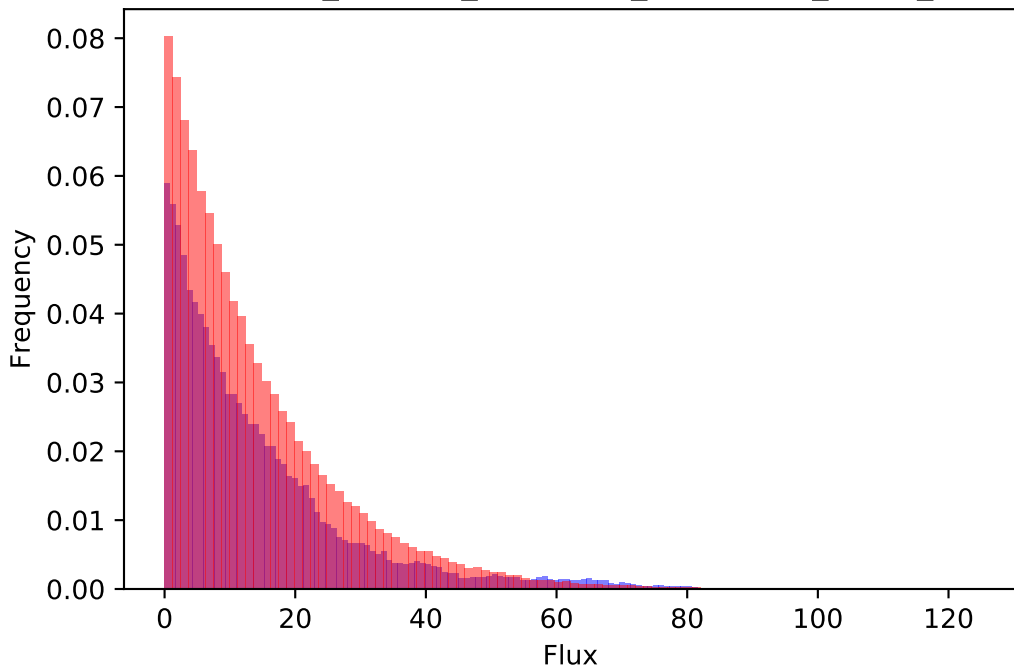
**\*\*34 : DHAP\_c + GAP\_c  $\rightleftharpoons$  FBP\_c\*\***



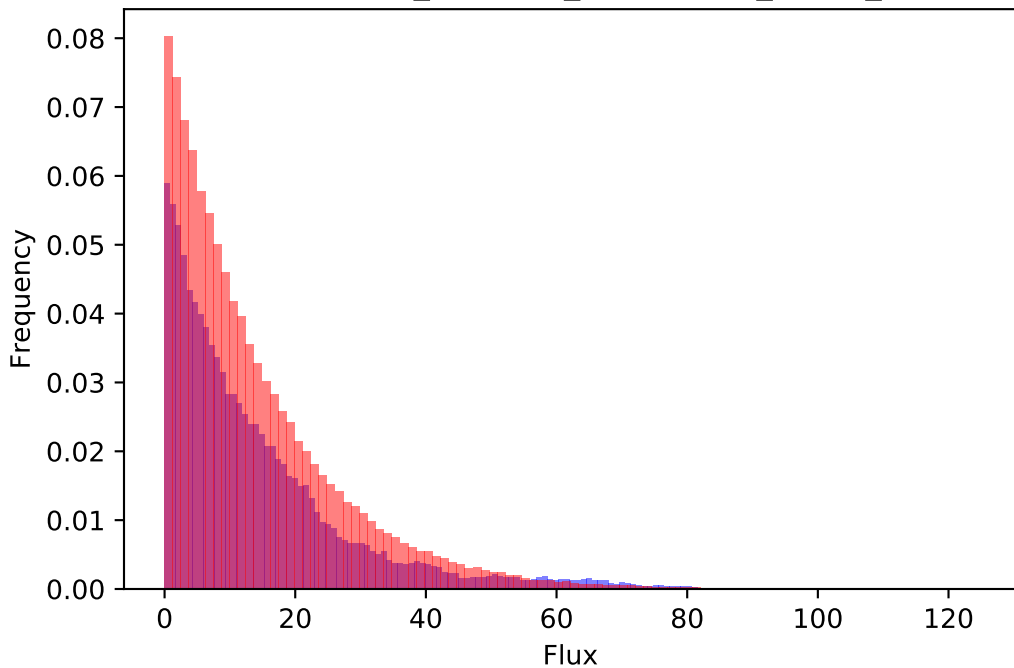
**\*\*35 : FBP\_c + H2O\_c --> F6P\_c + Pi\_c\*\***



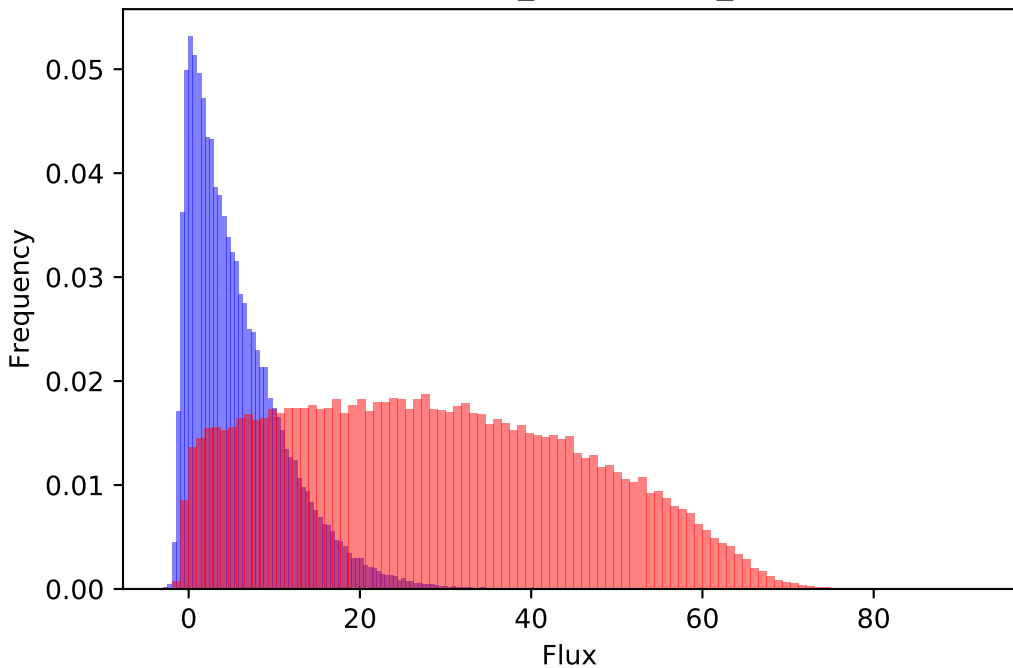
**\*\*36 : ATP\_c + F6P\_c --> ADP\_c + F26BP\_c + H\_c\*\***



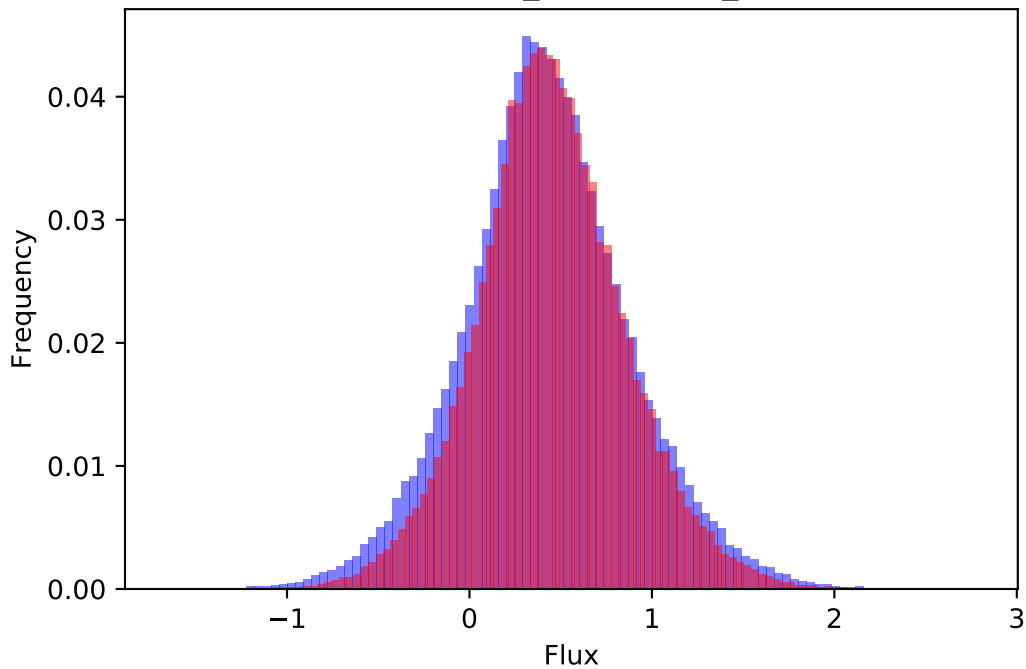
**\*\*37 : F26BP\_c + H2O\_c <=> F6P\_c + Pi\_c\*\***



**\*\*38 : F6P\_c <=> G6P\_c\*\***

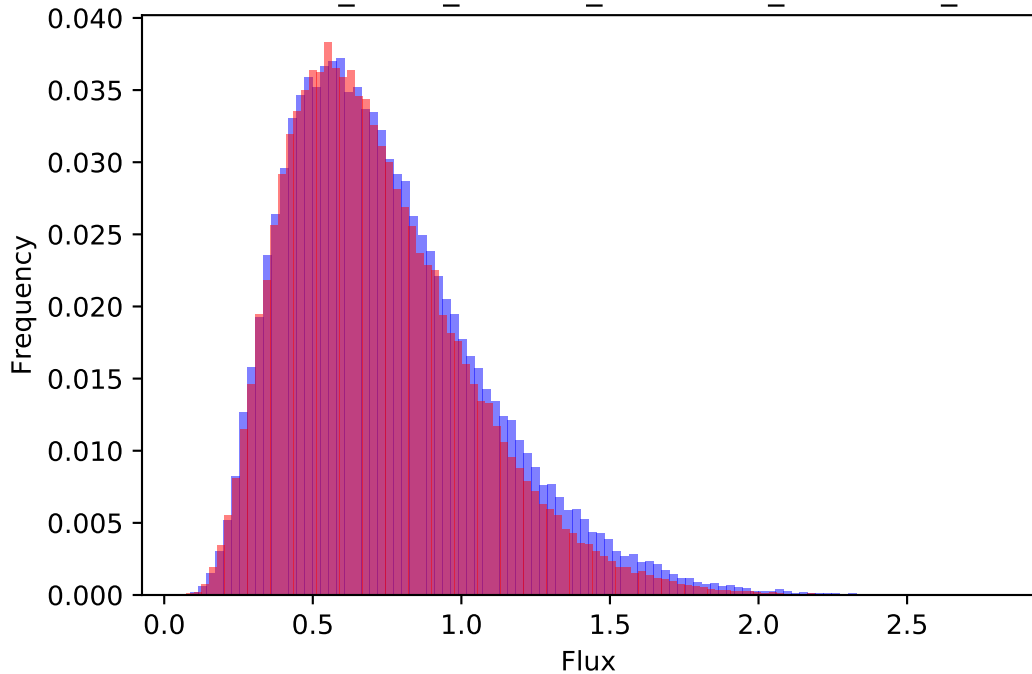


**\*\*39 : G6P\_c <=> G1P\_c\*\***

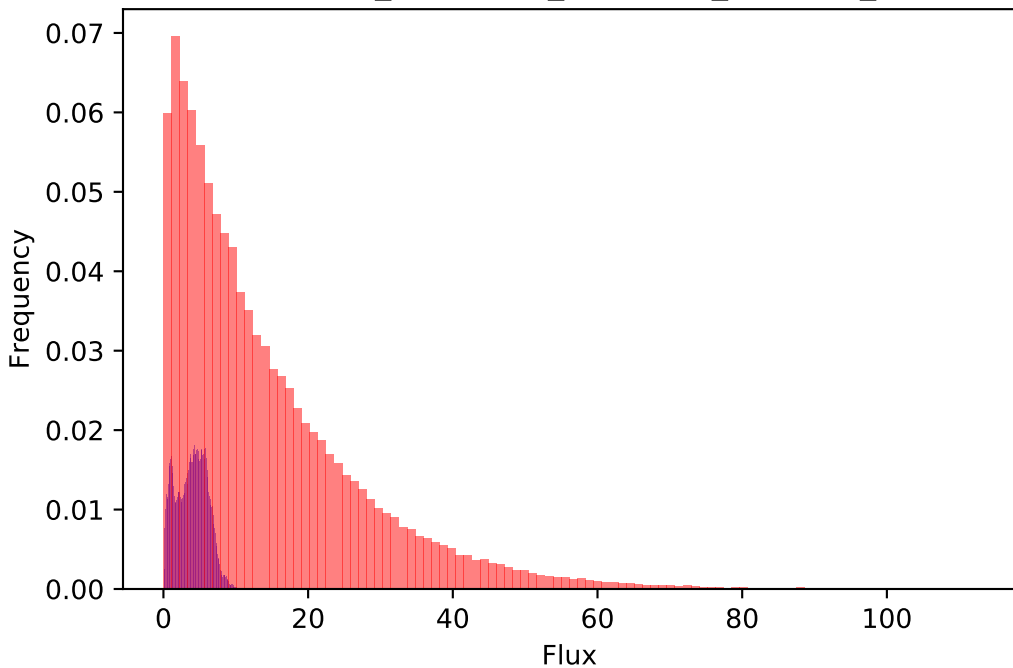




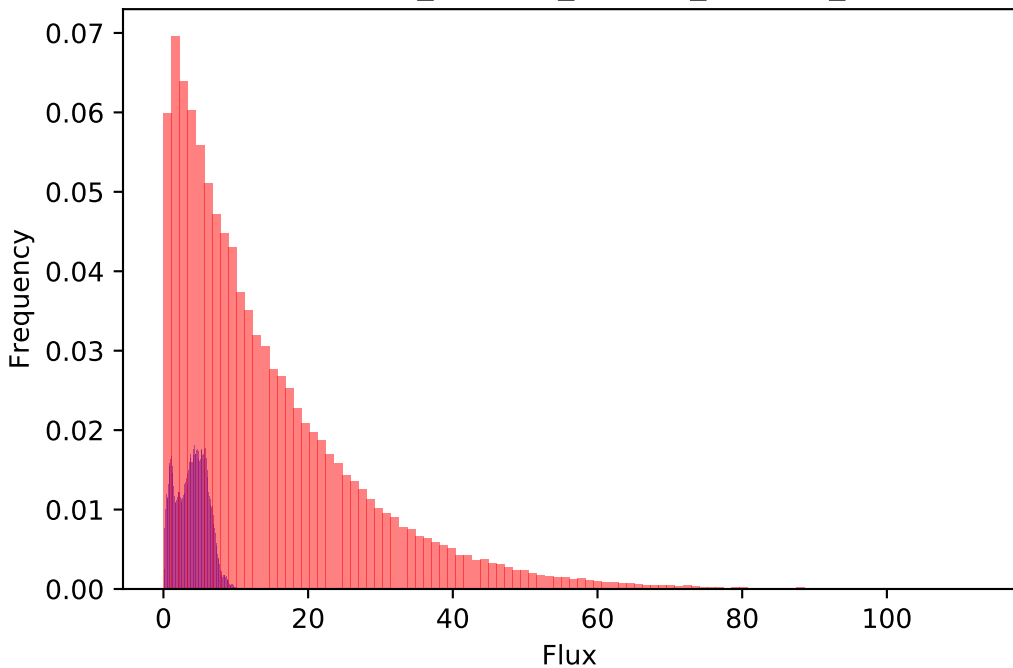
**\*\*40 : G1P\_c + H\_c + UTP\_c <=> PPi\_c + UDPG\_c\*\***



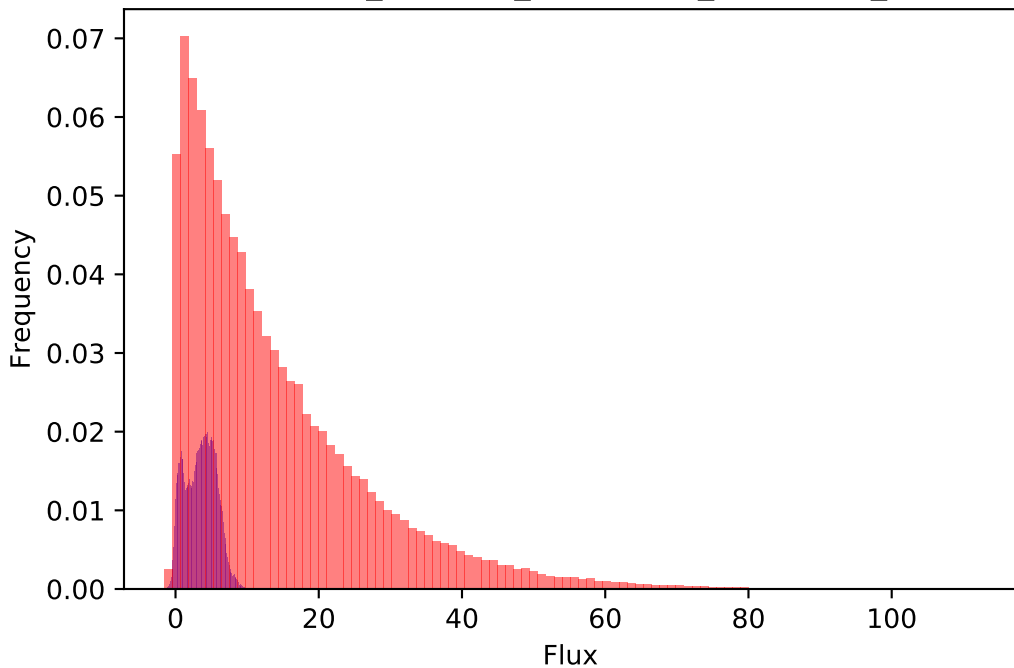
**\*\*41 : F6P\_c + UDPG\_c --> S6P\_c + UDP\_c\*\***



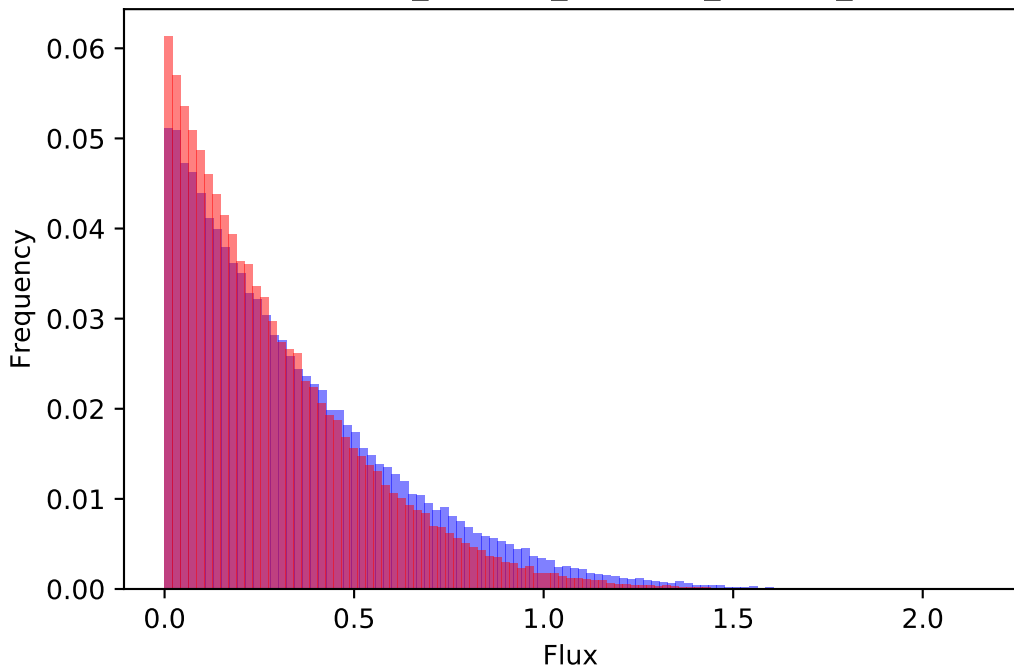
**\*\*42 : H2O\_c + S6P\_c --> Pi\_c + Suc\_c\*\***



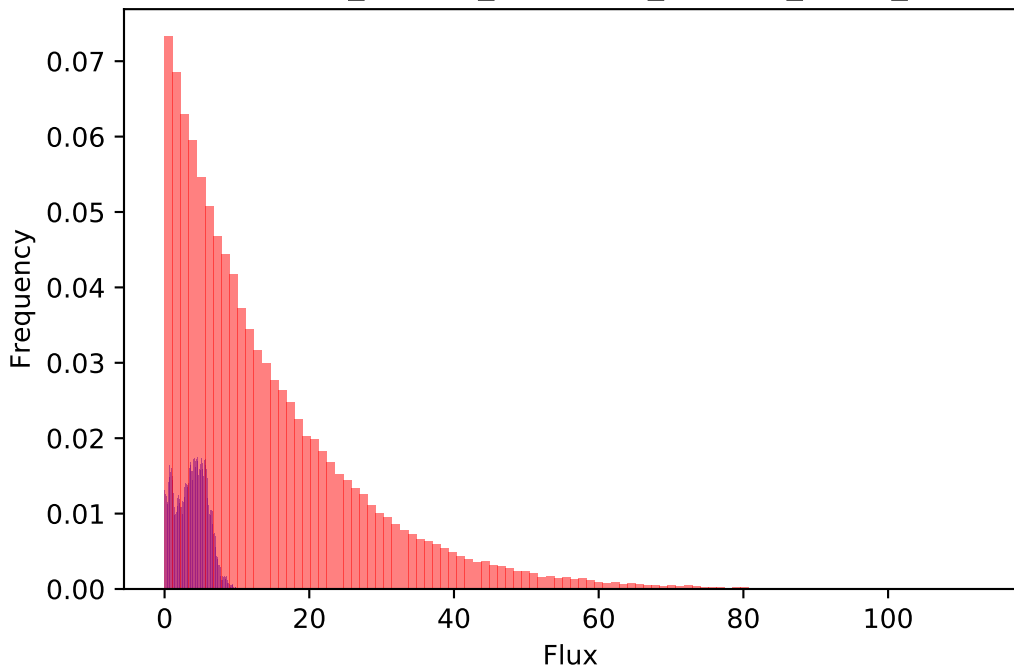
**\*\*43 : Suc\_c + UDP\_c <=> Frc\_c + UDPG\_c\*\***



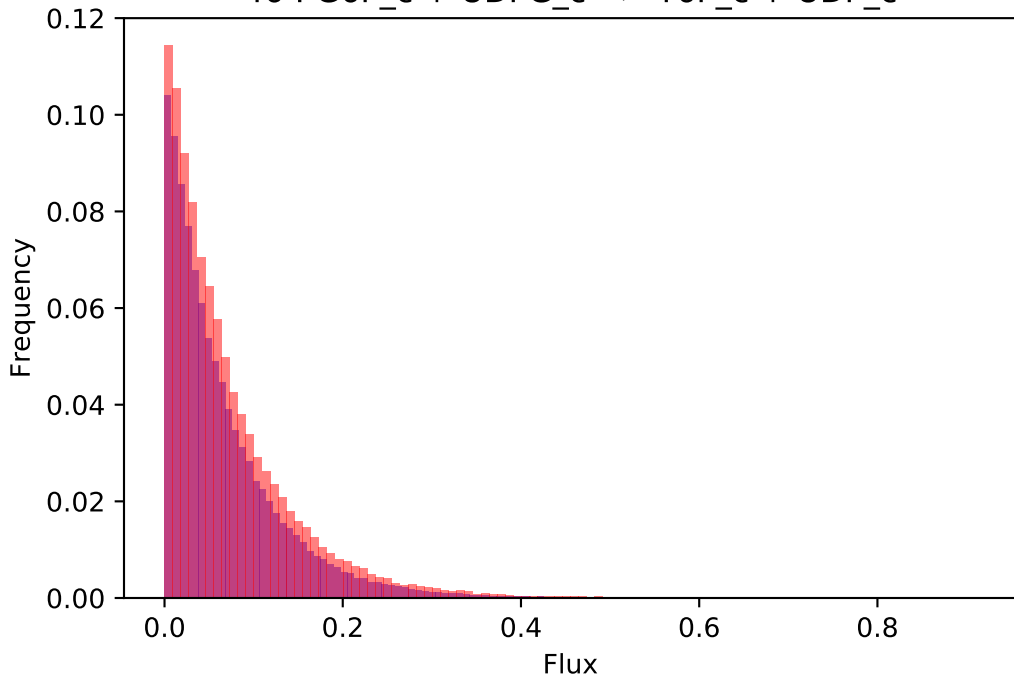
**\*\*44 : H2O\_c + Suc\_c --> Frc\_c + Glc\_c\*\***



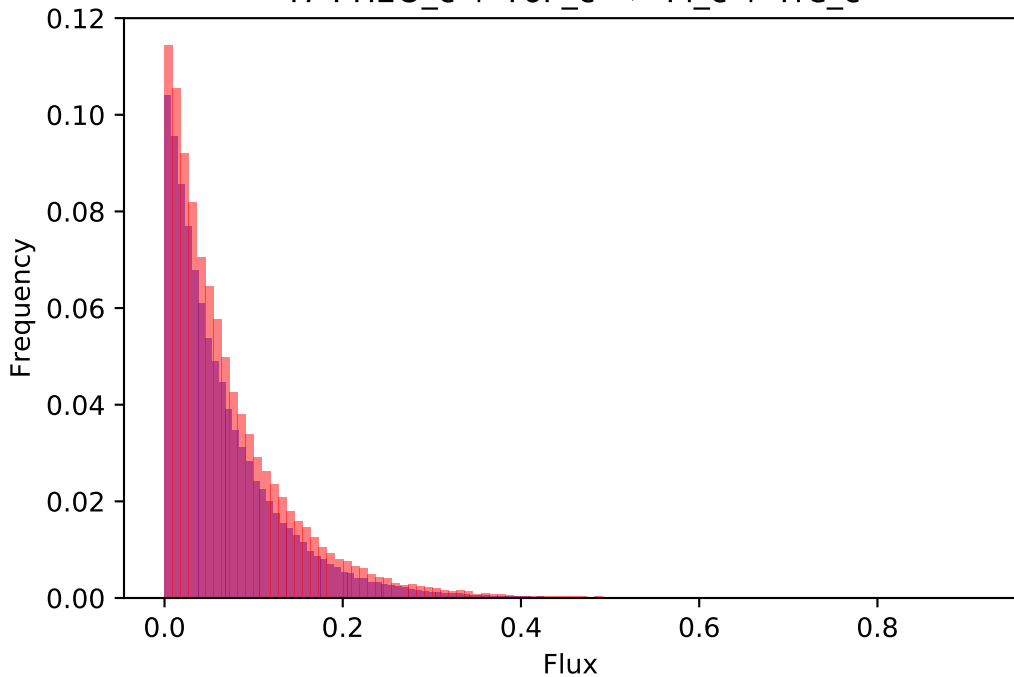
**\*\*45 : ATP\_c + Frc\_c --> ADP\_c + F6P\_c + H\_c\*\***



**\*\*46 : G6P\_c + UDPG\_c --> T6P\_c + UDP\_c\*\***

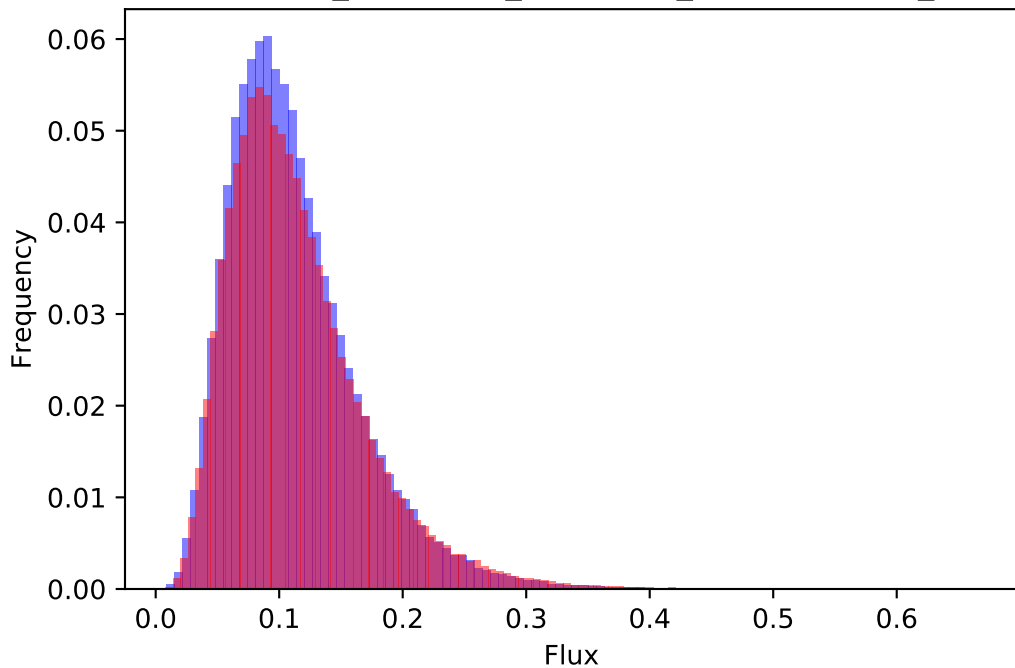


**\*\*47 : H2O\_c + T6P\_c --> Pi\_c + Tre\_c\*\***

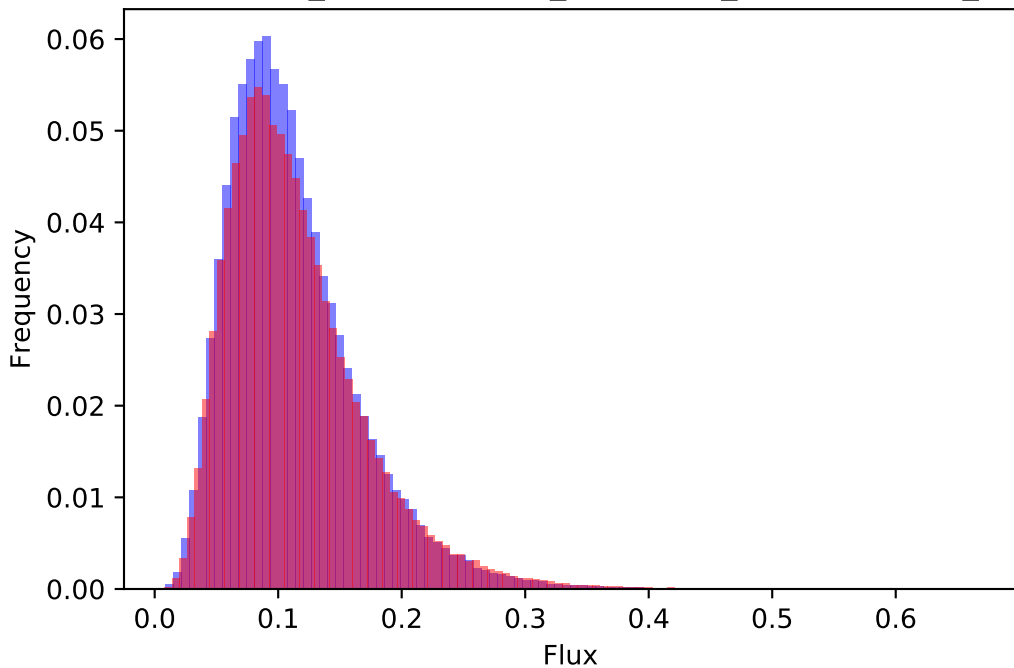




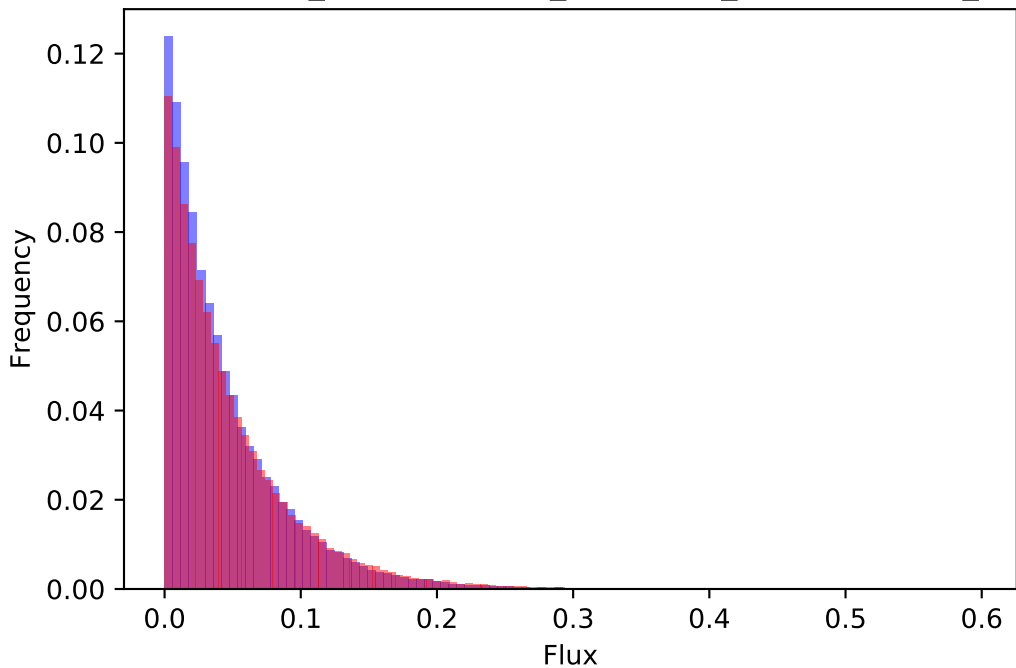
**\*\*48 : H2O\_c + UDPG\_c --> UDP\_c + cellulose1\_c\*\***



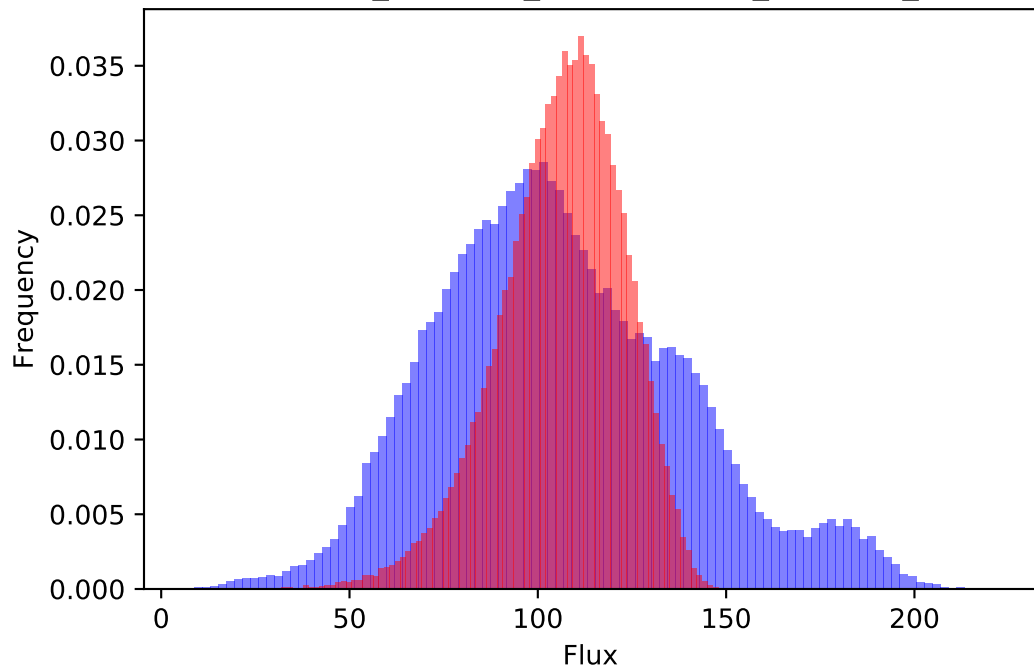
**\*\*49 : UDPG\_c + cellulose1\_c --> UDP\_c + cellulose2\_c\*\***



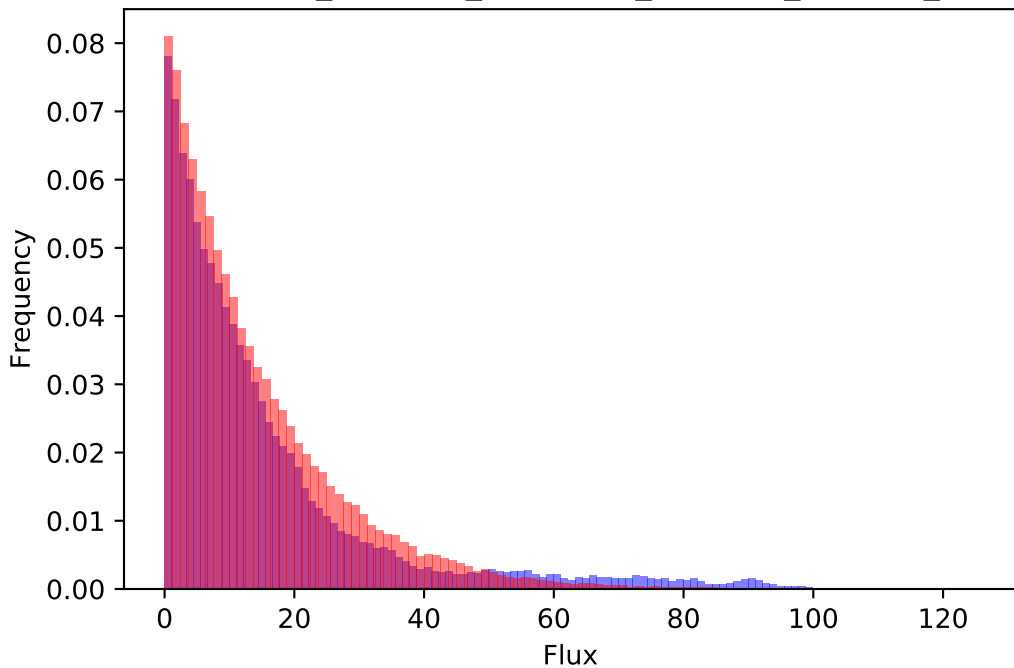
**\*\*50 : UDPG\_c + cellulose2\_c --> UDP\_c + cellulose3\_c\*\***



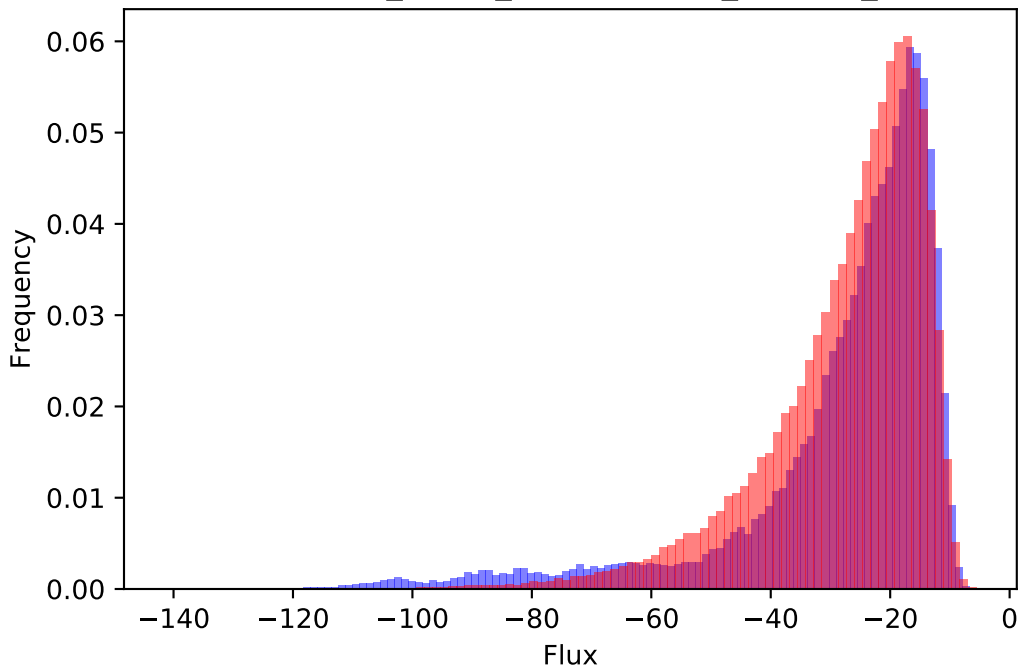
**\*\*51 : Mal\_c + NAD\_c <=> NADH\_c + OAA\_c\*\***



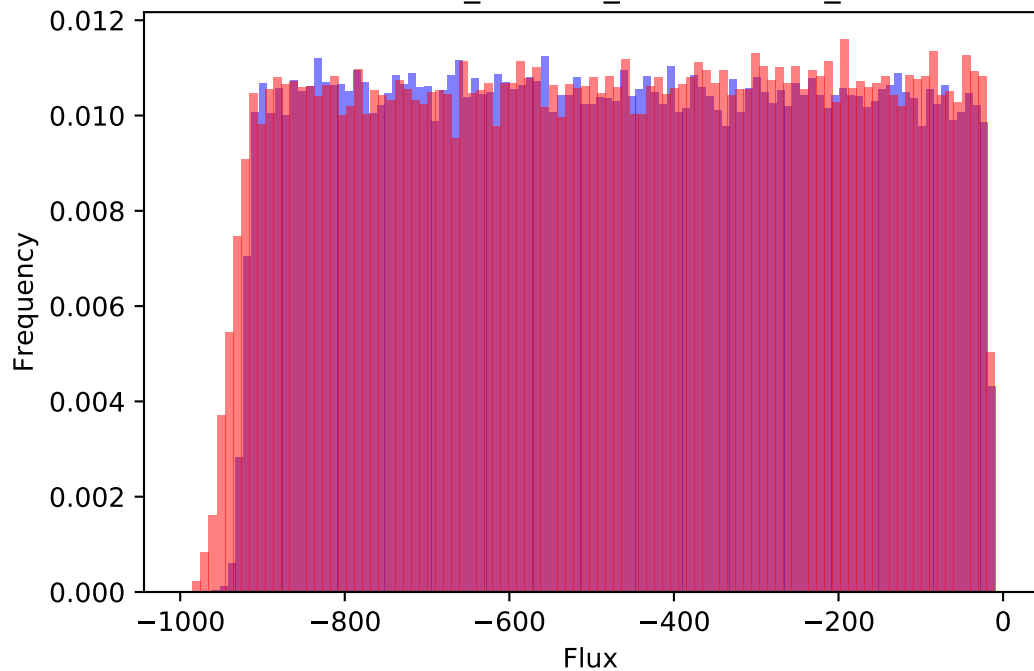
**\*\*52 : ATP\_c + OAA\_c --> ADP\_c + CO2\_c + PEP\_c\*\***



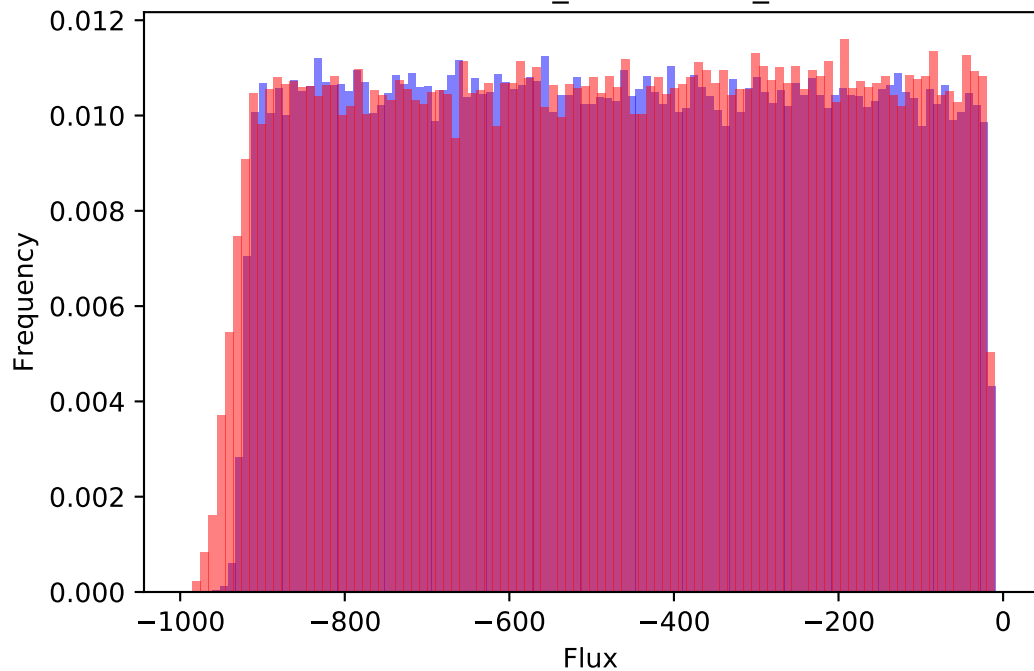
**\*\*53 : OAA\_c + Pi\_c <=> HCO3\_c + PEP\_c\*\***



**\*\*54 : H2O\_c + PEP\_c <=> 2PGA\_c\*\***

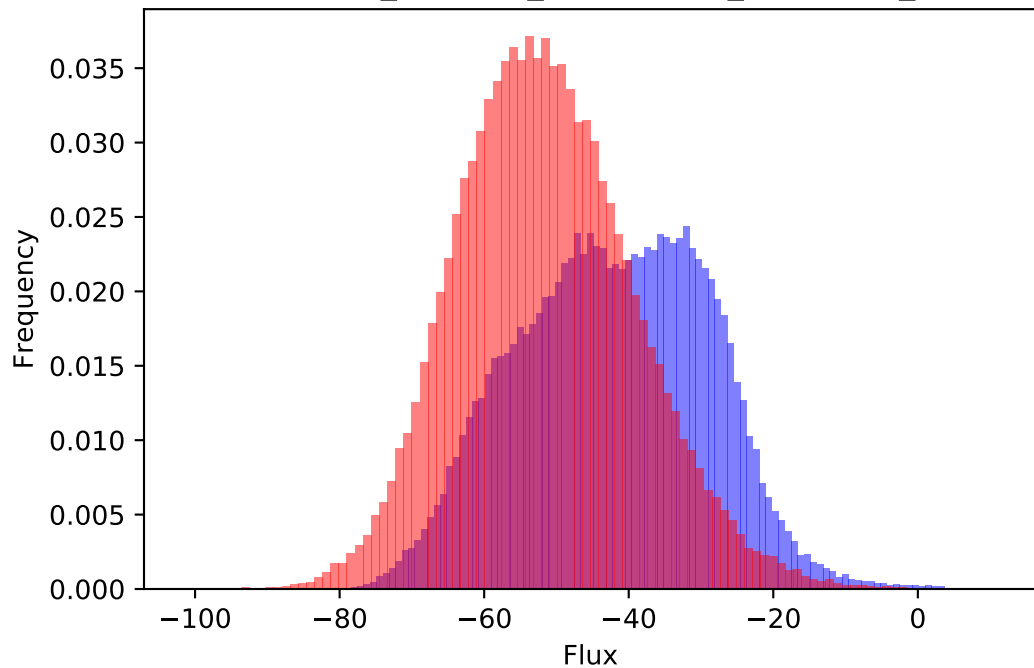


**\*\*55 : 2PGA\_c <=> PGA\_c\*\***

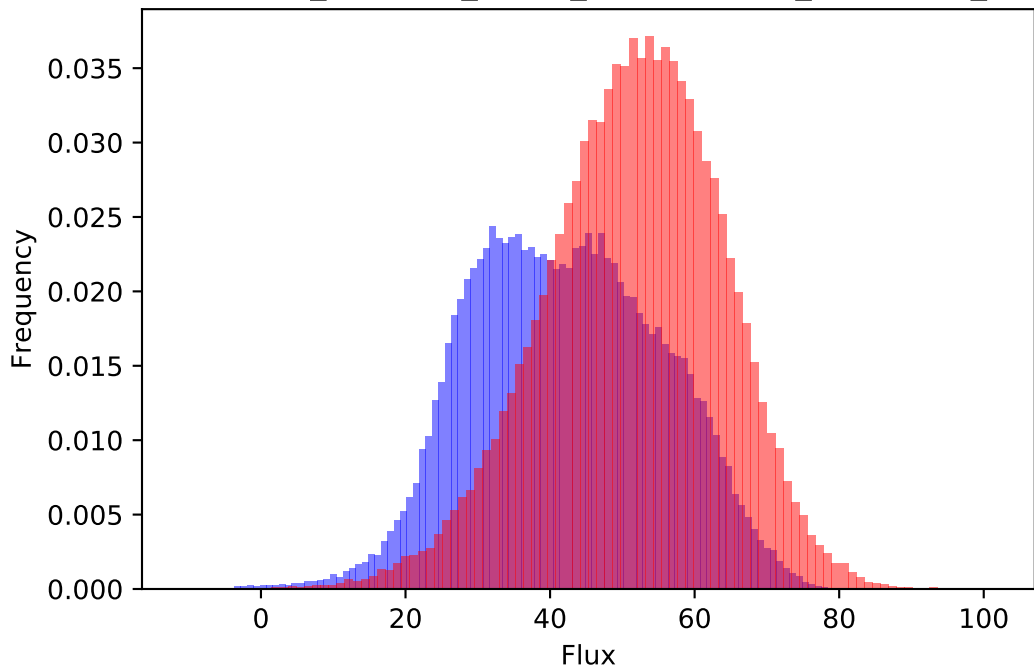




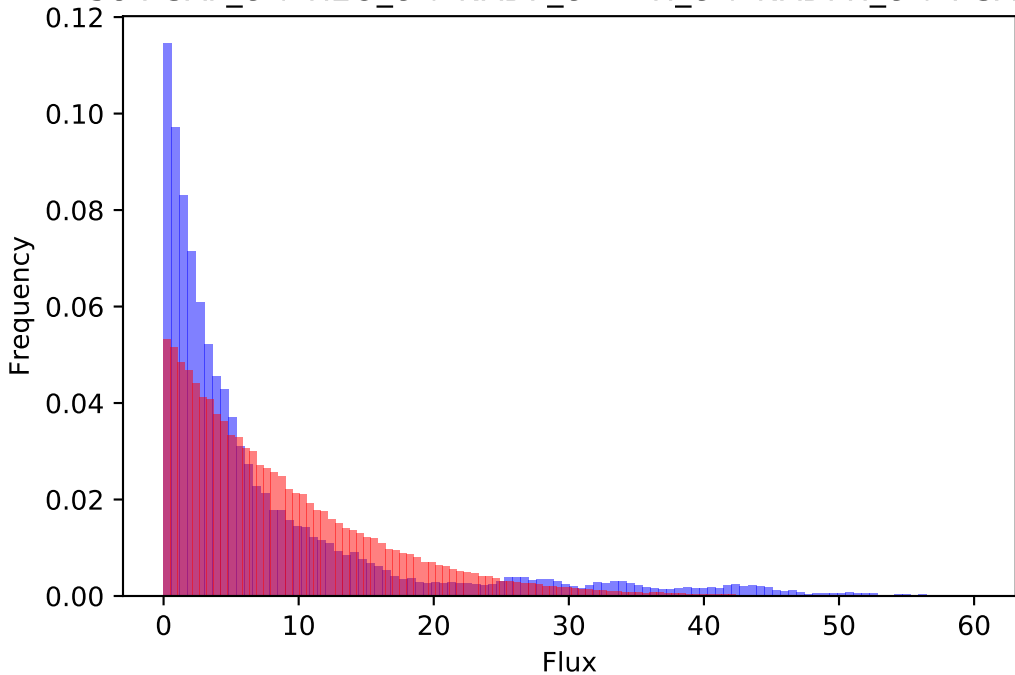
**\*\*56 : ATP\_c + PGA\_c <=> ADP\_c + DPGA\_c\*\***



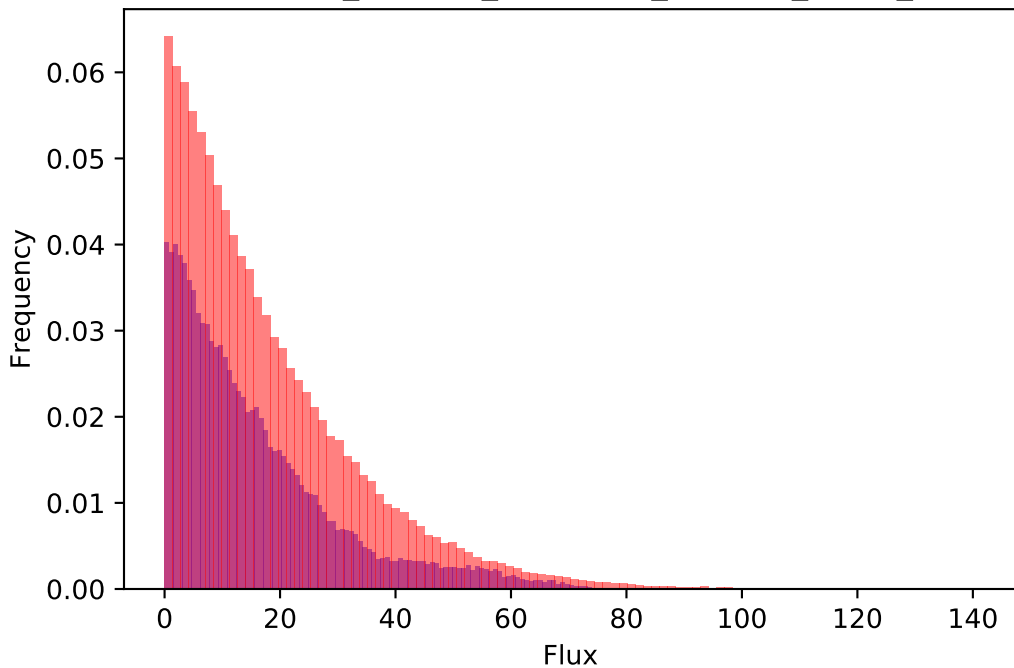
**\*\*57 : GAP\_c + NAD\_c + Pi\_c <=> DPGA\_c + NADH\_c\*\***



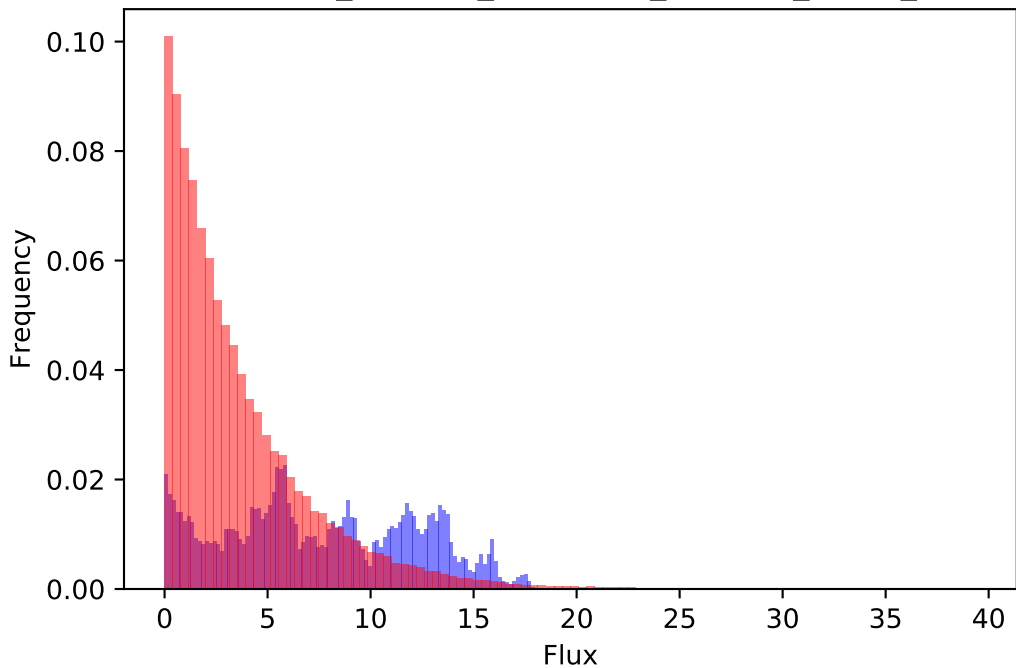
**\*\*58 : GAP\_c + H2O\_c + NADP\_c --> H\_c + NADPH\_c + PGA\_c\*\***



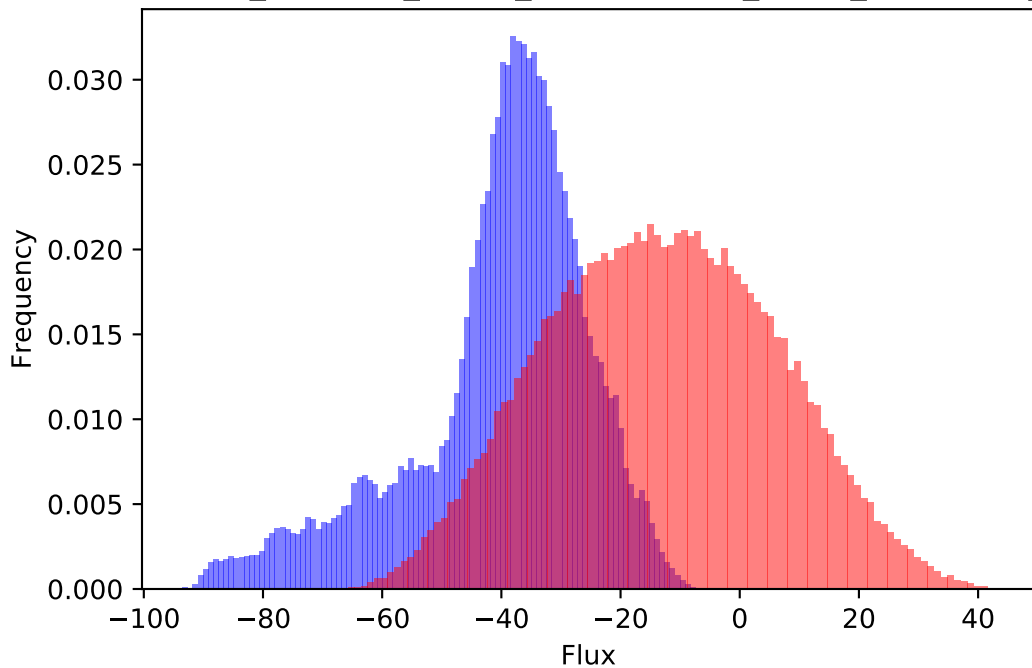
**\*\*59 : ATP\_c + F6P\_c --> ADP\_c + FBP\_c + H\_c\*\***



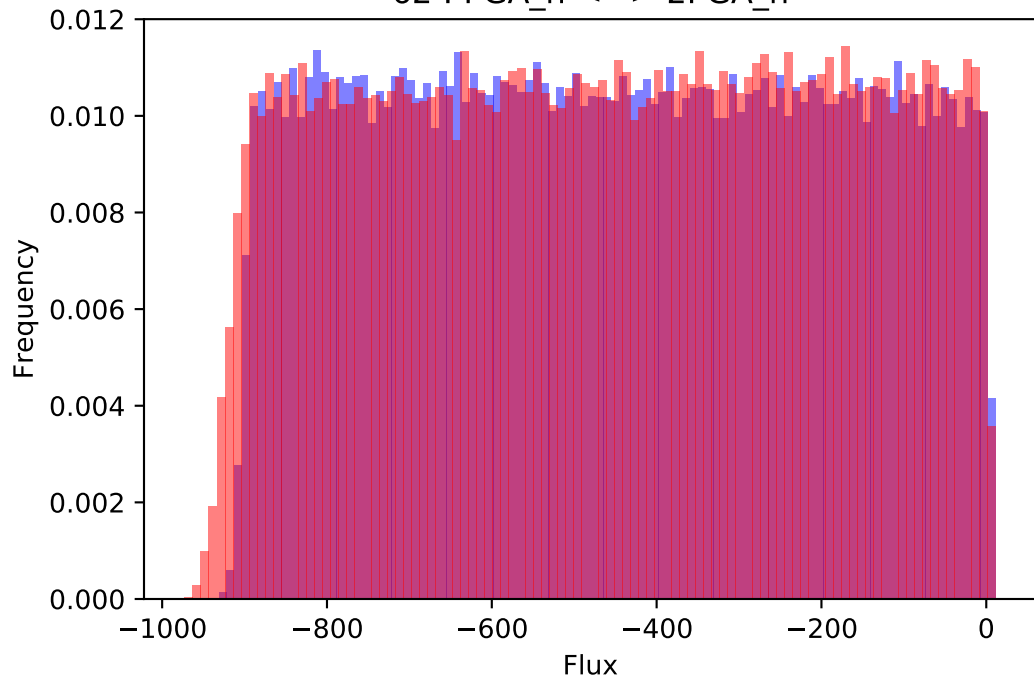
**\*\*60 : ATP\_h + F6P\_h --> ADP\_h + FBP\_h + H\_h\*\***



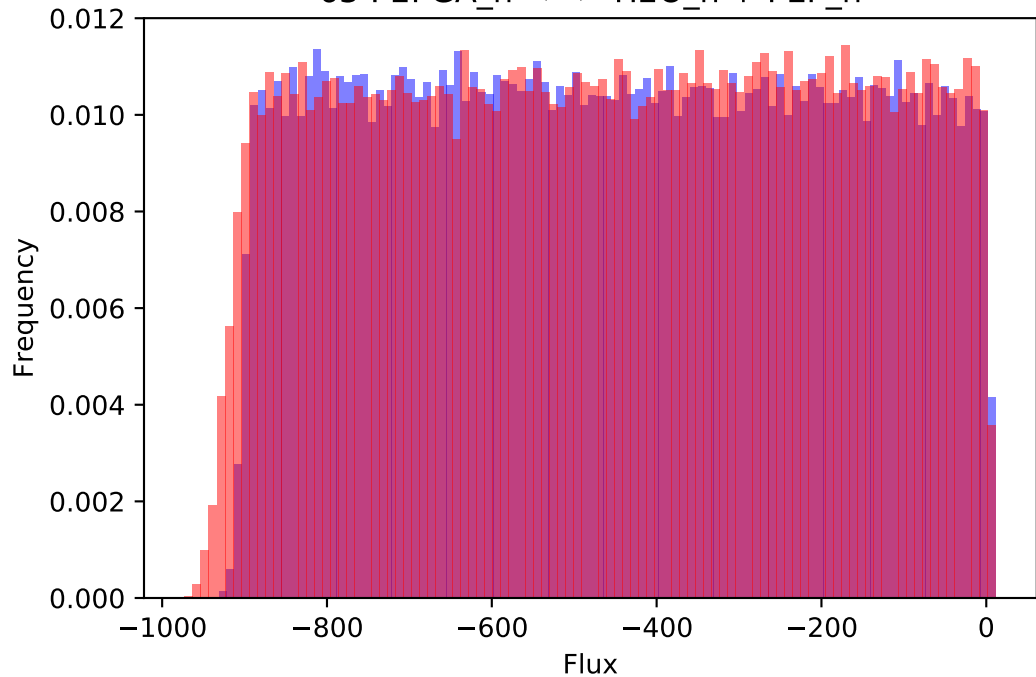
**\*\*61 : GAP\_h + NAD\_h + Pi\_h <=> DPGA\_h + H\_h + NADH\_h\*\***



**\*\*62 : PGA\_h <=> 2PGA\_h\*\***

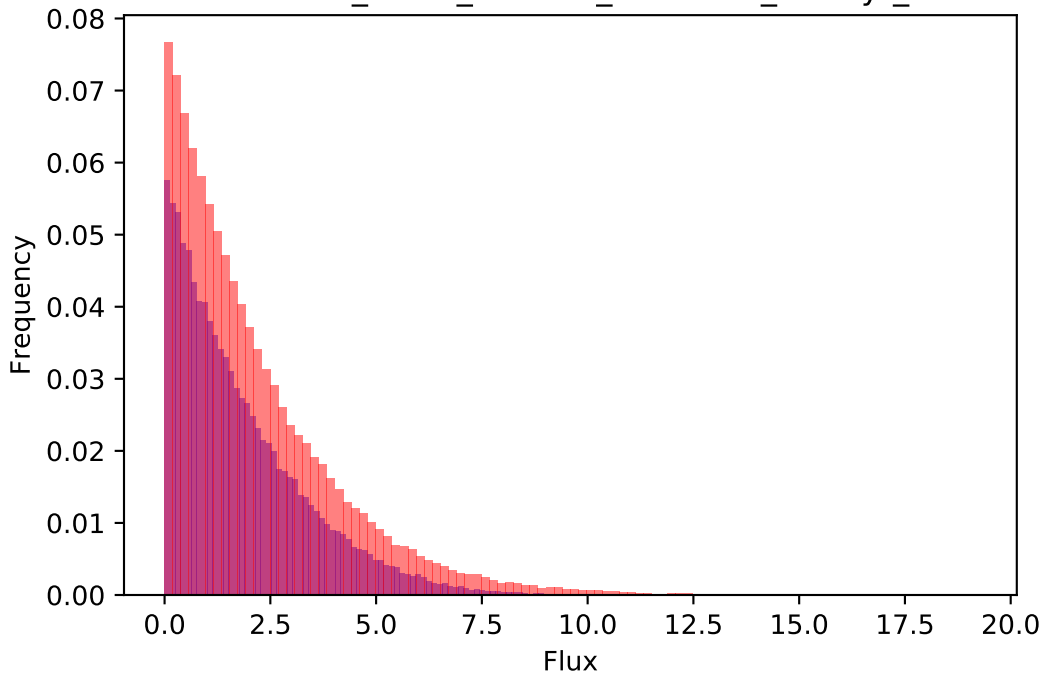


**\*\*63 : 2PGA\_h <=> H2O\_h + PEP\_h\*\***

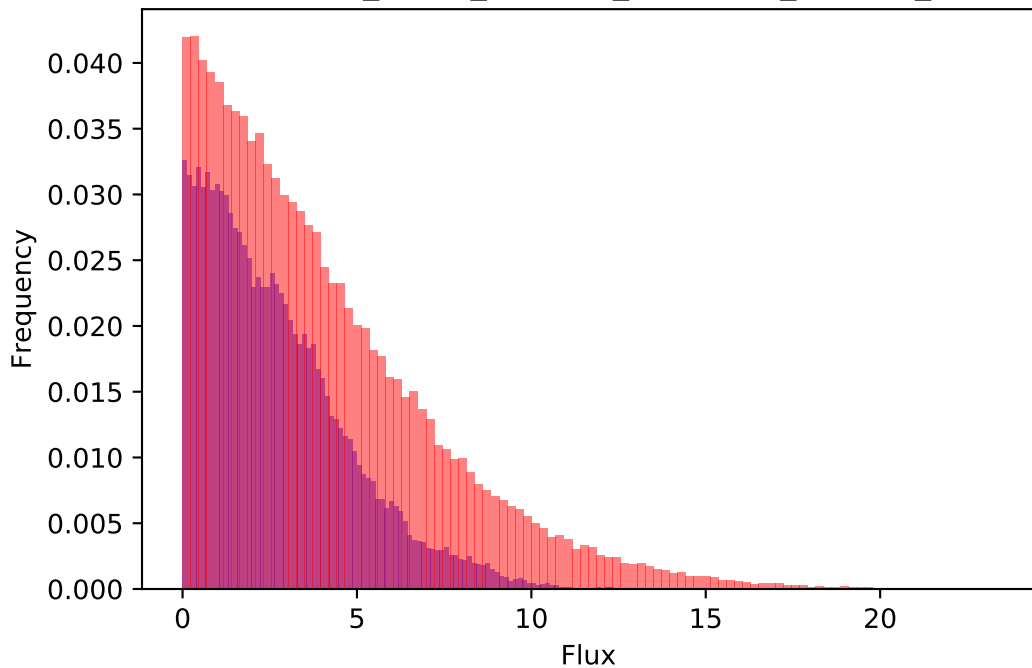




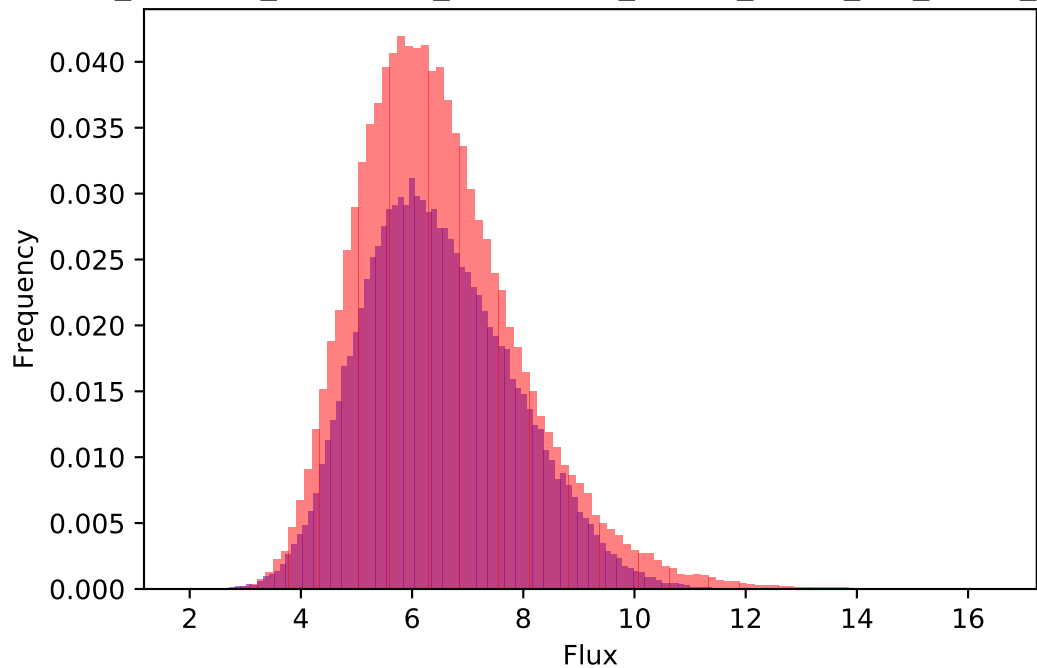
**\*\*64 : ADP\_c + H\_c + PEP\_c --> ATP\_c + Pyr\_c\*\***



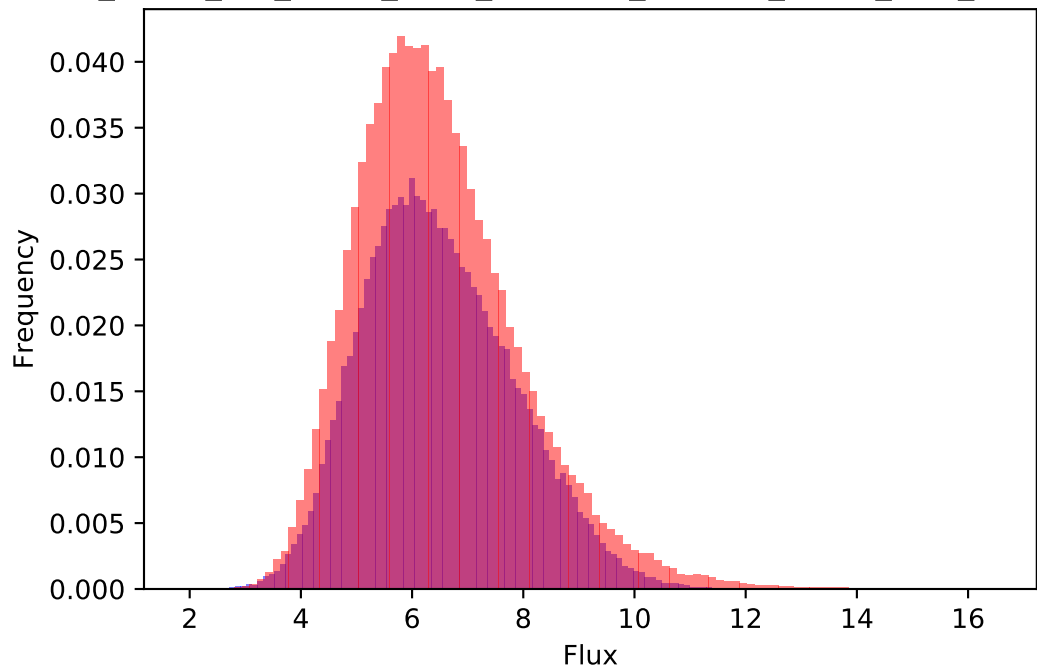
**\*\*65 : ADP\_h + H\_h + PEP\_h --> ATP\_h + Pyr\_h\*\***



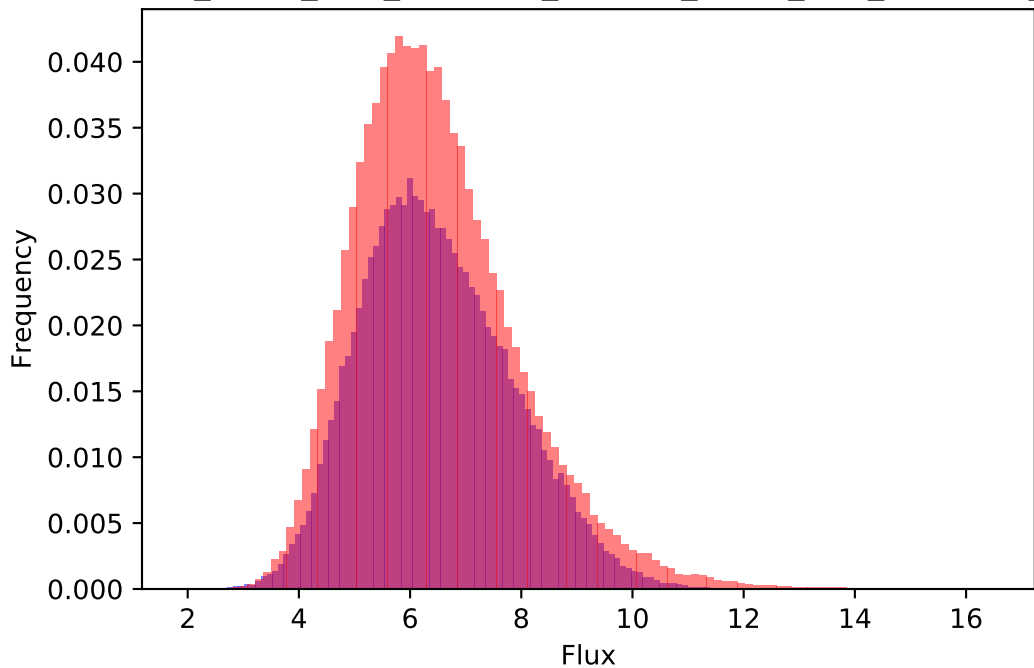
\*66 : H\_m + Pyr\_m + ThPP\_m --> CO2\_m + H\_DASH\_Eth\_DASH\_ThPP\_m



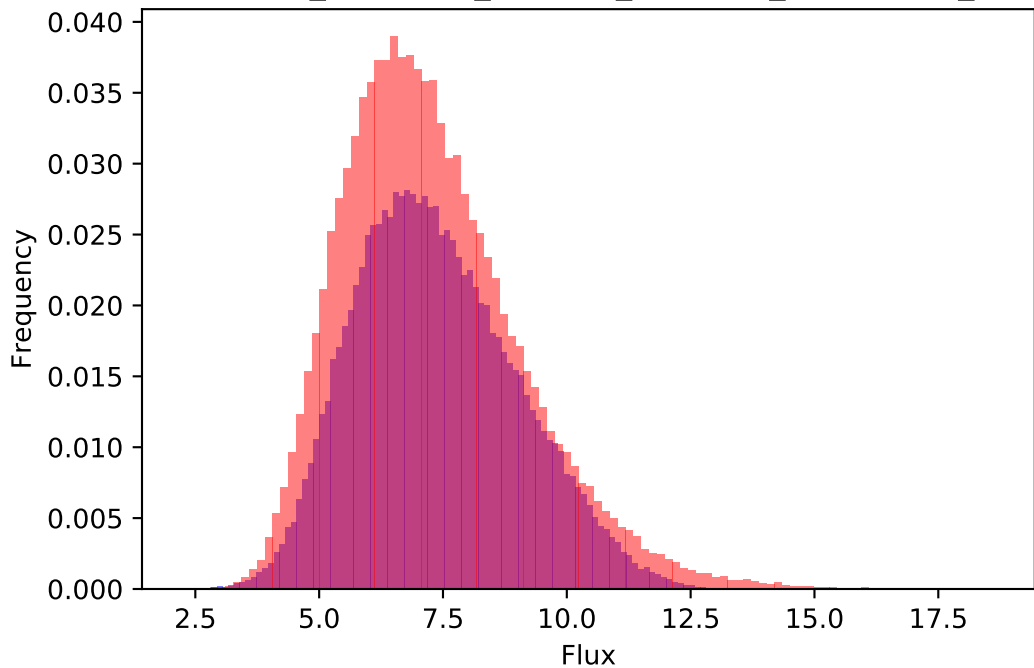
67 : H\_DASH\_Eth\_DASH\_ThPP\_m + LPA\_m --> A\_DASH\_DHL\_m + ThPP\_m



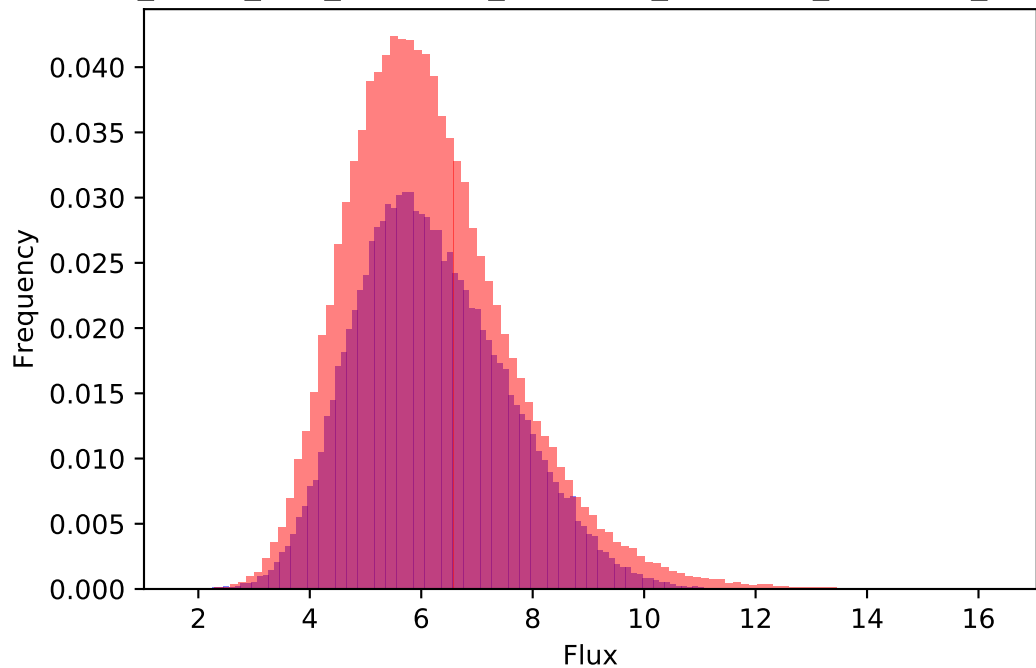
**\*\*68 : A\_DASH\_DHL\_m + CoA\_m --> A\_DASH\_CoA\_m + DHL\_m\*\***



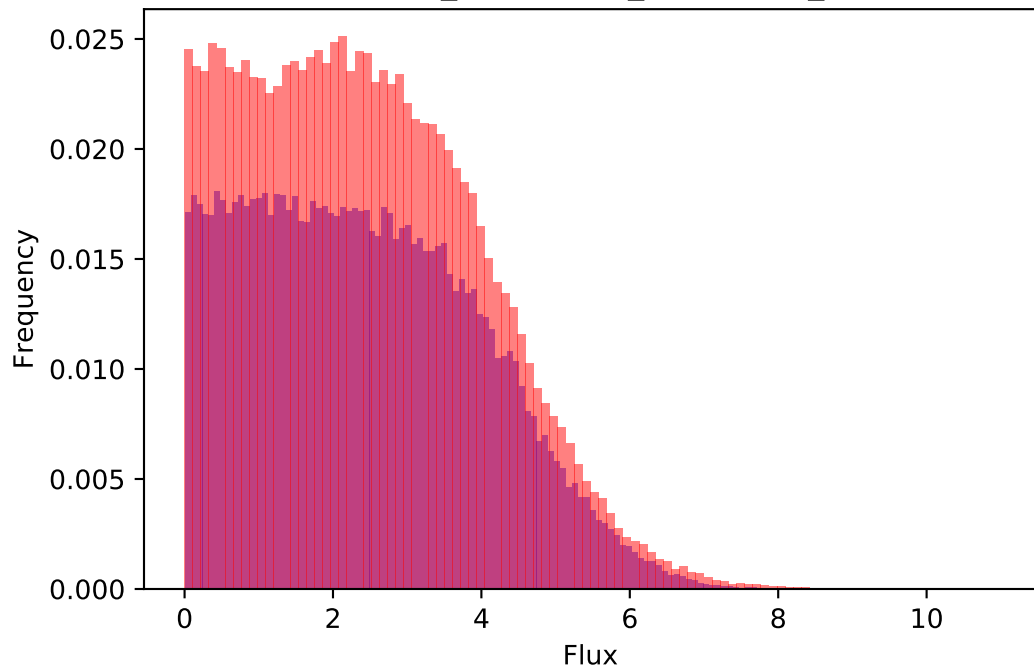
**\*\*69 : DHL\_m + NAD\_m --> H\_m + LPA\_m + NADH\_m\*\***



**\*\*70 : A\_DASH\_CoA\_m + H2O\_m + OAA\_m --> Cit\_m + CoA\_m + H\_m\***

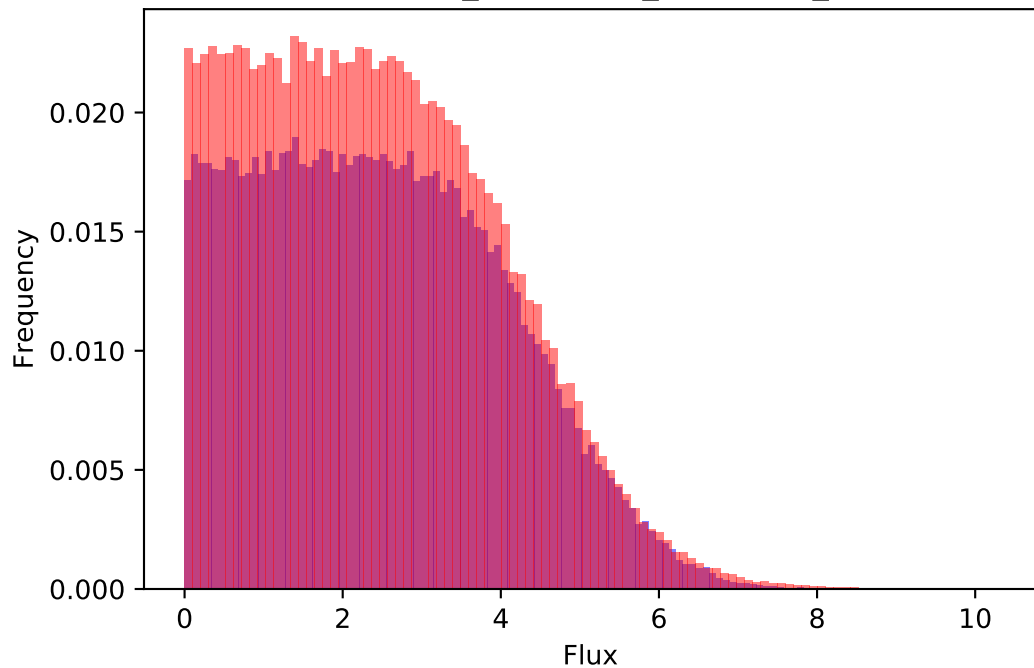


71 : Cit<sub>m</sub> --> H<sub>2</sub>O<sub>m</sub> + cACN<sub>m</sub>

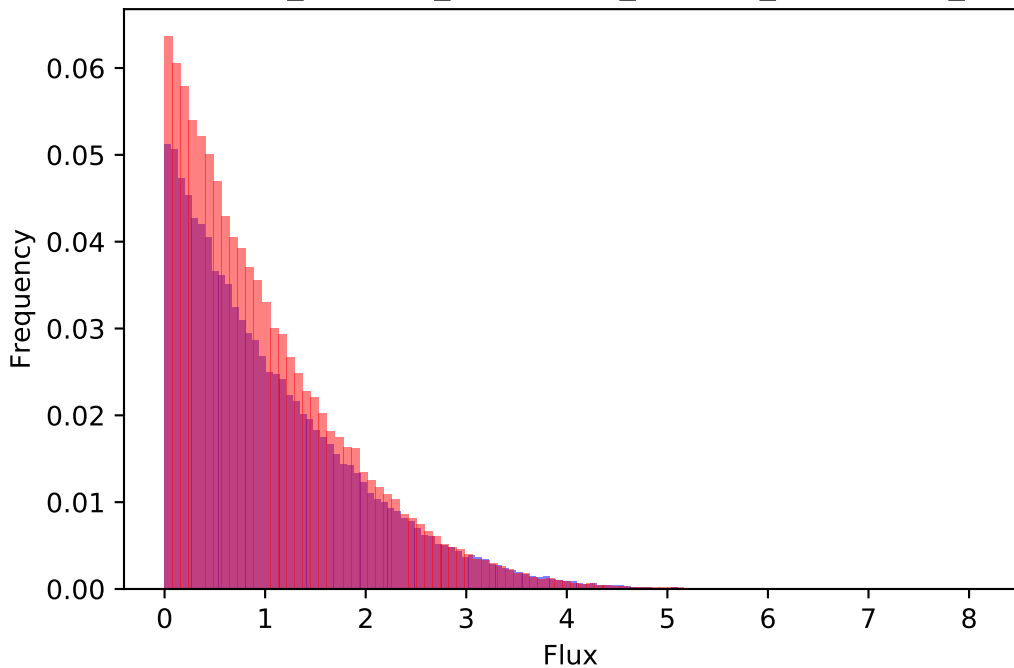




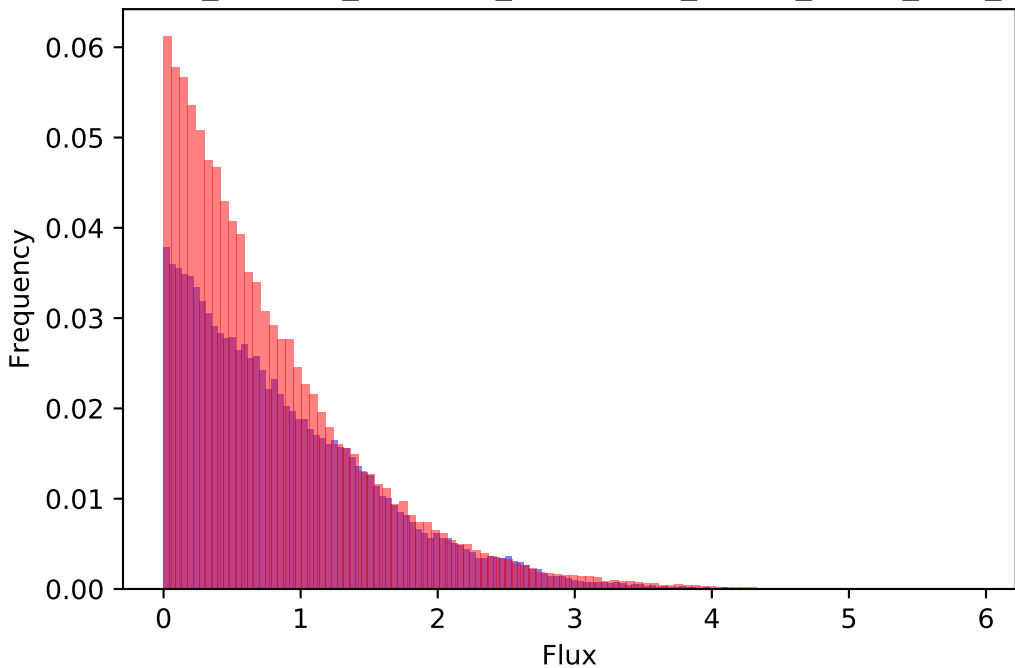
**\*\*72 : H2O\_m + cACN\_m --> iCit\_m\*\***



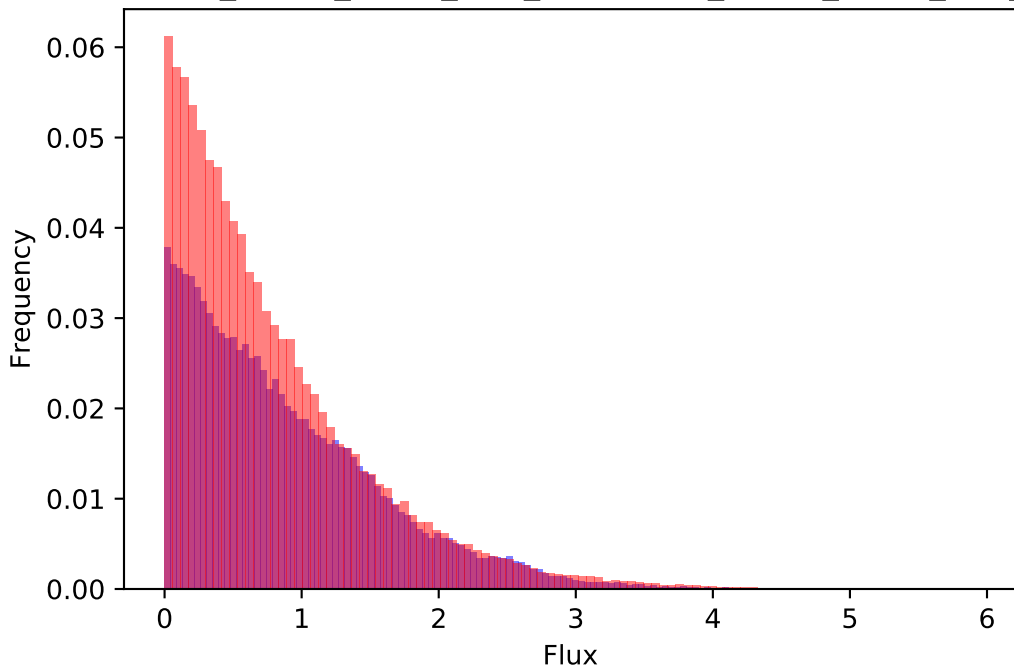
**\*\*73 : NAD\_m + iCit\_m --> CO2\_m + KG\_m + NADH\_m\*\***



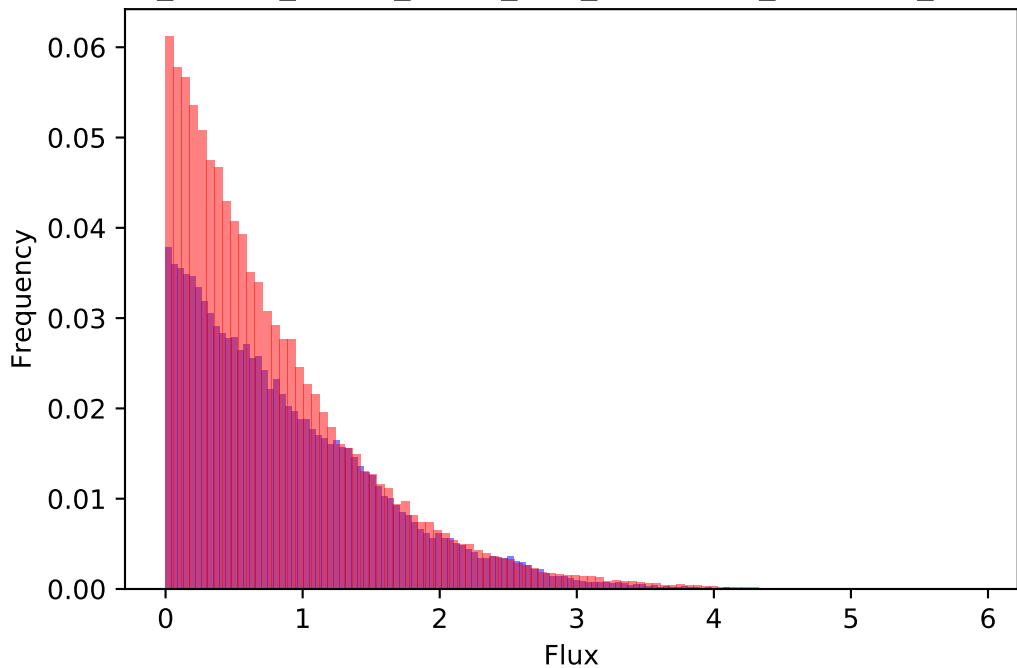
**\*\*74 : H\_m + KG\_m + LPA\_m --> CO2\_m + S\_DASH\_DHL\_m\*\***



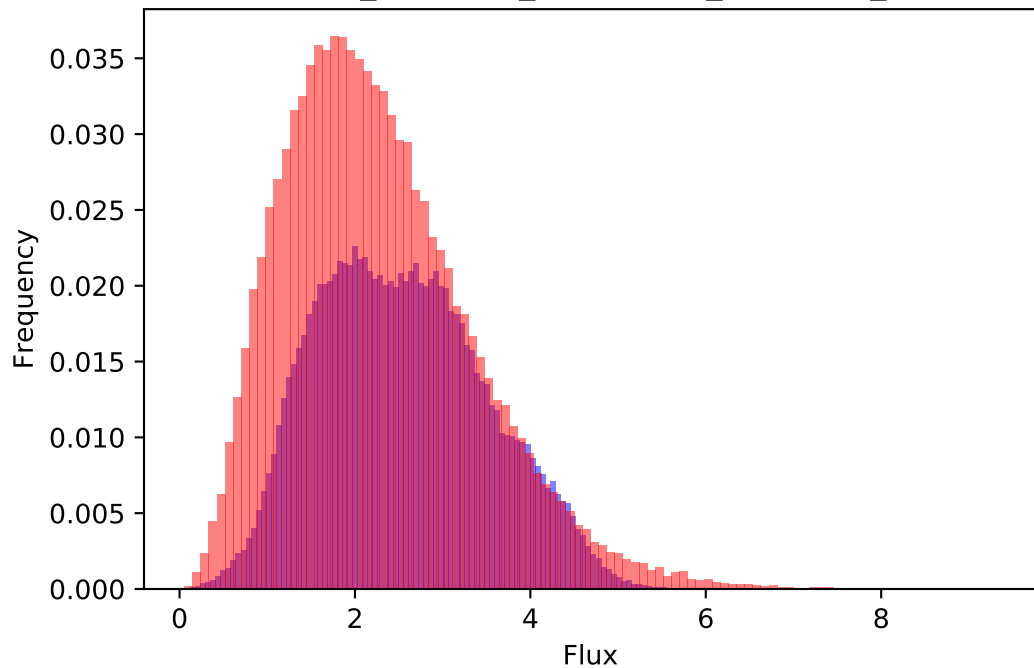
**\*\*75 : CoA\_m + S\_DASH\_DHL\_m --> DHL\_m + S\_DASH\_CoA\_m\*\***



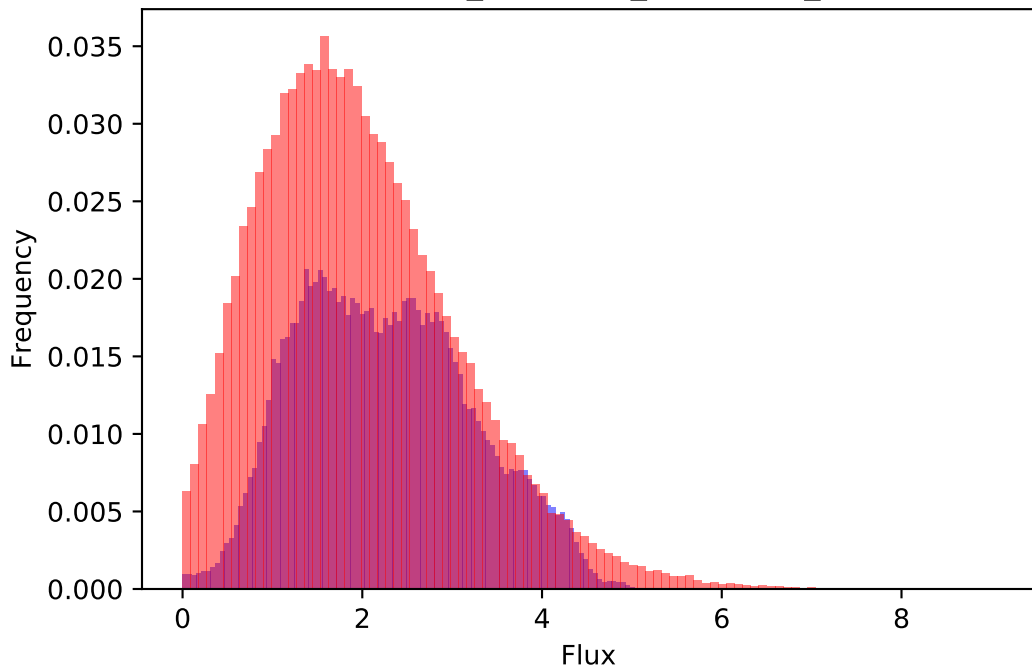
**\*\*76 : ADP\_m + Pi\_m + S\_DASH\_CoA\_m --> ATP\_m + CoA\_m + SCA\_m\***



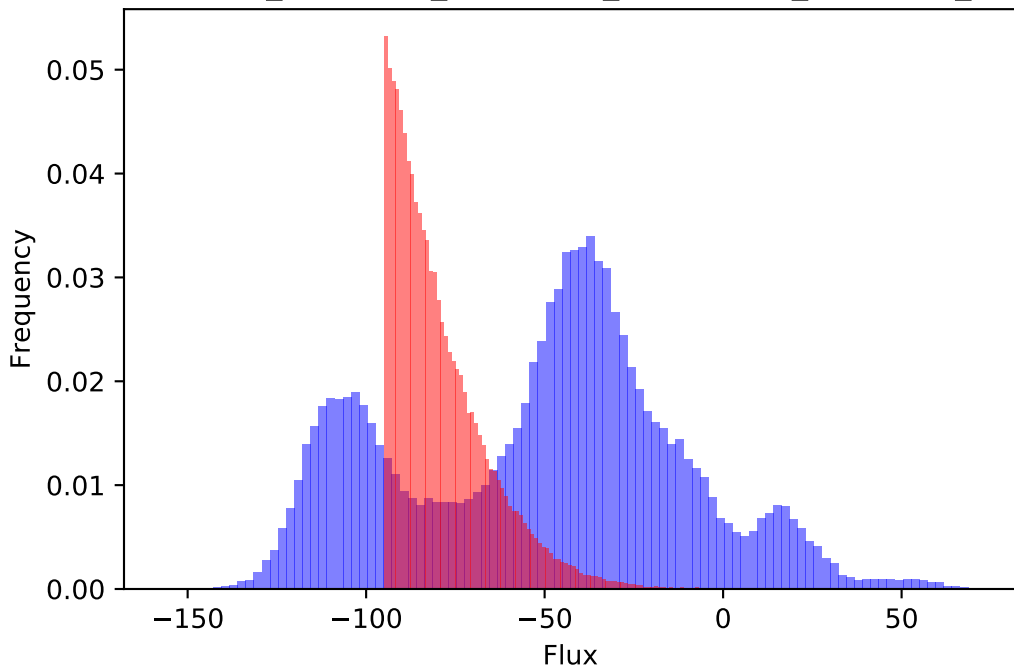
**\*\*77 : Q\_m + SCA\_m --> Fum\_m + QH2\_m\*\***



**\*\*78 : Fum\_m + H2O\_m --> Mal\_m\*\***

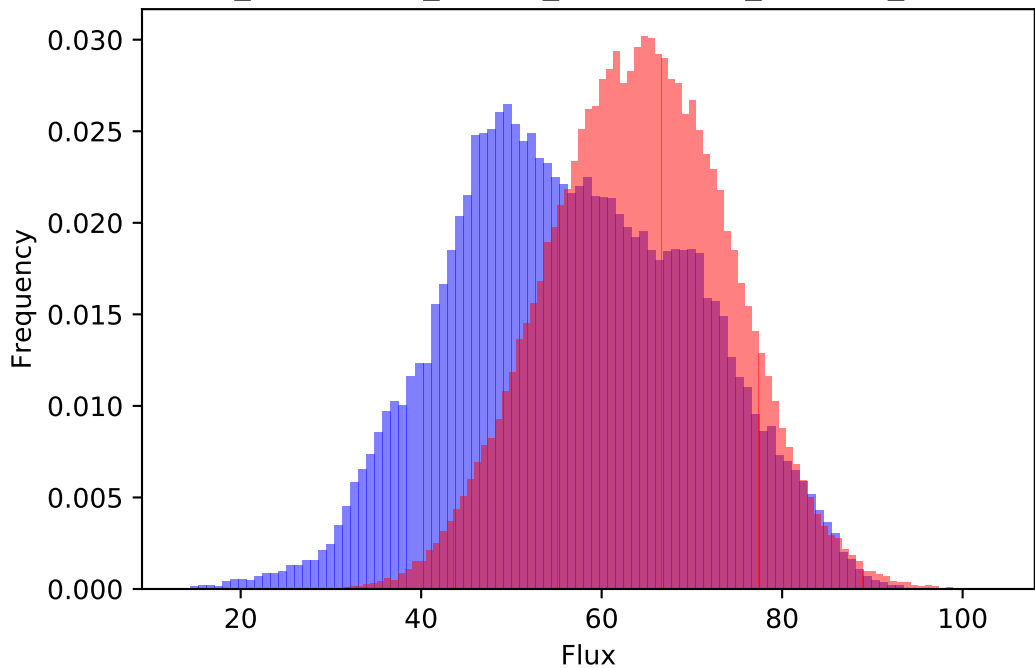


**\*\*79 : Mal\_m + NAD\_m <=> H\_m + NADH\_m + OAA\_m\*\***

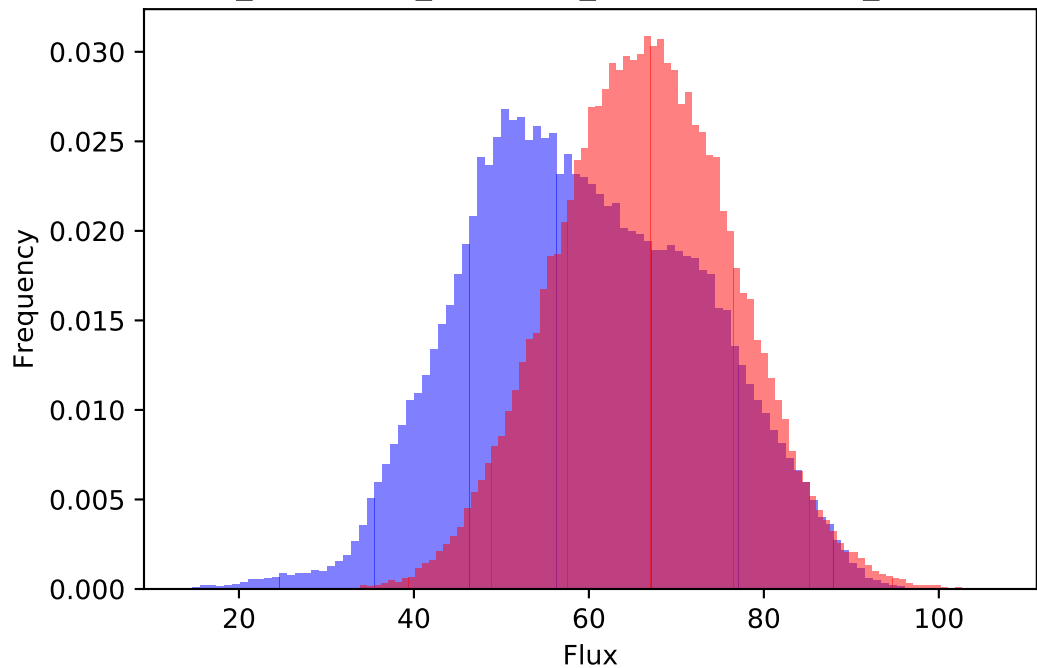




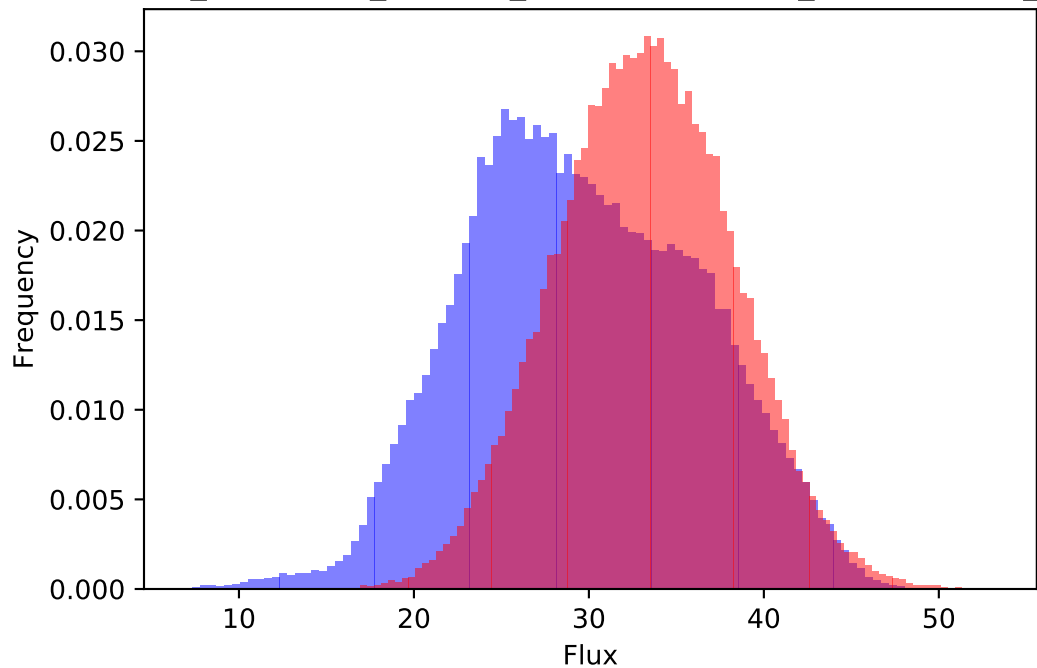
**\*\*80 : 5.0 H\_m + NADH\_m + Q\_m --> 4.0 H\_i + NAD\_m + QH2\_m\*\***



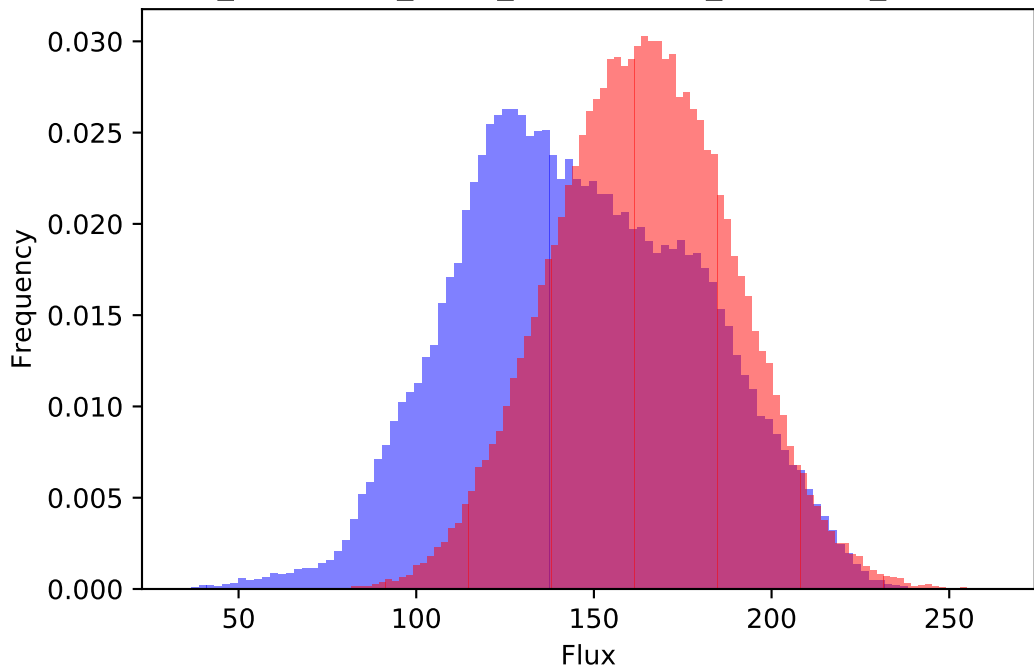
B1 : 2.0 Cytcox\_m + 2.0 H\_m + QH2\_m --> 2.0 Cytcrd\_m + 4.0 H\_i + Q\_



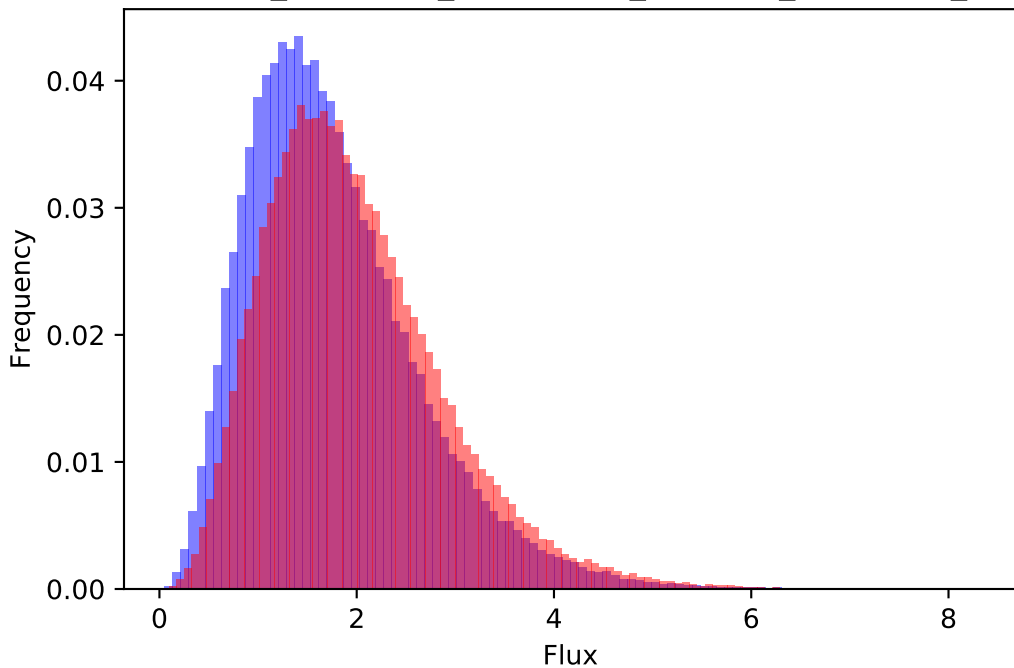
: 4.0 Cytcrd\_m + 8.0 H\_m + O2\_m --> 4.0 Cytcox\_m + 2.0 H2O\_m + 4.0



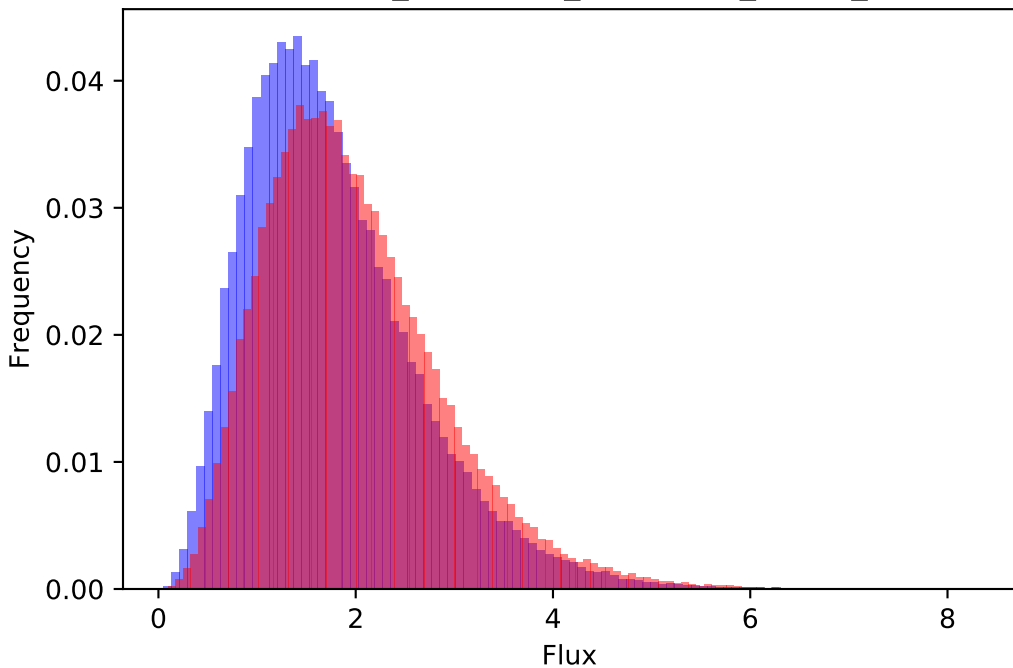
**\*\*83 :  $\text{ADP}_m + 4.0 \text{ H}_i + \text{Pi}_m \rightleftharpoons \text{ATP}_m + \text{H}_2\text{O}_m + 3.0 \text{ H}_m$  \*\***



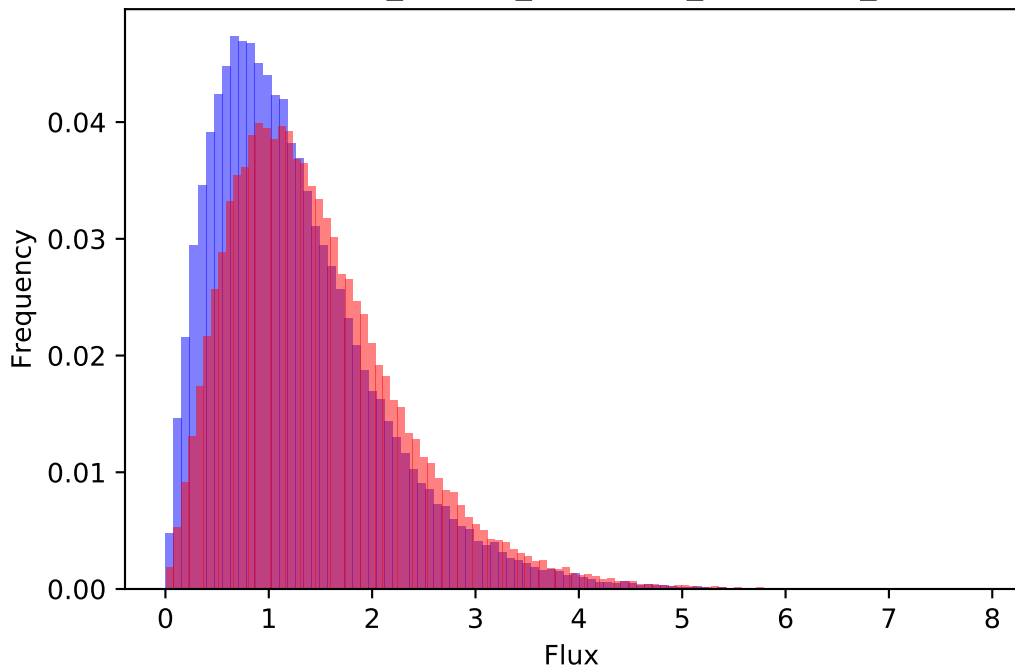
**\*\*84 : O2\_h + RuBP\_h --> 2.0 H\_h + PGA\_h + PGCA\_h\*\***



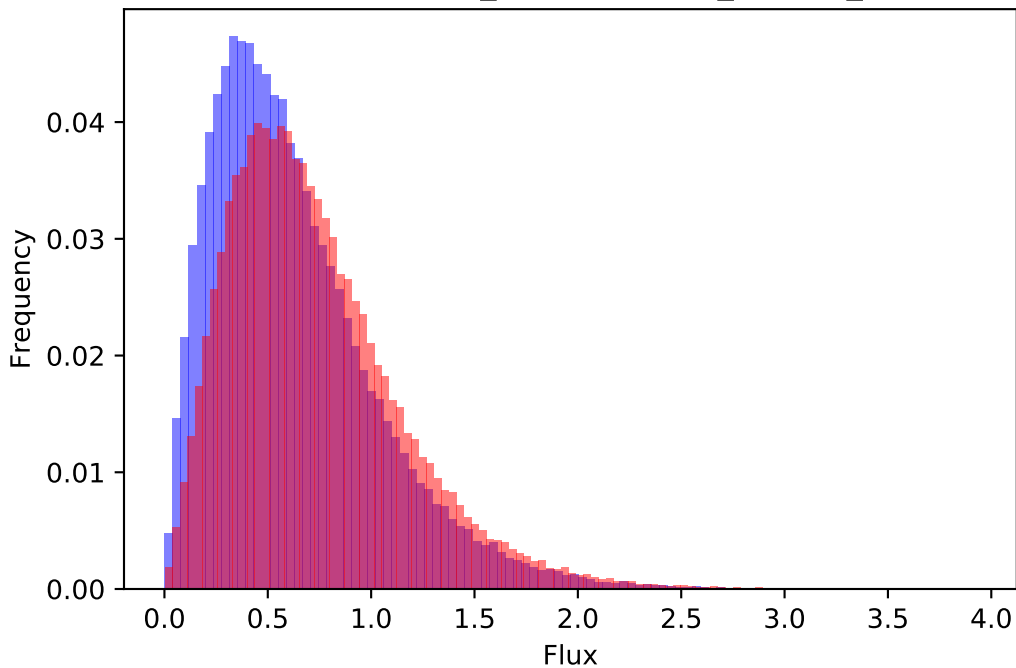
**\*\*85 : H2O\_h + PGCA\_h --> GCA\_h + Pi\_h\*\***



**\*\*86 : GCA\_p + O2\_p --> GLX\_p + H2O2\_p\*\***

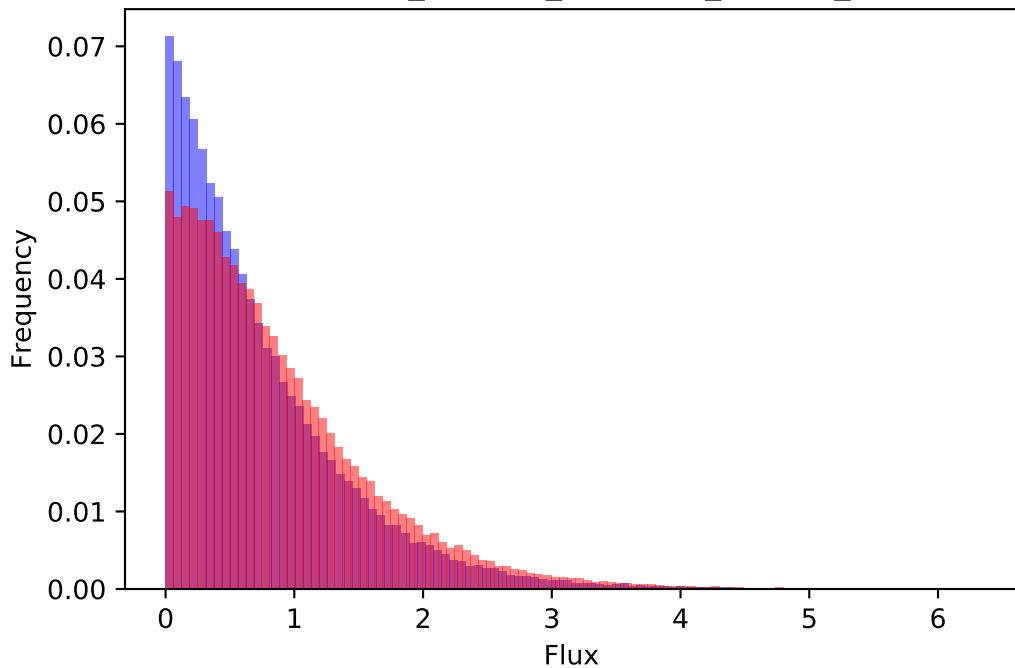


**\*\*87 : 2.0 H2O2\_p --> 2.0 H2O\_p + O2\_p\*\***

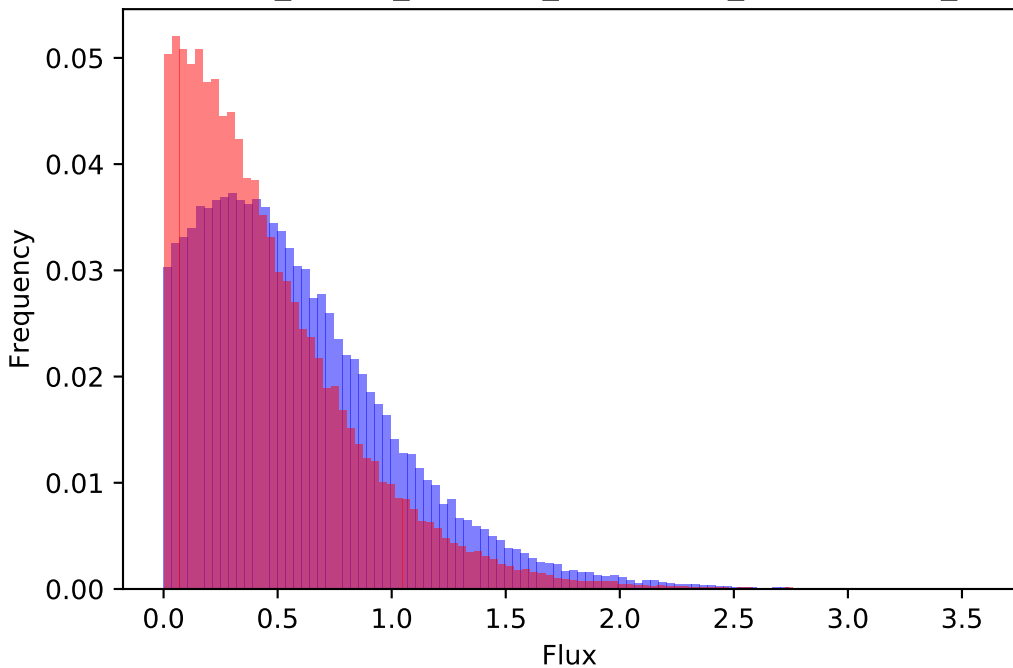




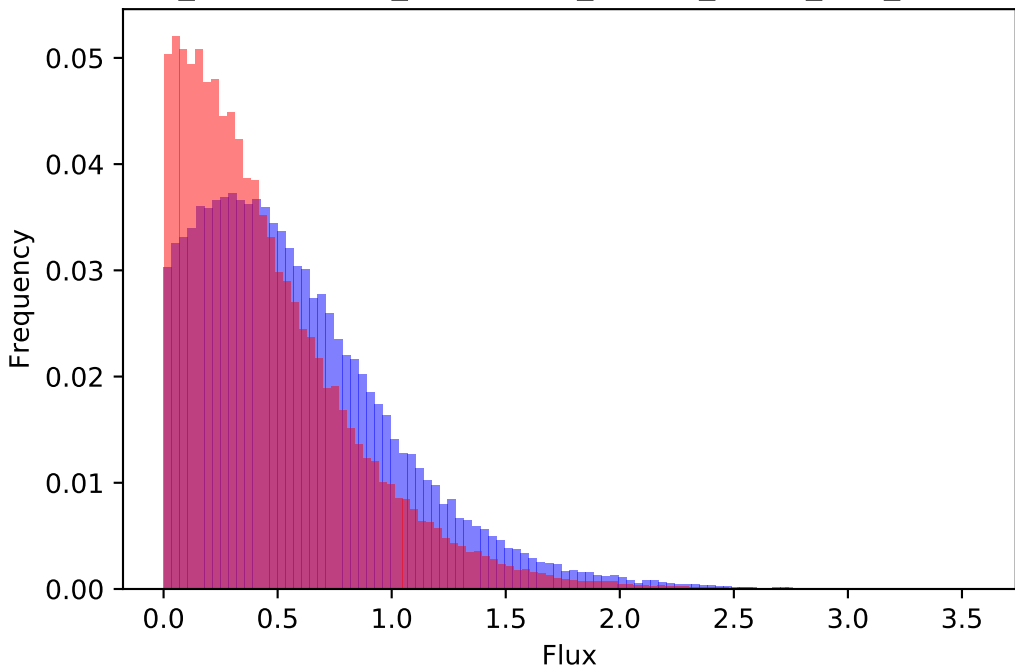
**\*\*88 : GLX\_p + Glu\_p --> Gly\_p + KG\_p\*\***



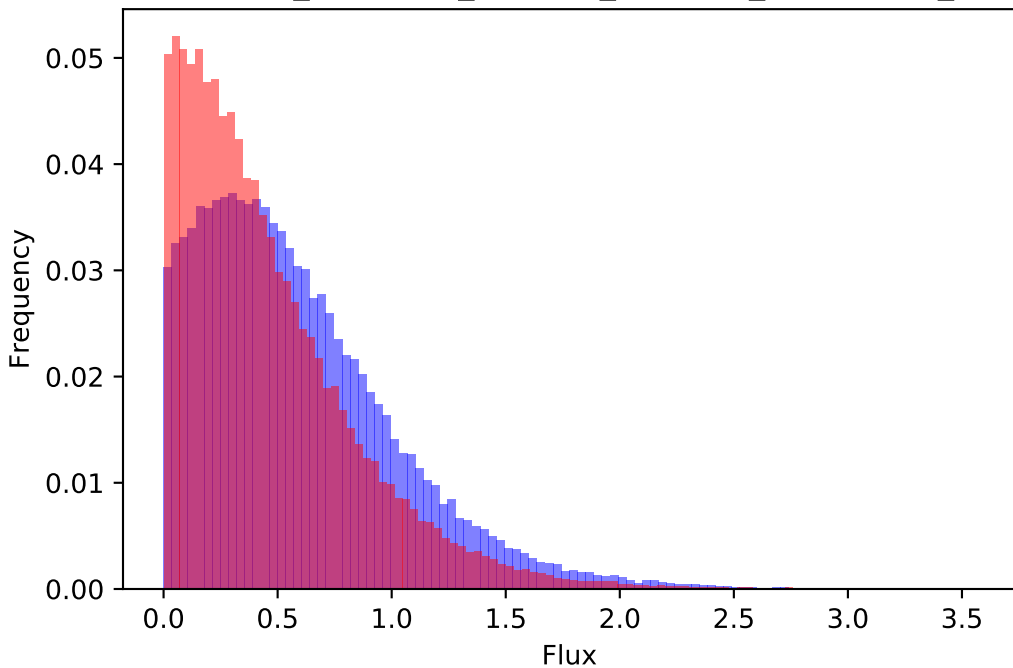
**\*\*89 : Gly\_m + H\_m + LPL\_m --> CO2\_m + amDHP\_m\*\***



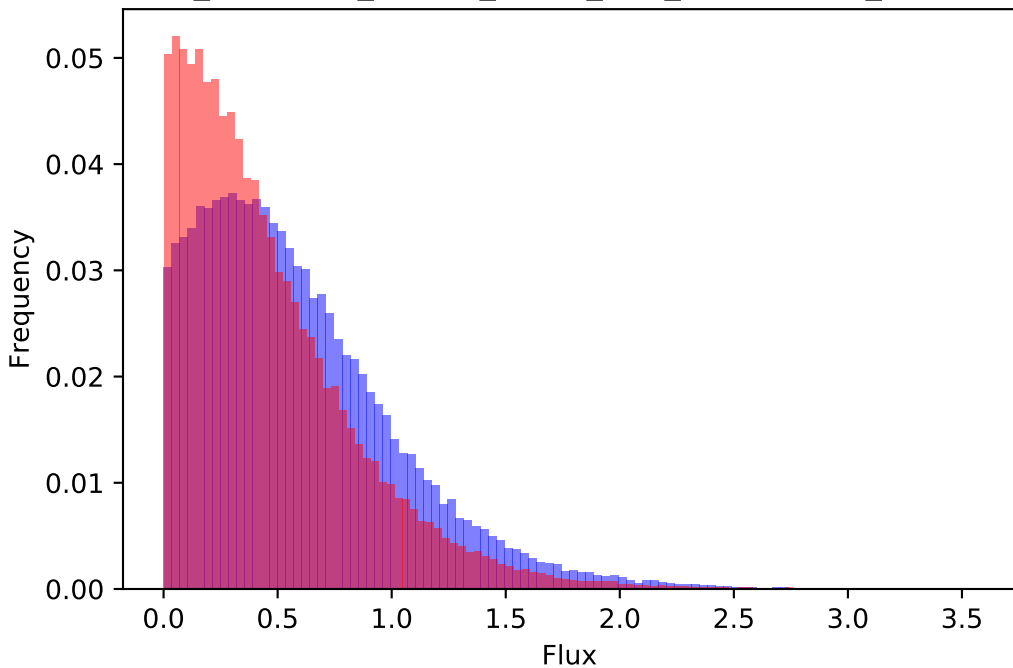
**\*\*90 : THF\_m + amDHP\_m --> DHP\_m + M\_DASH\_THF\_m + NH4\_m\*\***



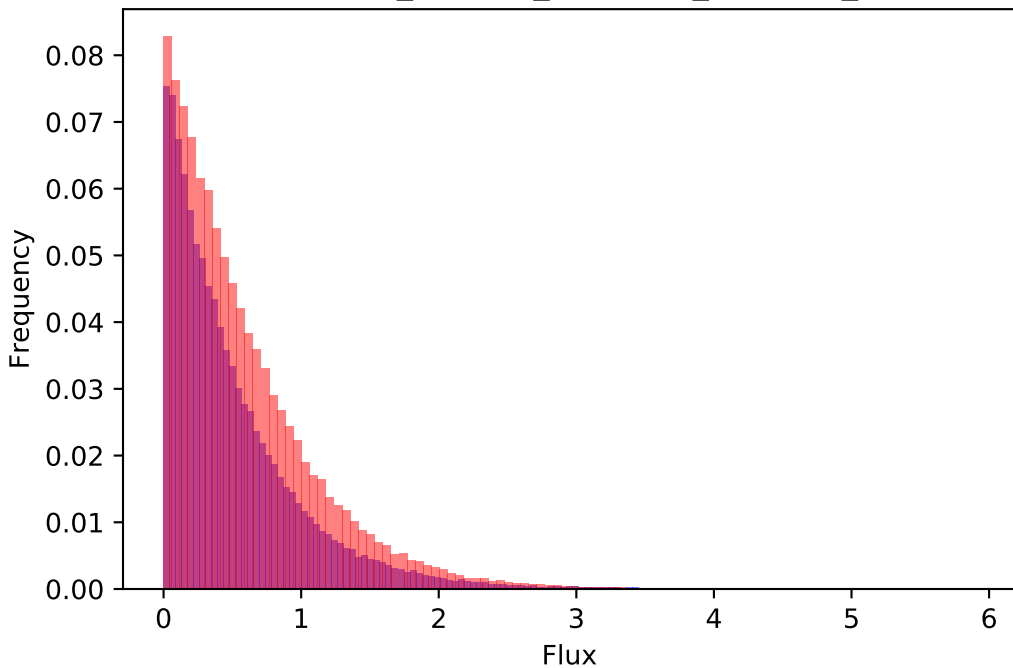
**\*\*91 : DHP\_m + NAD\_m --> H\_m + LPL\_m + NADH\_m\*\***



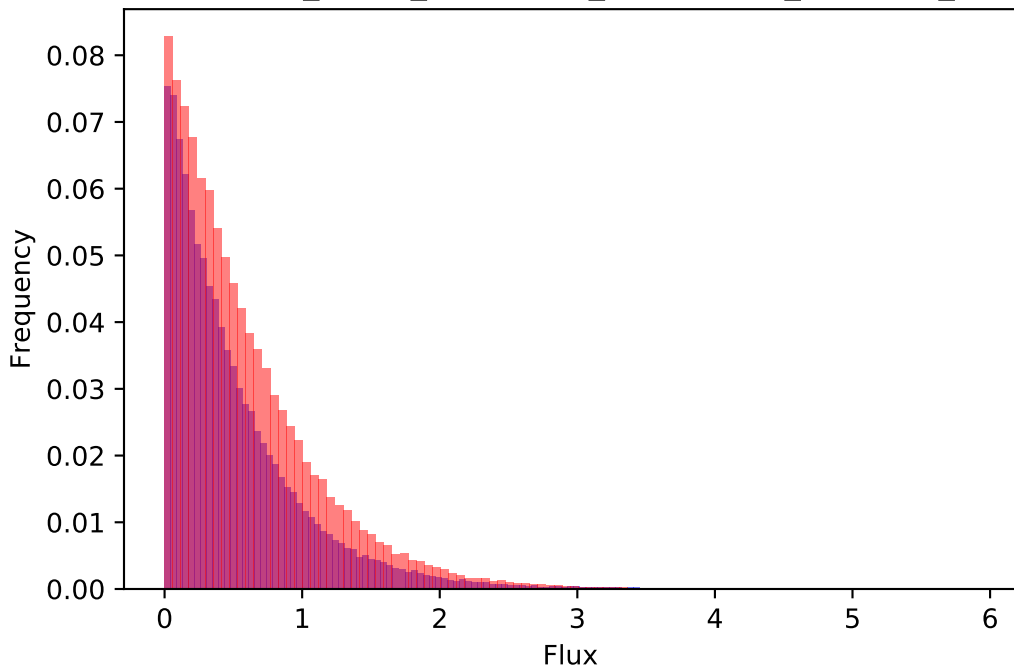
**\*\*92 : Gly\_m + H2O\_m + M\_DASH\_THF\_m <=> Ser\_m + THF\_m\*\***



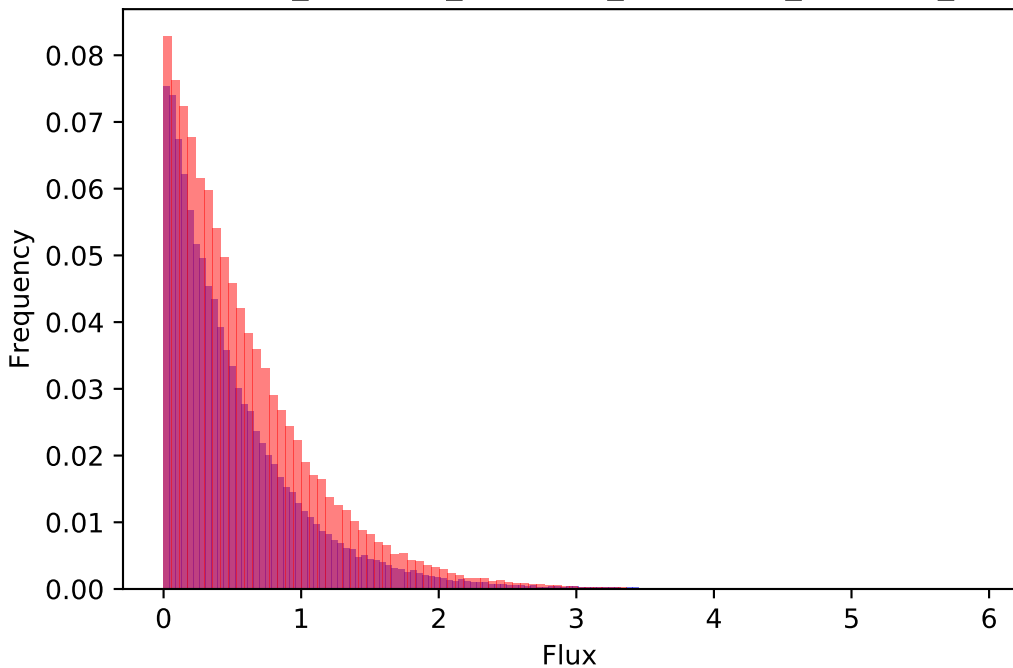
**\*\*93 : GLX\_p + Ser\_p --> Gly\_p + HPR\_p\*\***



**\*\*94 : HPR\_p + H\_p + NADH\_p --> GCEA\_p + NAD\_p\*\***

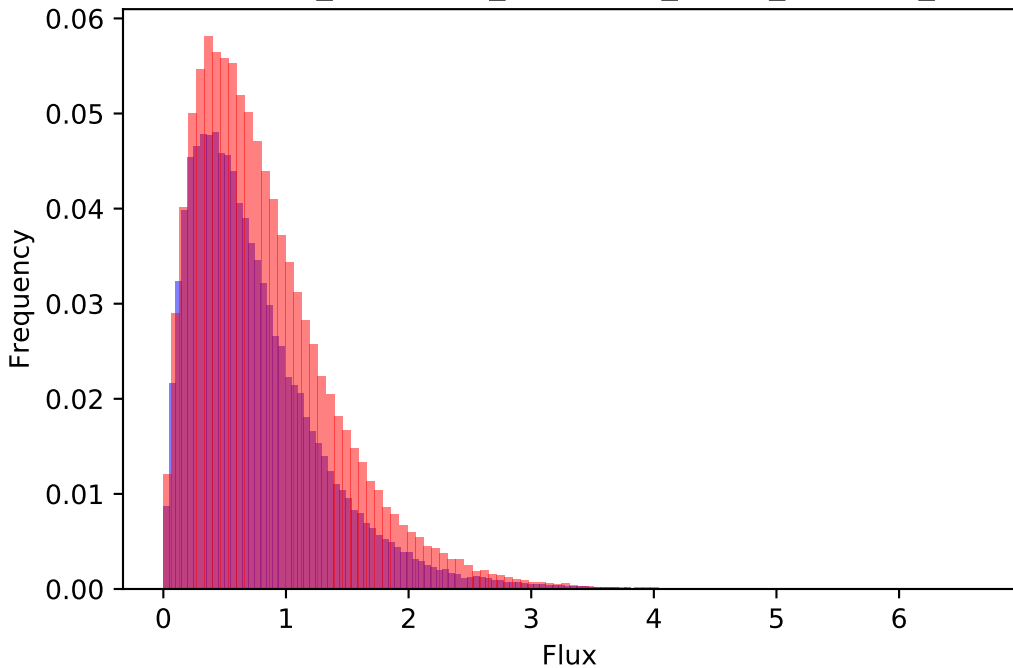


**\*\*95 : Mal\_p + NAD\_p <=> H\_p + NADH\_p + OAA\_p\*\***

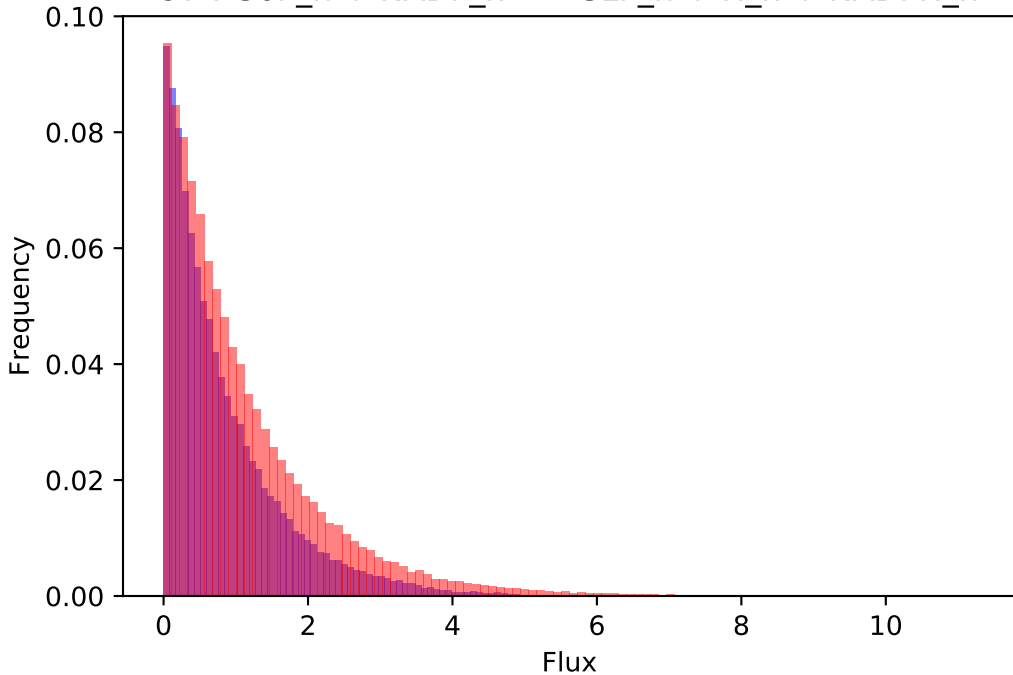




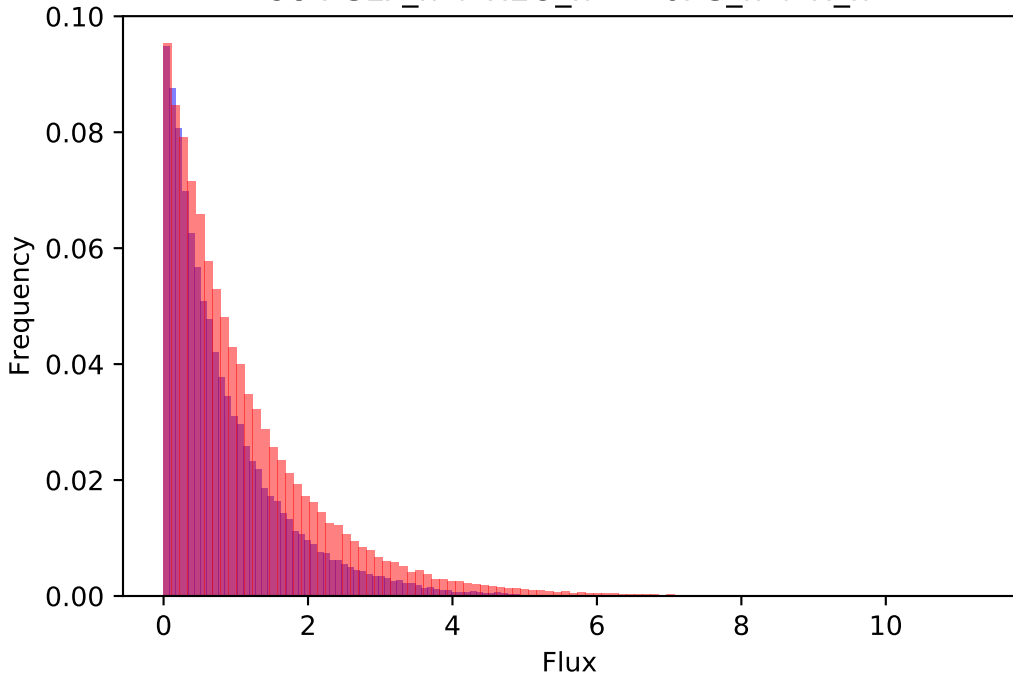
**\*\*96 : ATP\_h + GCEA\_h --> ADP\_h + H\_h + PGA\_h\*\***



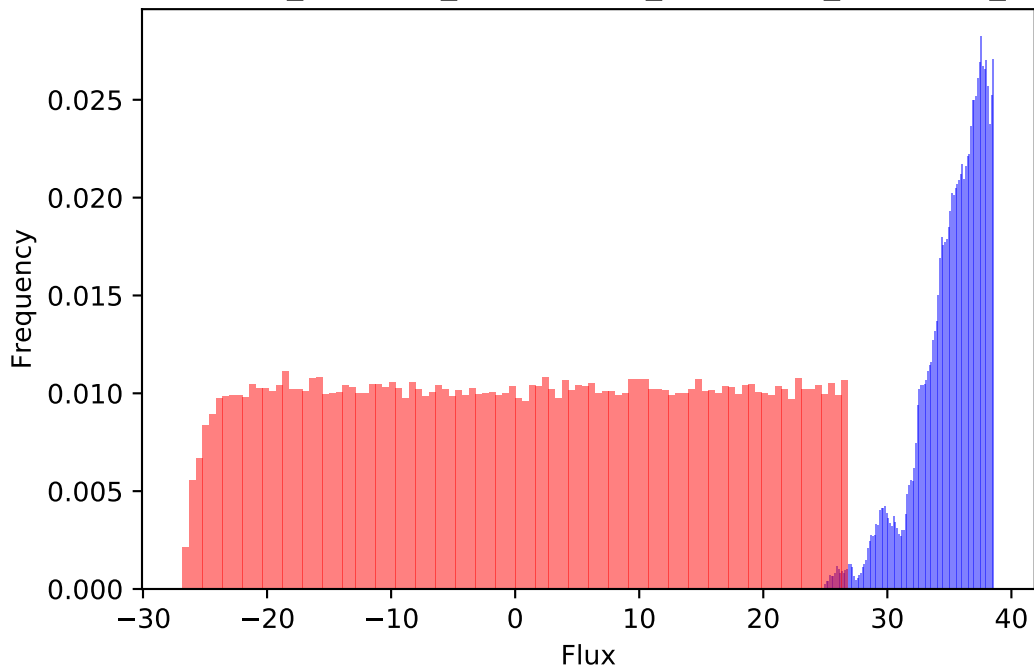
**\*\*97 : G6P\_h + NADP\_h --> GLP\_h + H\_h + NADPH\_h\*\***



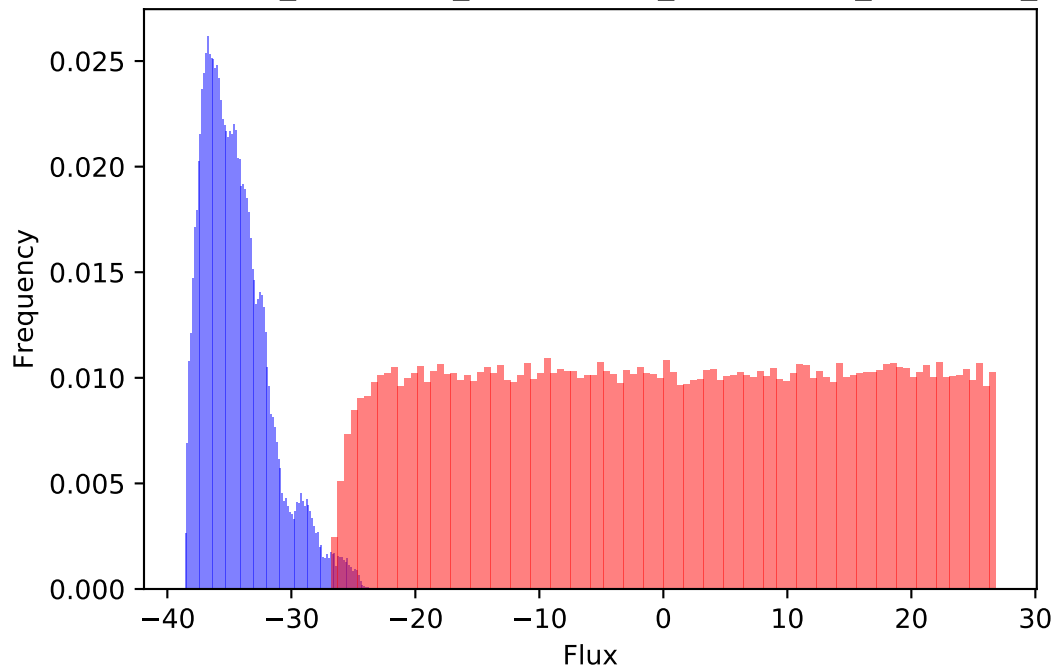
**\*\*98 : GLP\_h + H2O\_h --> 6PG\_h + H\_h\*\***



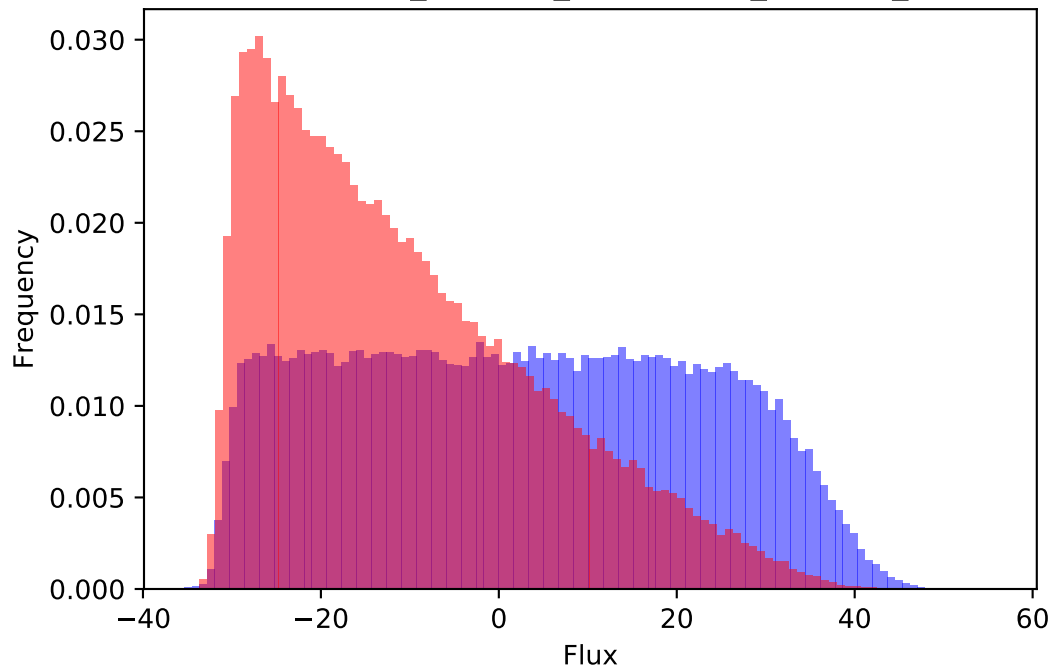
**\*\*99 : 6PG\_h + NAD\_h <=> CO2\_h + NADH\_h + Ru5P\_h\*\***



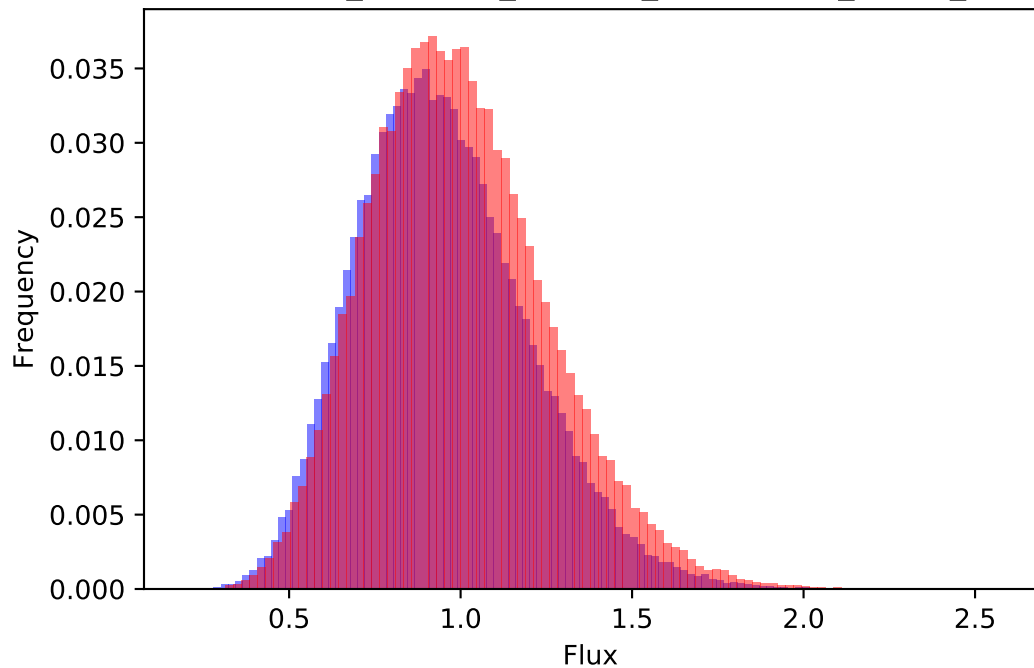
**\*\*100 : 6PG\_h + NADP\_h <=> CO2\_h + NADPH\_h + Ru5P\_h\*\***



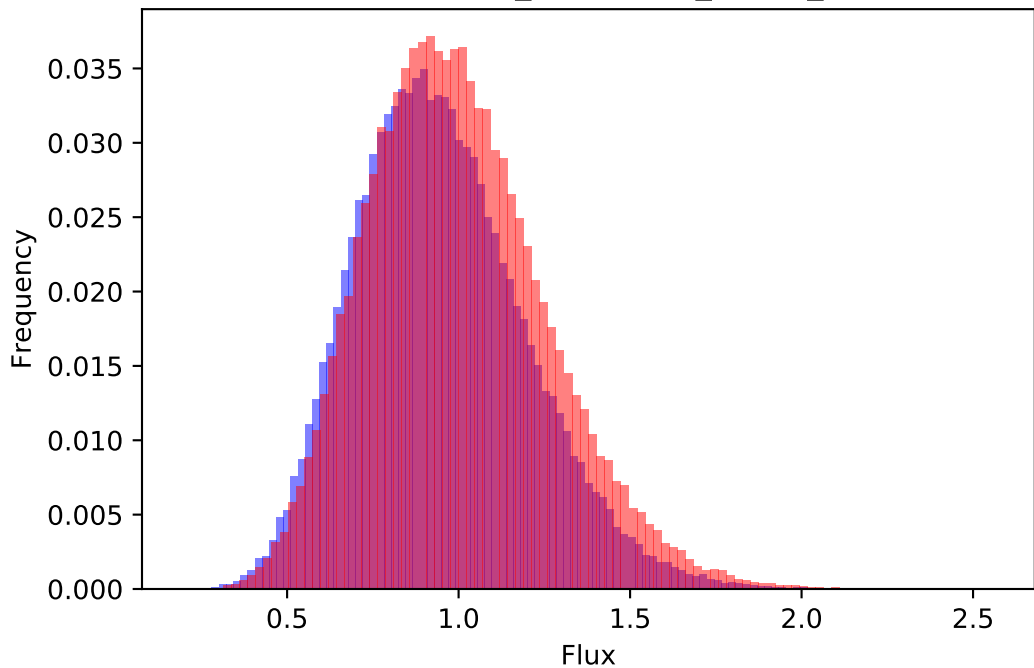
**\*\*101 : GAP\_h + S7P\_h <=> E4P\_h + F6P\_h\*\***



**\*\*102 : E4P\_h + H2O\_h + PEP\_h --> DAHP\_h + Pi\_h\*\***

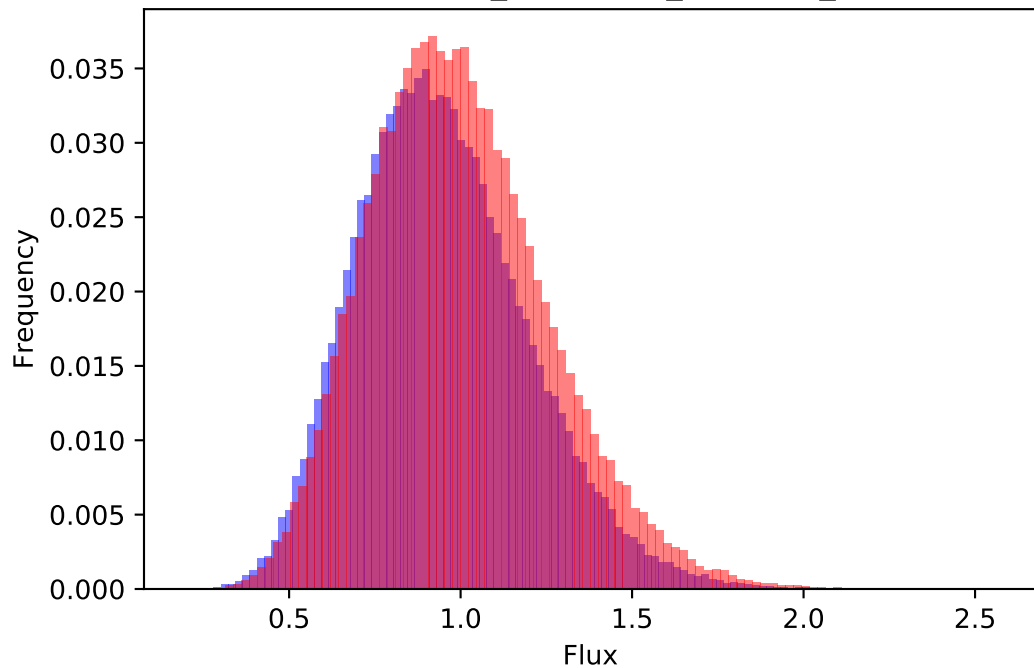


**\*\*103 : DAHP\_h --> DHQ\_h + Pi\_h\*\***

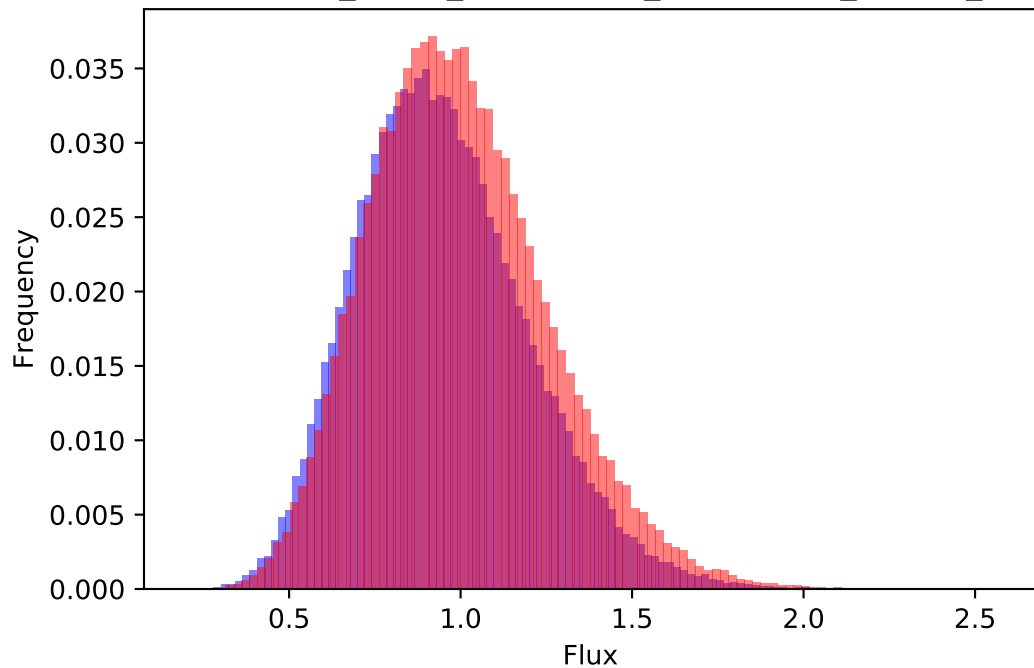




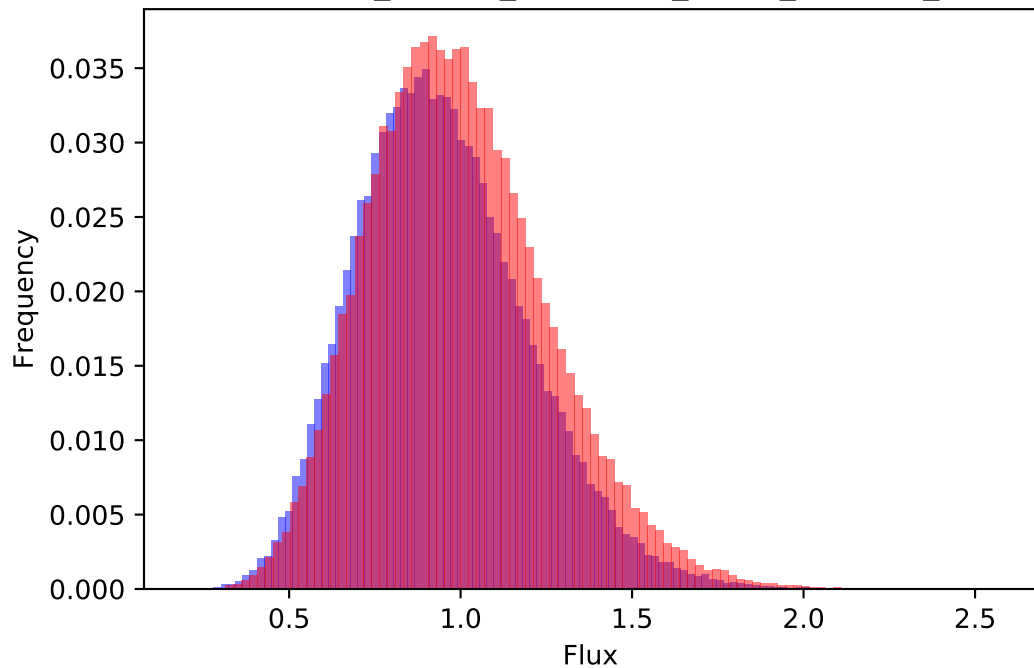
**\*\*104 : DHQ\_h --> DHS\_h + H2O\_h\*\***



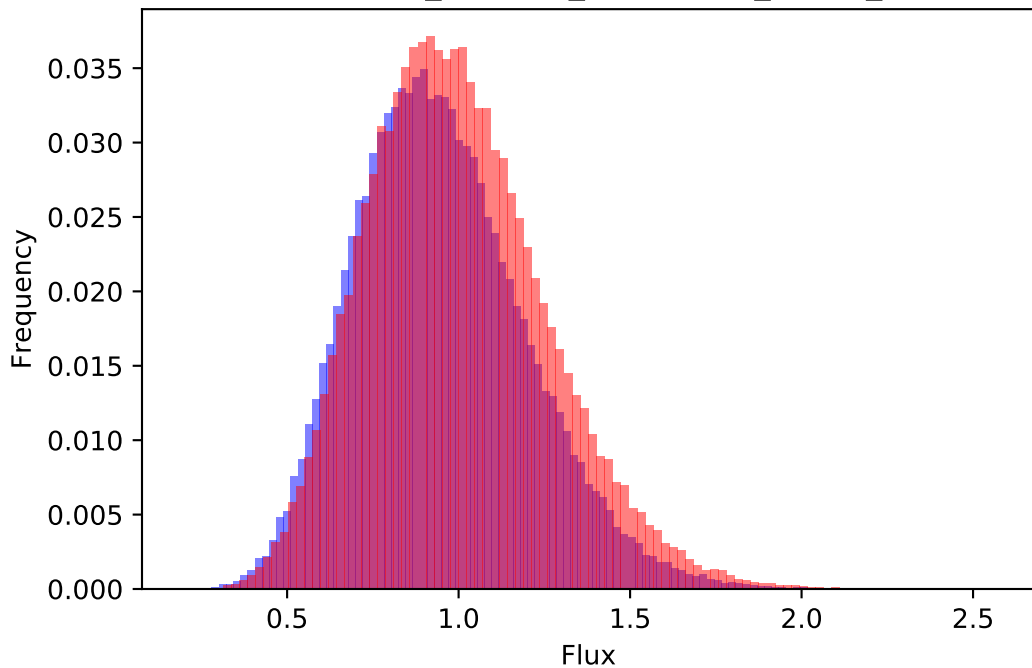
**\*\*105 : DHS\_h + H\_h + NADPH\_h --> NADP\_h + SA\_h\*\***



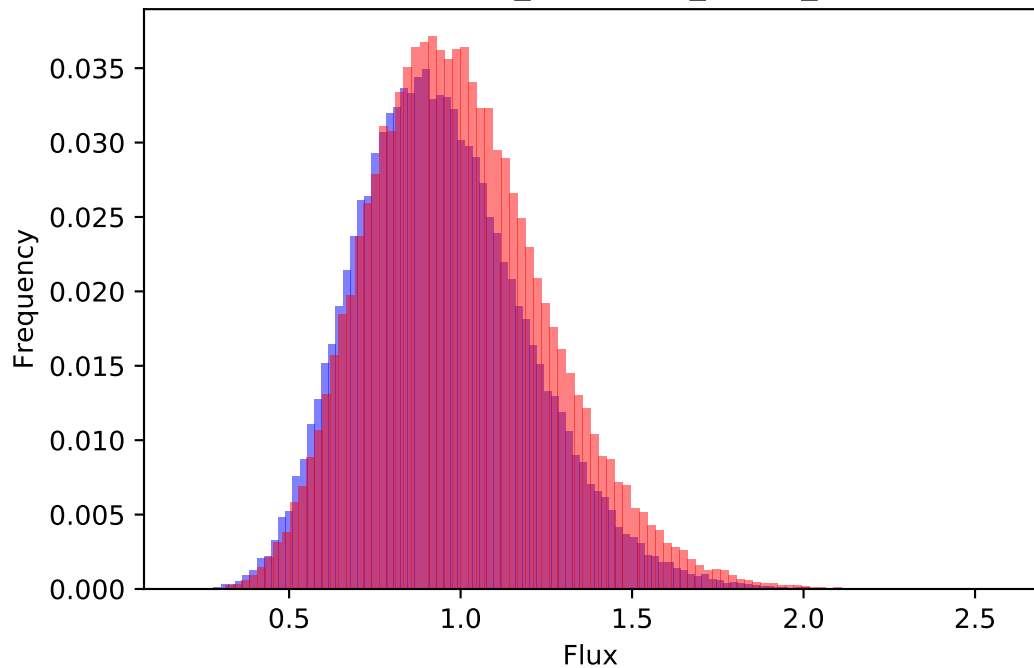
**\*\*106 : ATP\_h + SA\_h --> ADP\_h + H\_h + S3P\_h\*\***



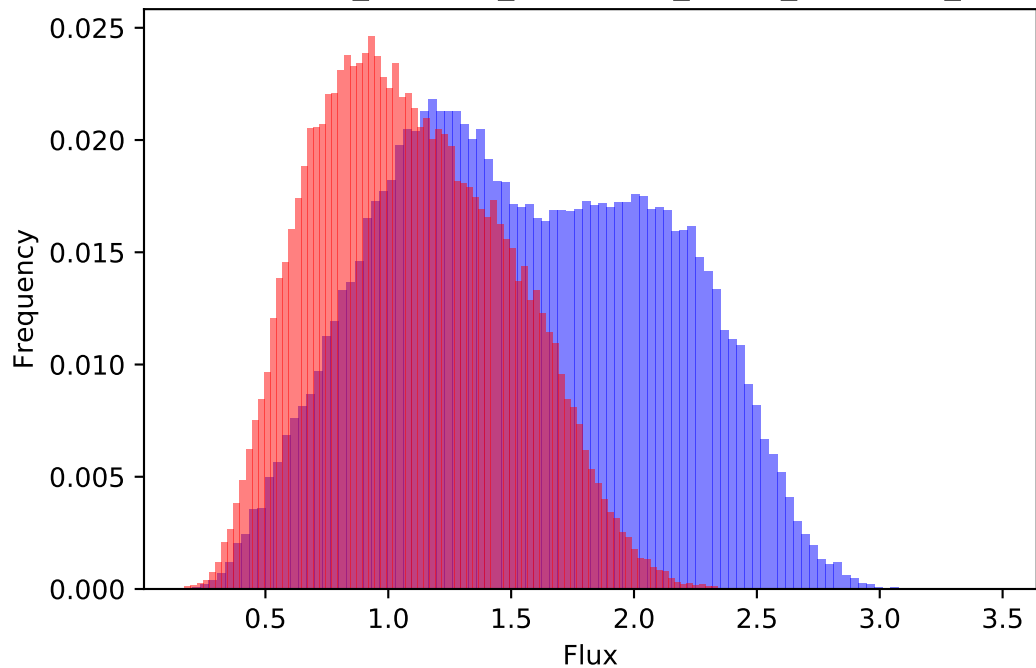
**\*\*107 : PEP\_h + S3P\_h --> EPSP\_h + Pi\_h\*\***



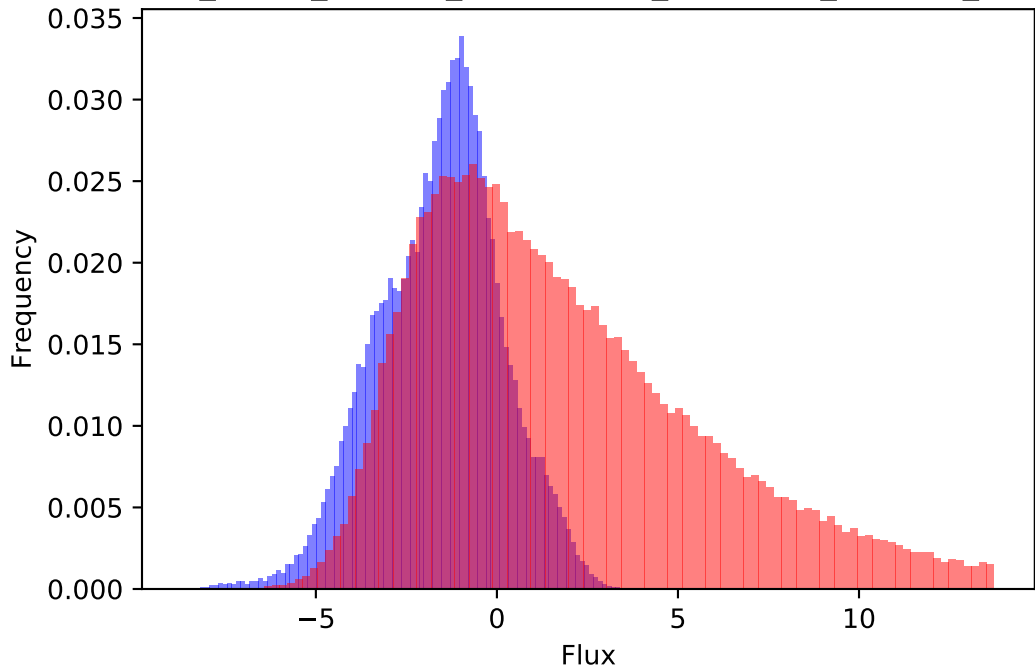
**\*\*108 : EPSP\_h --> CHR\_h + Pi\_h\*\***



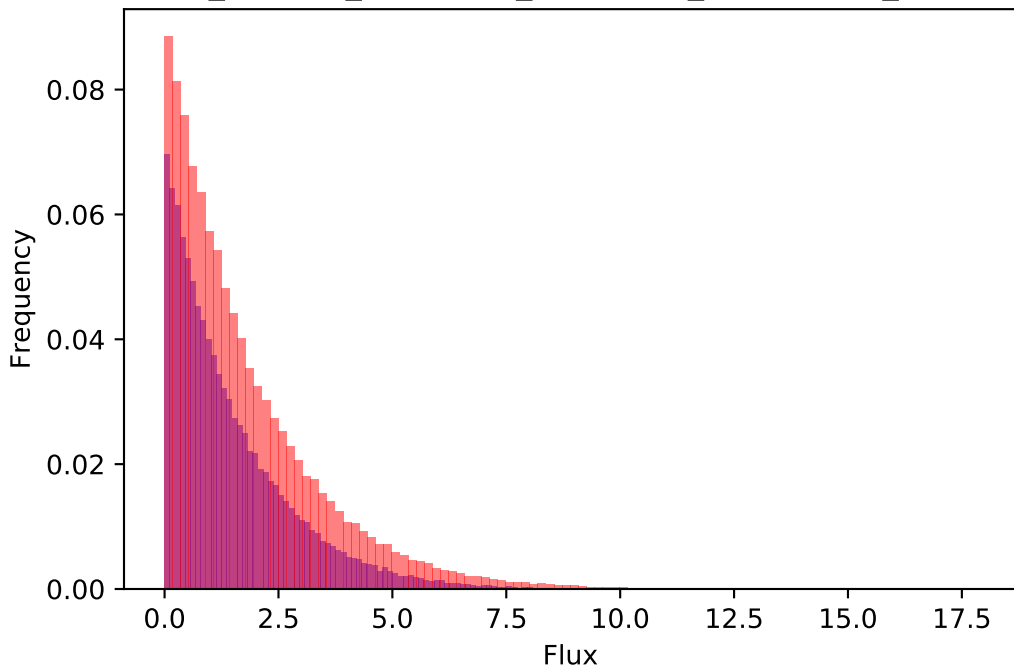
**\*\*109 : ATP\_h + R5P\_h --> AMP\_h + H\_h + PRPP\_h\*\***



**\*\*110 :  $\text{ATP}_h + \text{Pi}_h + \text{Pyr}_h \rightleftharpoons \text{AMP}_h + 2.0 \text{H}_h + \text{PEP}_h + \text{PPi}_h$ \***

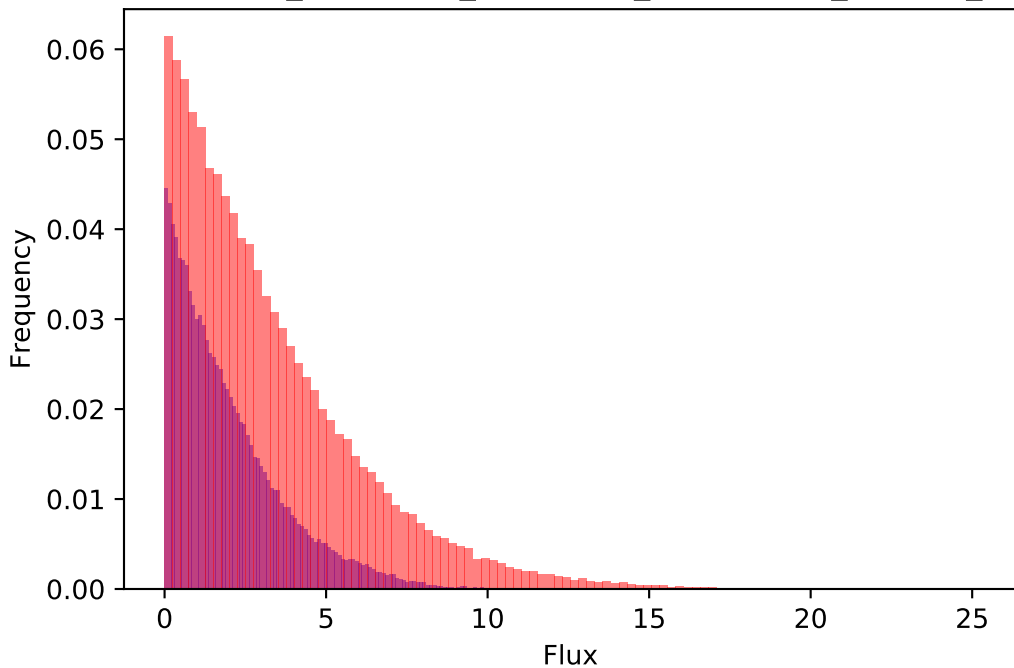


**\*\*111 : H\_c + Mal\_c + NADP\_c --> CO2\_c + NADPH\_c + Pyr\_c\*\***

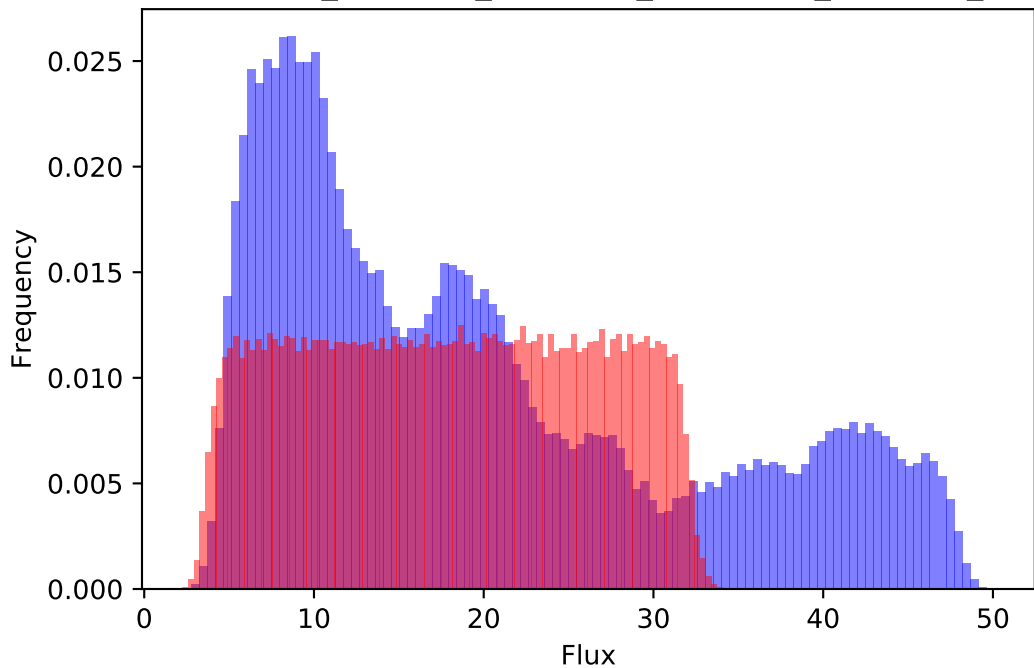




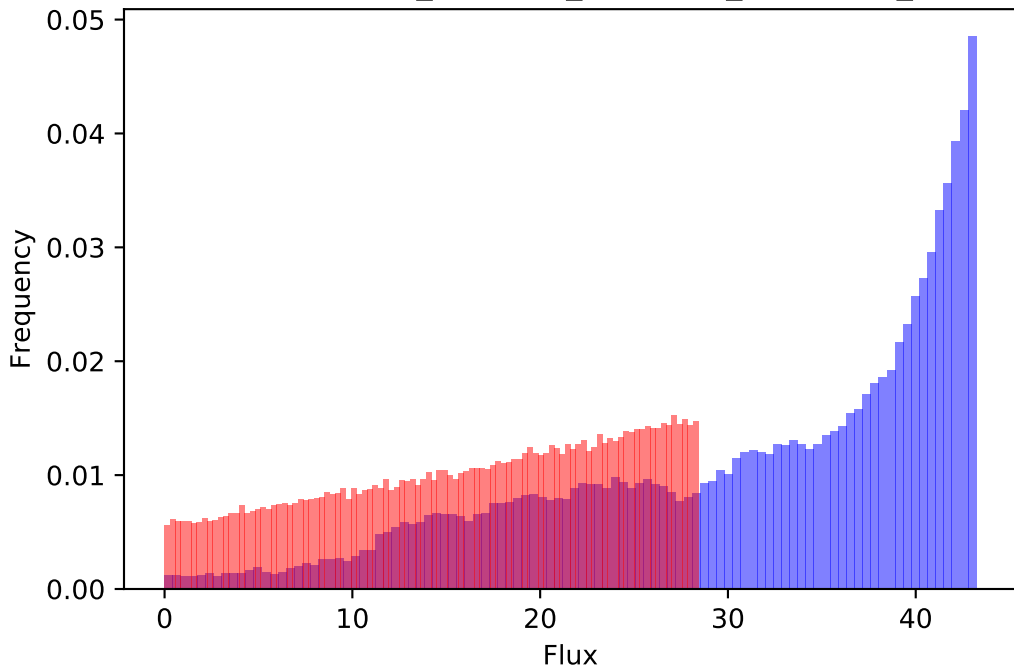
**\*\*112 : Mal\_h + NADP\_h --> CO2\_h + NADPH\_h + Pyr\_h\*\***



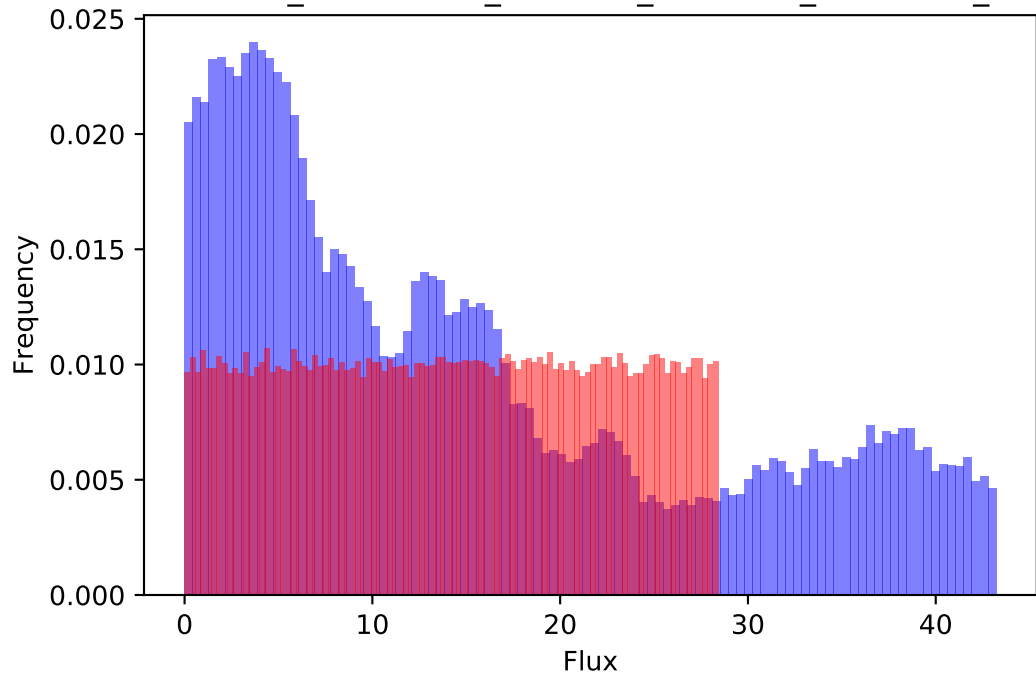
**\*\*113 : Mal\_h + NAD\_h <=> H\_h + NADH\_h + OAA\_h\*\***



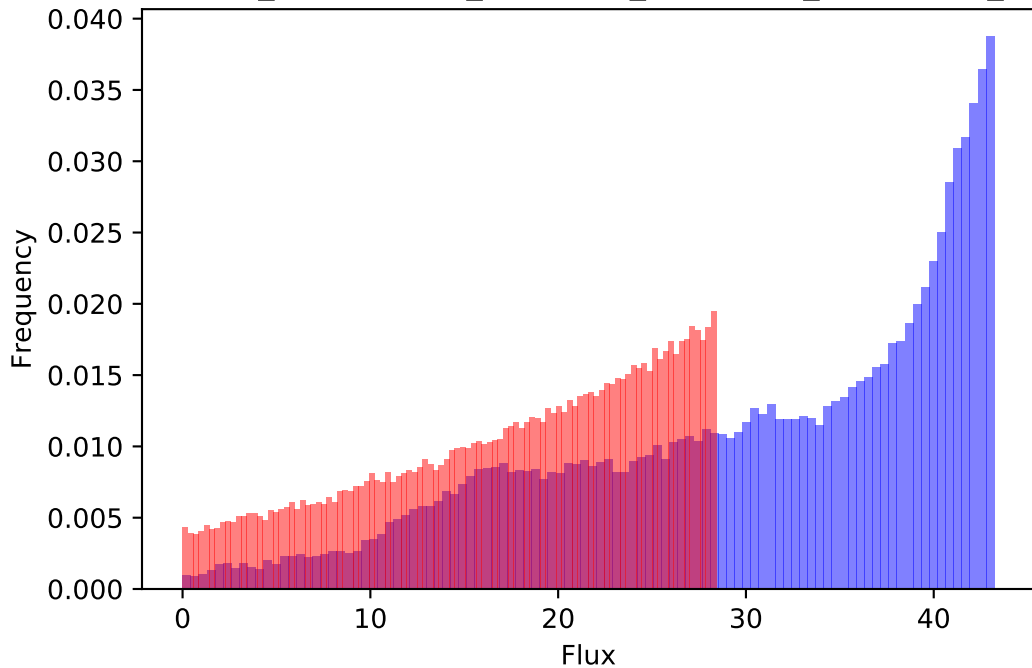
**\*\*114 : NADPH\_c + OAA\_c --> Mal\_c + NADP\_c\*\***



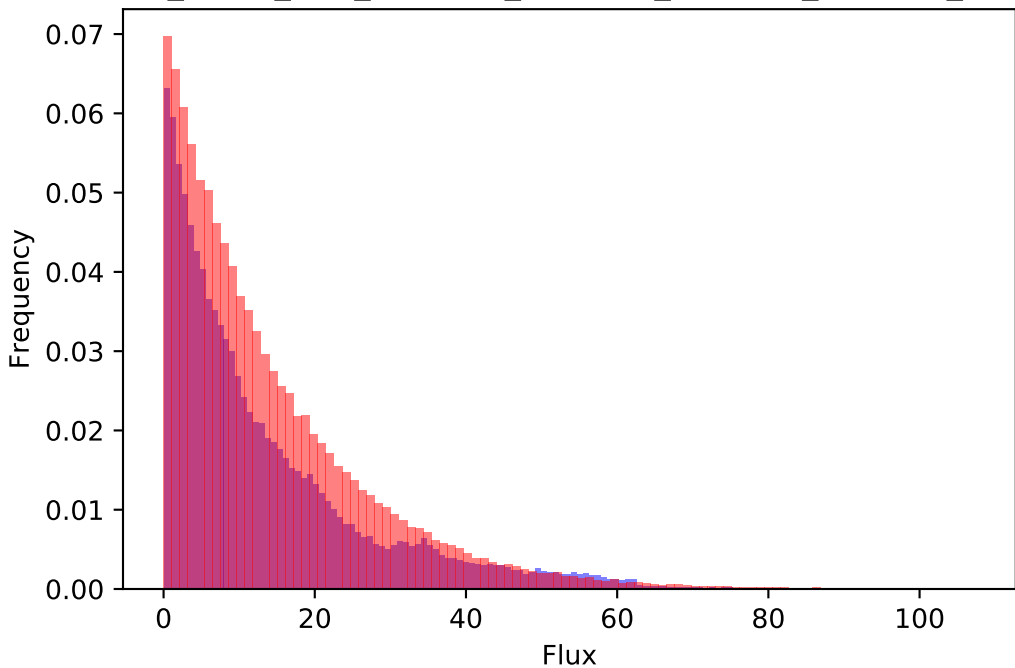
**\*\*115 : H\_h + NADPH\_h + OAA\_h --> Mal\_h + NADP\_h\*\***



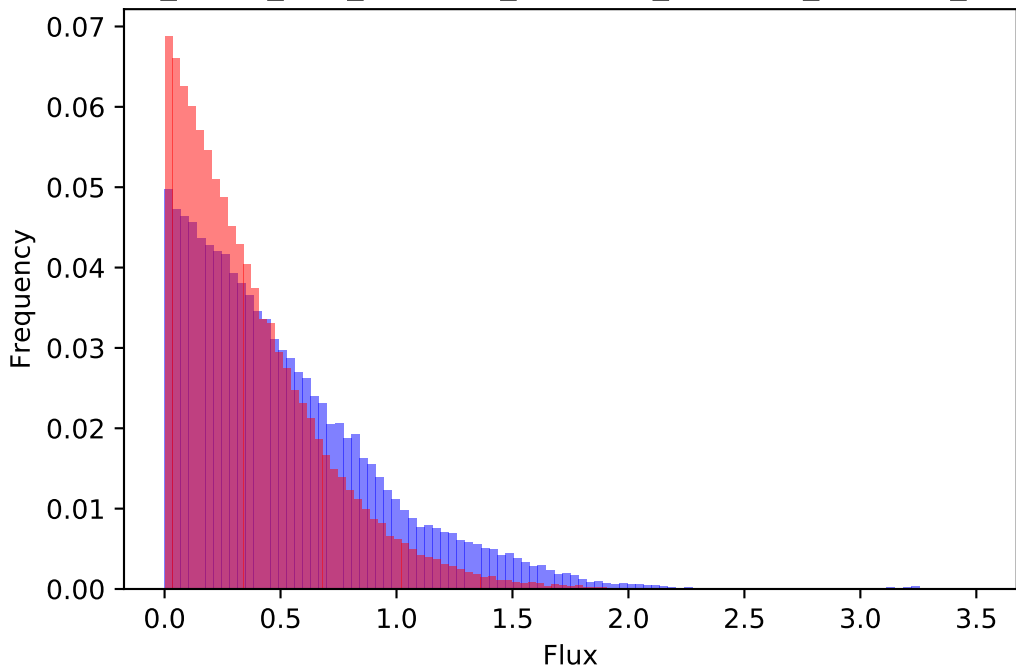
**\*\*116 : H\_m + NADPH\_m + OAA\_m --> Mal\_m + NADP\_m\*\***



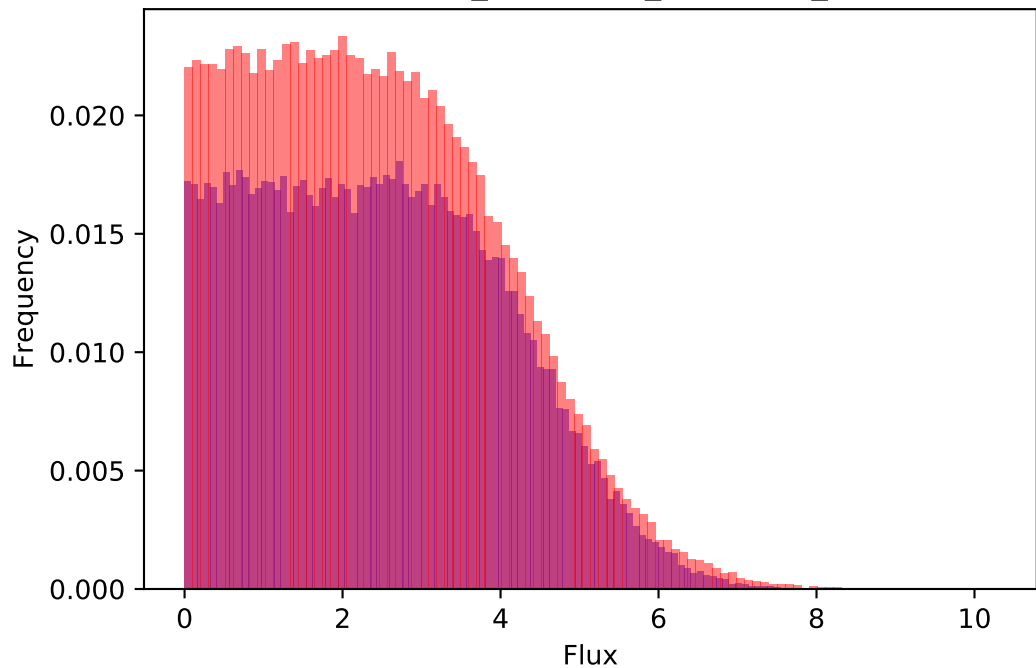
**\*\*117 : A\_DASH\_CoA\_c + H2O\_c + OAA\_c --> Cit\_c + CoA\_c + H\_c\*\***



**\*\*118 : A\_DASH\_CoA\_h + H2O\_h + OAA\_h --> Cit\_h + CoA\_h + H\_h\*\***

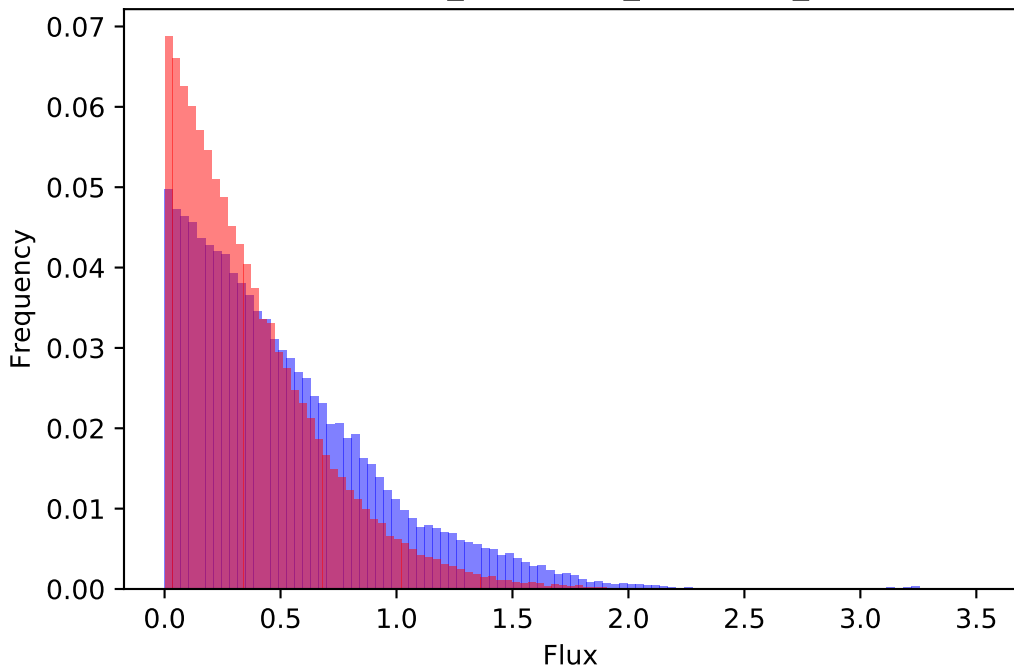


**\*\*119 : Cit\_c --> H2O\_c + cACN\_c\*\***

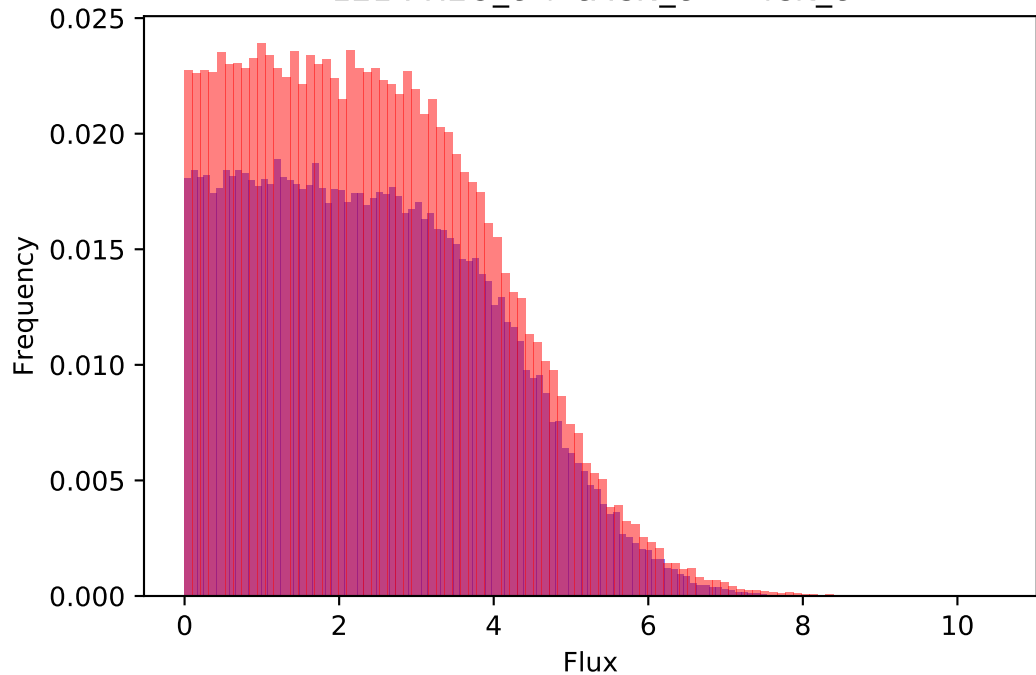




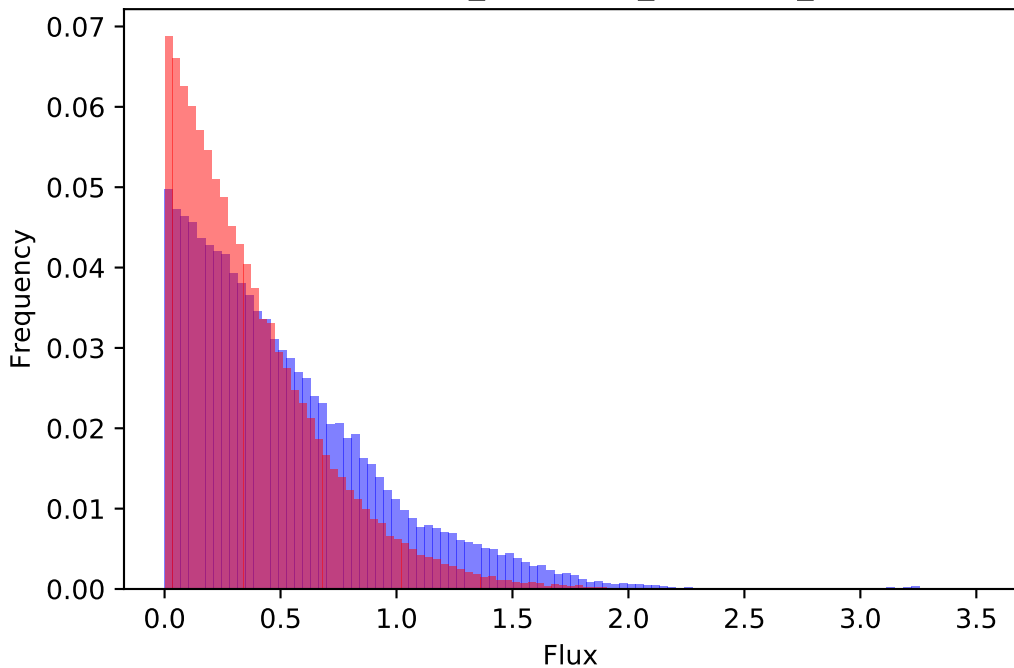
**\*\*120 : Cit\_h --> H2O\_h + cACN\_h\*\***



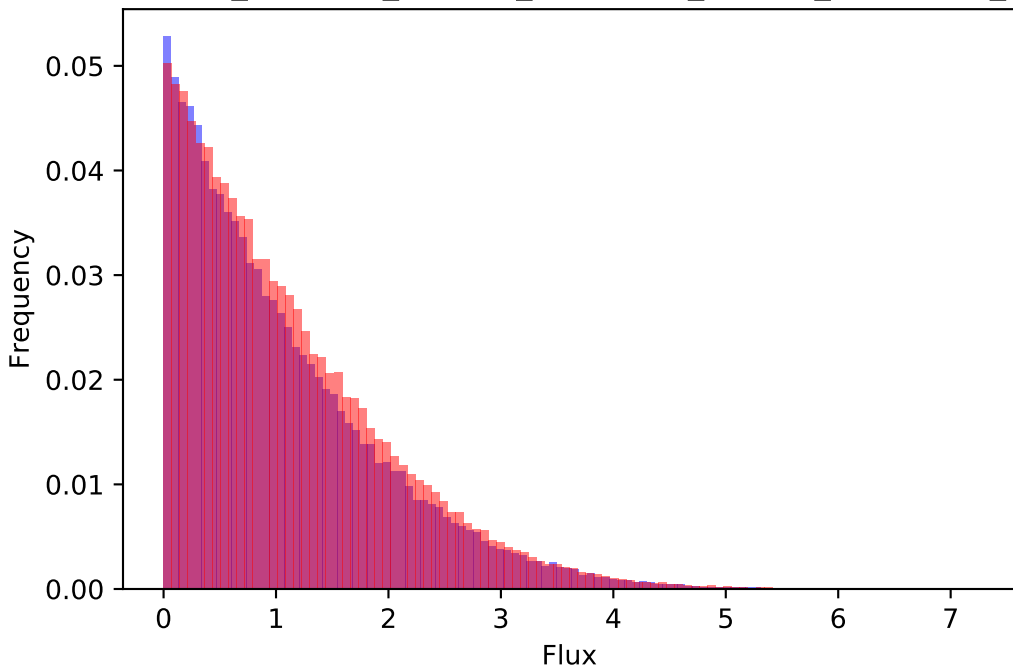
121 : H2O\_c + cACN\_c --> iCit\_c



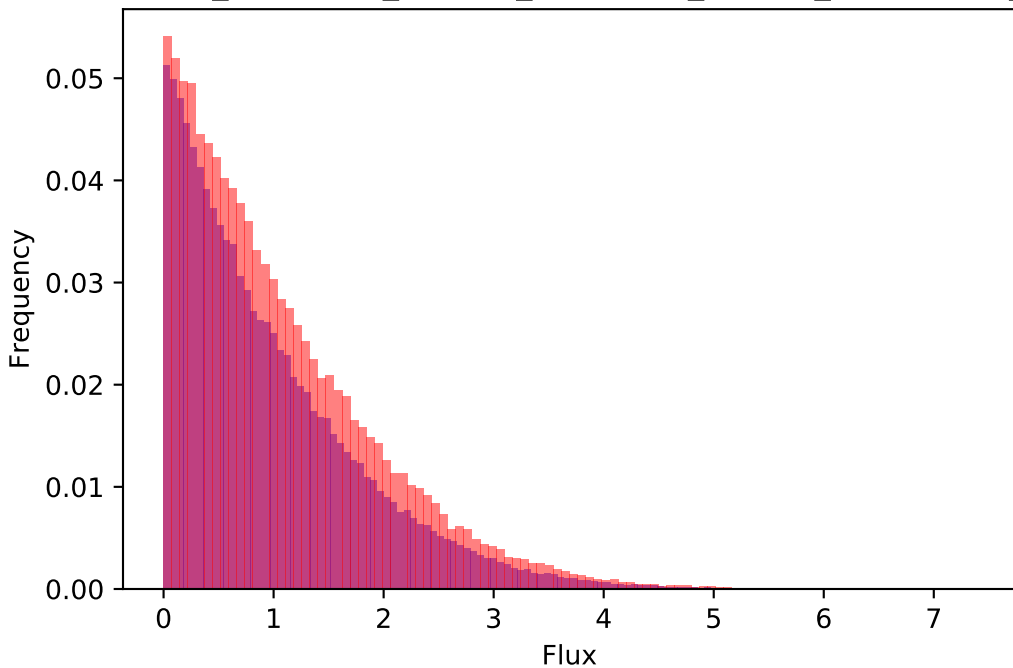
**\*\*122 : H2O\_h + cACN\_h --> iCit\_h\*\***



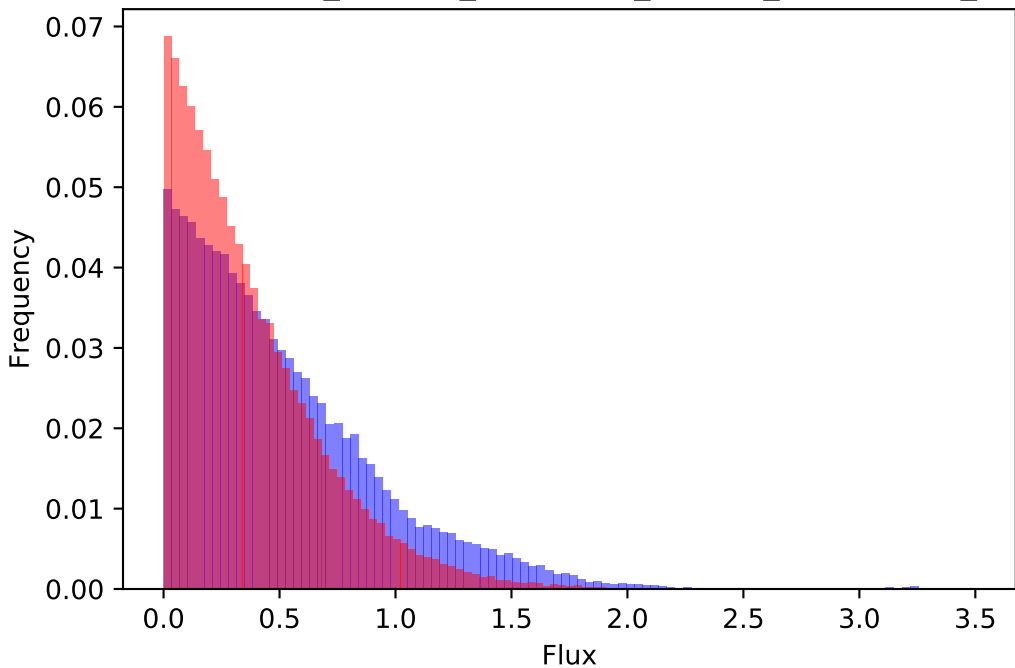
**\*\*123 : H\_c + NAD\_c + iCit\_c --> CO2\_c + KG\_c + NADH\_c\*\***



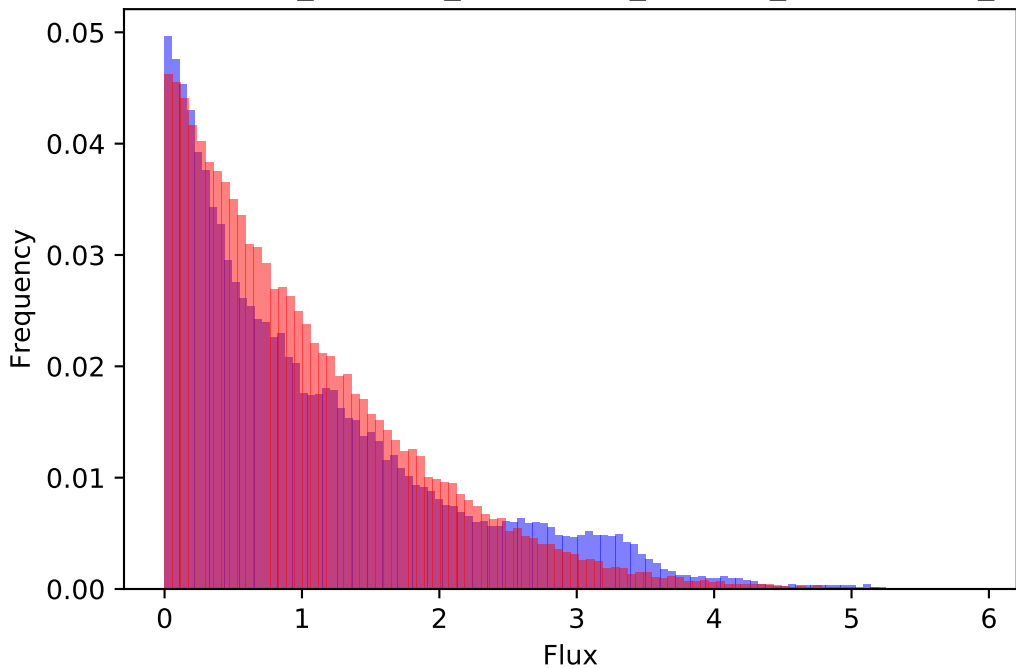
**\*\*124 : H\_c + NADP\_c + iCit\_c --> CO2\_c + KG\_c + NADPH\_c\*\***



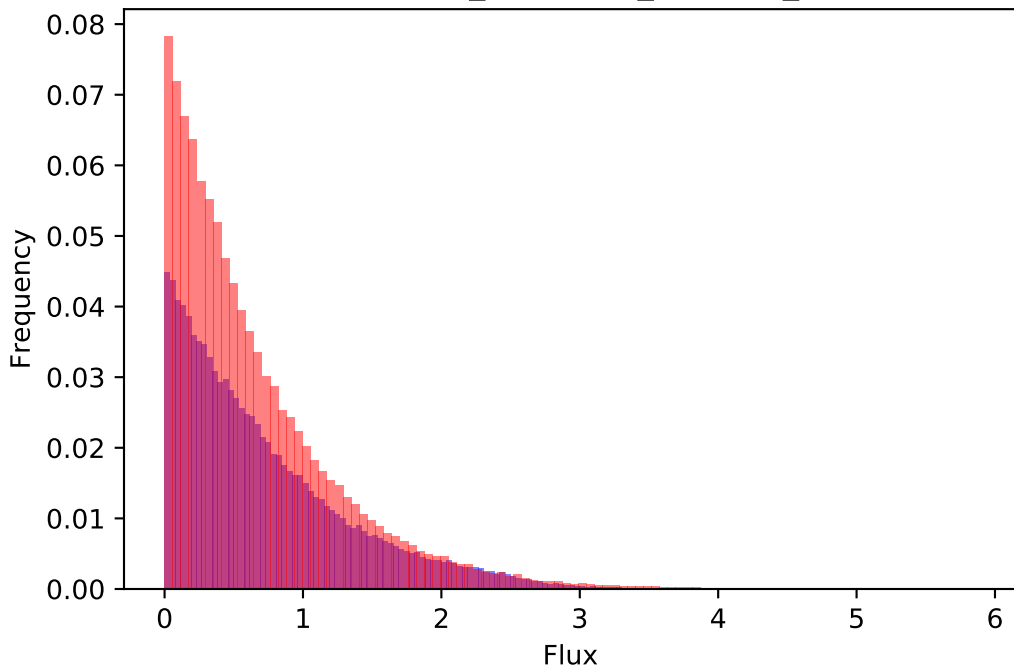
**\*\*125 : NADP\_h + iCit\_h --> CO2\_h + KG\_h + NADPH\_h\*\***



**\*\*126 : NADP\_m + iCit\_m --> CO2\_m + KG\_m + NADPH\_m\*\***

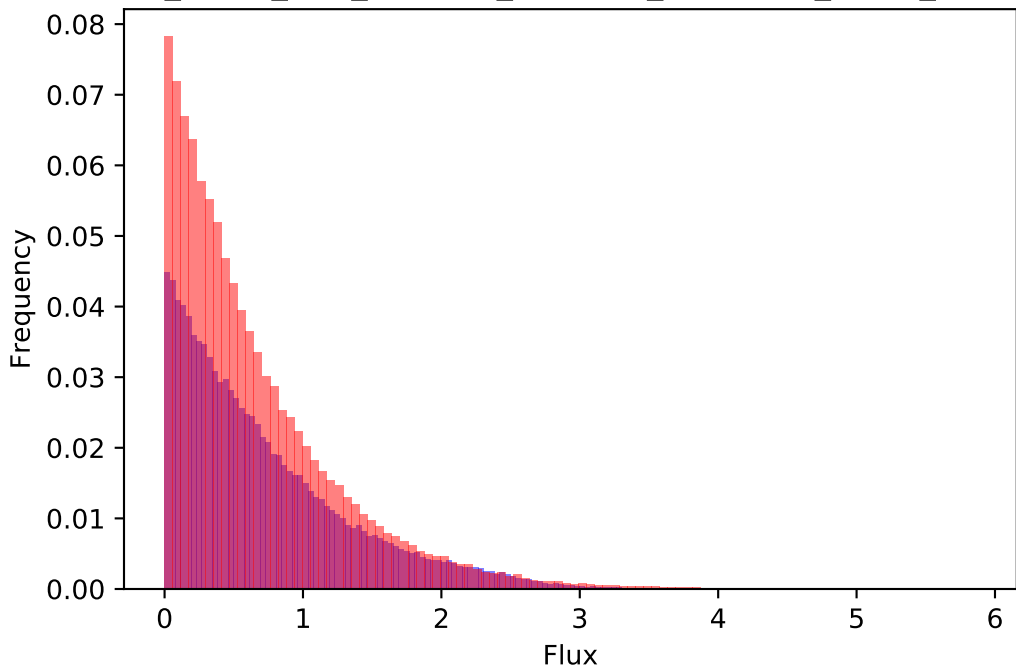


**\*\*127 : iCit\_c --> GLX\_c + SCA\_c\*\***

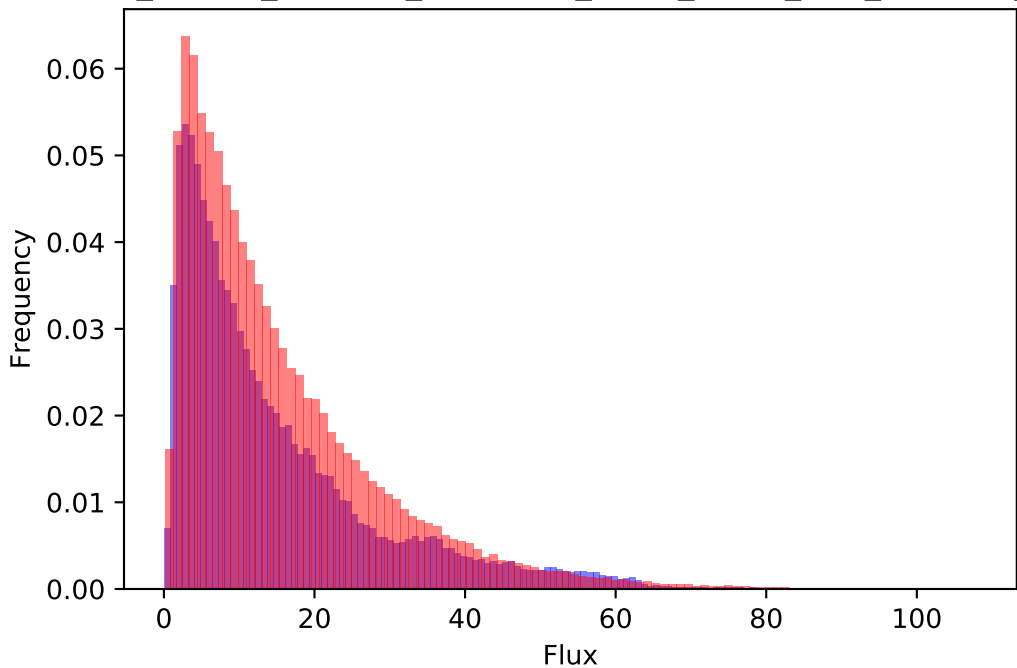




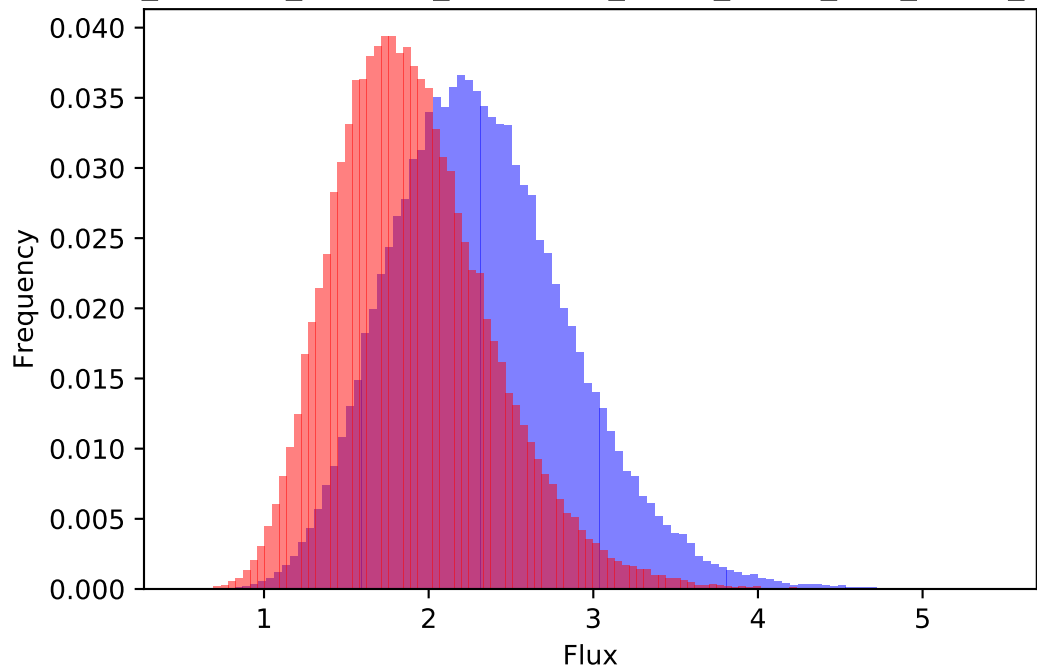
**\*\*128 : A\_DASH\_CoA\_c + GLX\_c + H2O\_c --> CoA\_c + H\_c + Mal\_c\*\***



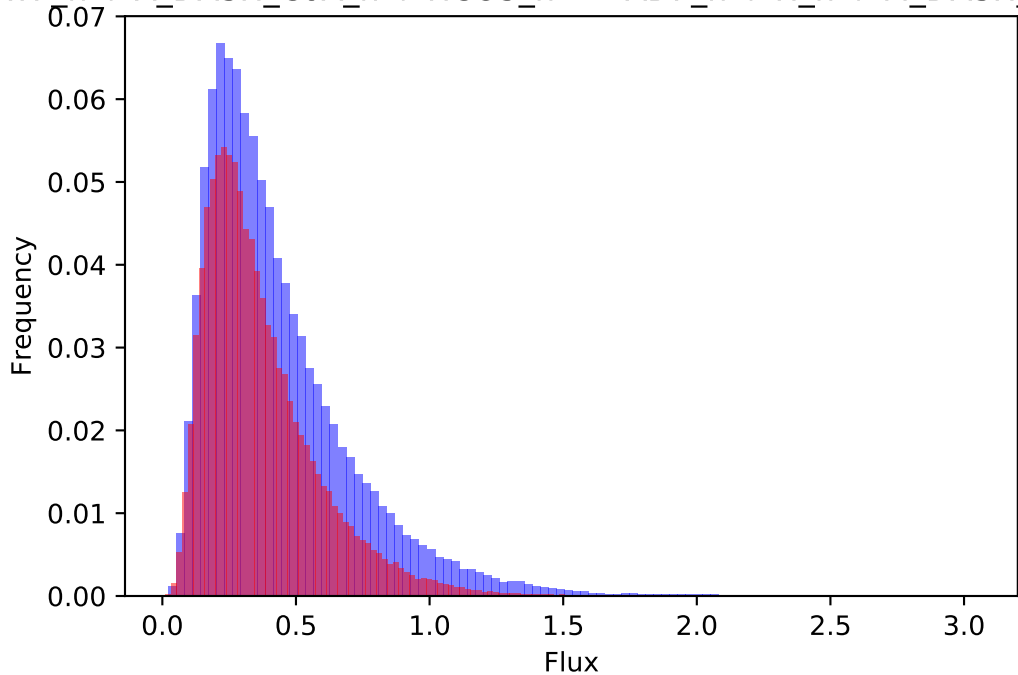
F129 : ATP\_c + Cit\_c + CoA\_c --> ADP\_c + A\_DASH\_CoA\_c + OAA\_c + Pi\_c



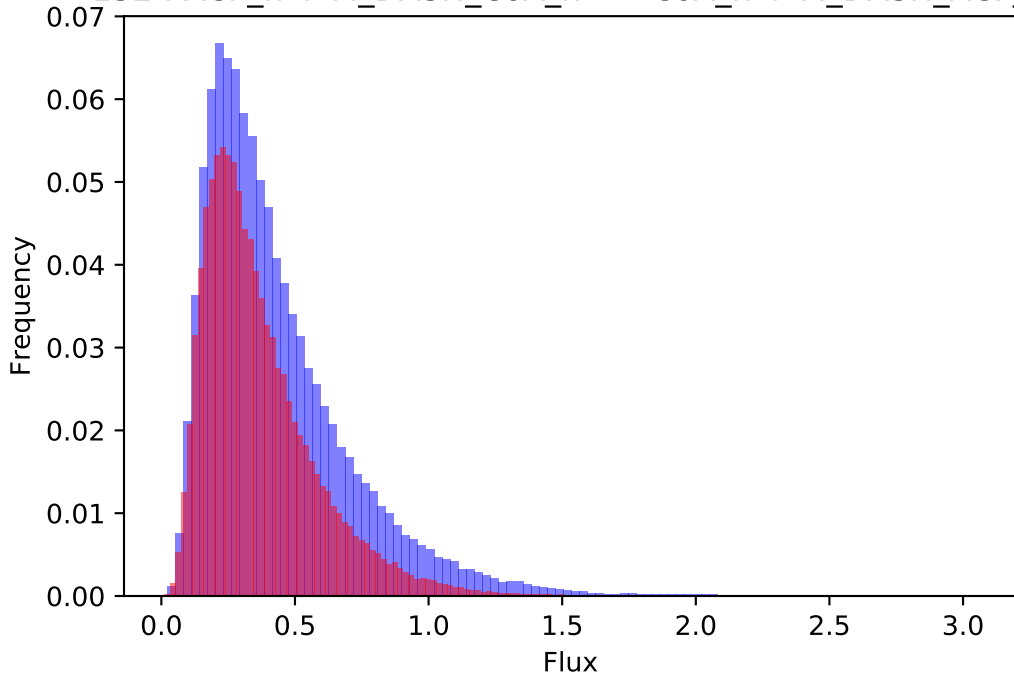
≤130 : AC\_h + ATP\_h + CoA\_h --> AMP\_h + A\_DASH\_CoA\_h + H\_h + PPi\_h



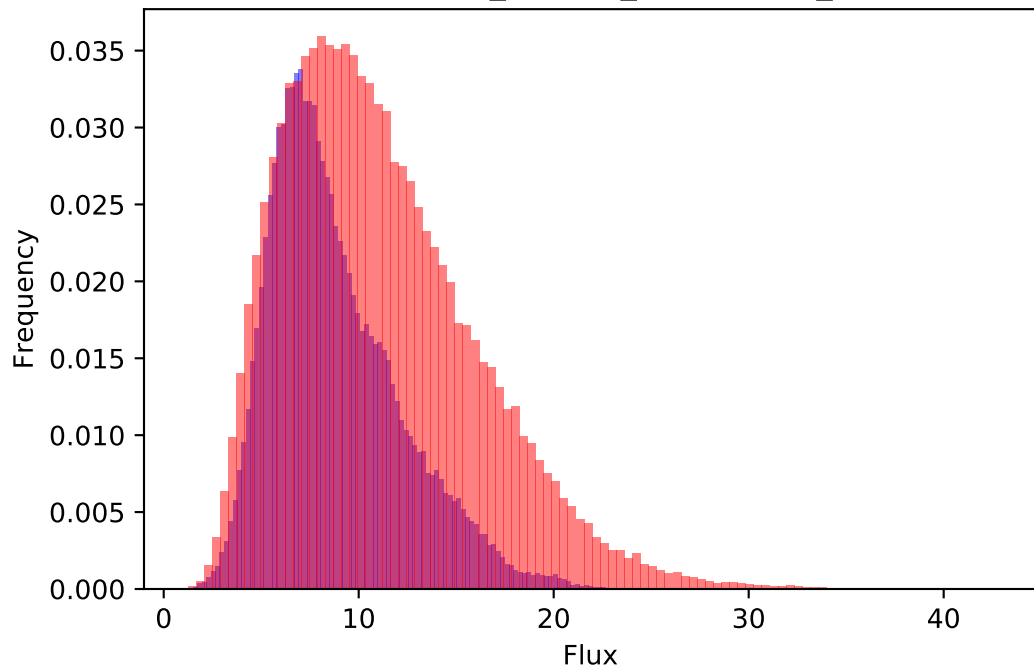
$\text{ATP}_h + \text{A\_DASH\_CoA}_h + \text{HCO3}_h \rightarrow \text{ADP}_h + \text{H}_h + \text{M\_DASH\_CoA}_h$



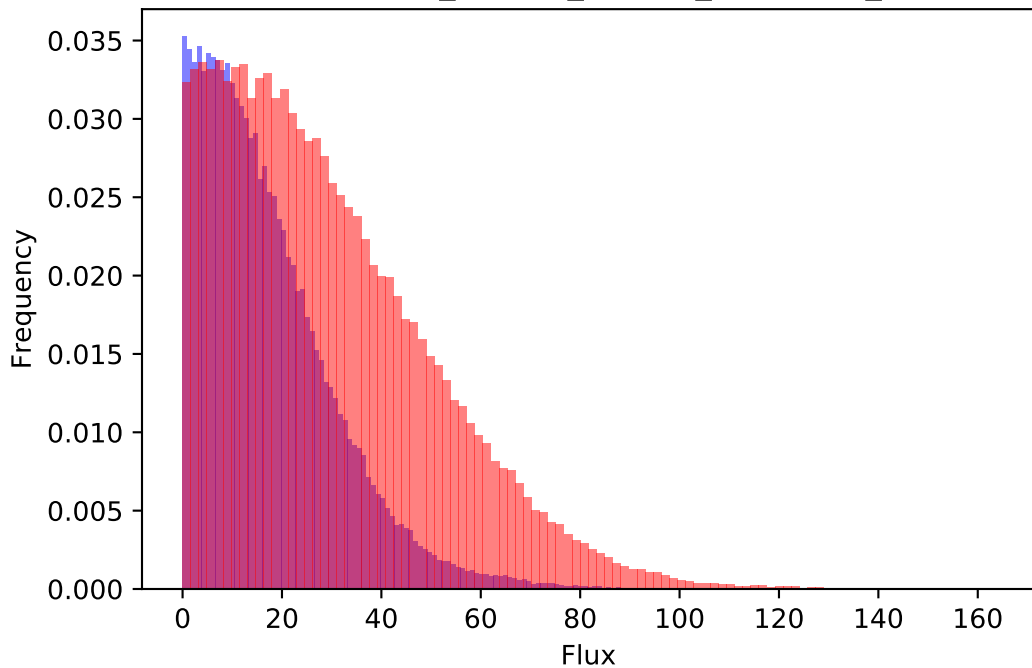
**\*\*132 : ACP\_h + M\_DASH\_CoA\_h --> CoA\_h + M\_DASH\_ACP\_h\*\***



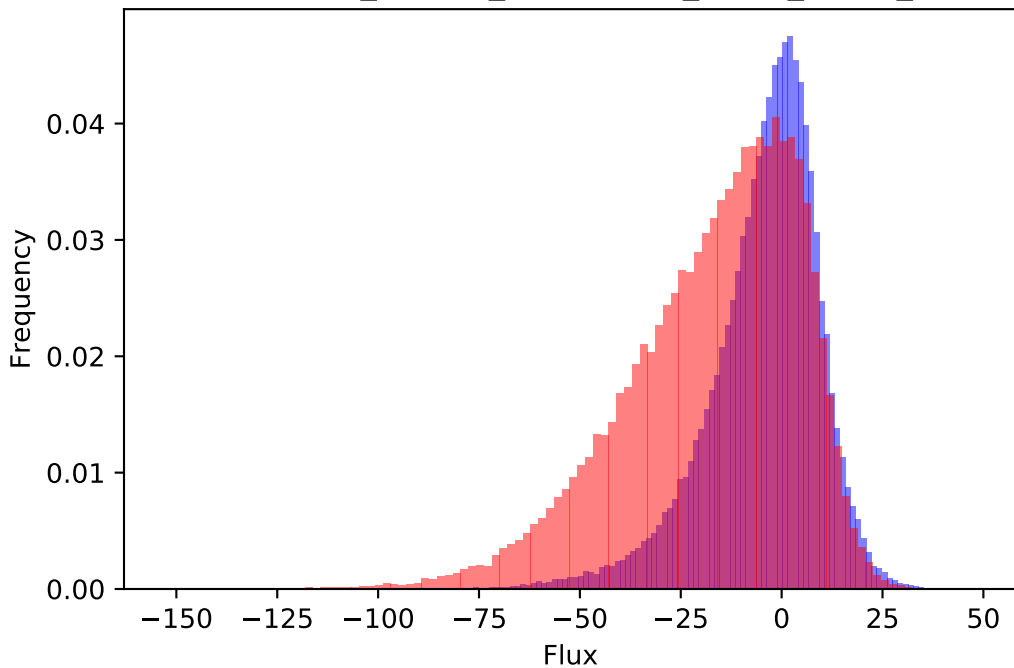
**\*\*133 : H2O\_h + PPI\_h --> 2.0 Pi\_h\*\***



**\*\*134 : H2O\_c + P*Pi*\_c --> H\_c + 2.0 *Pi*\_c\*\***

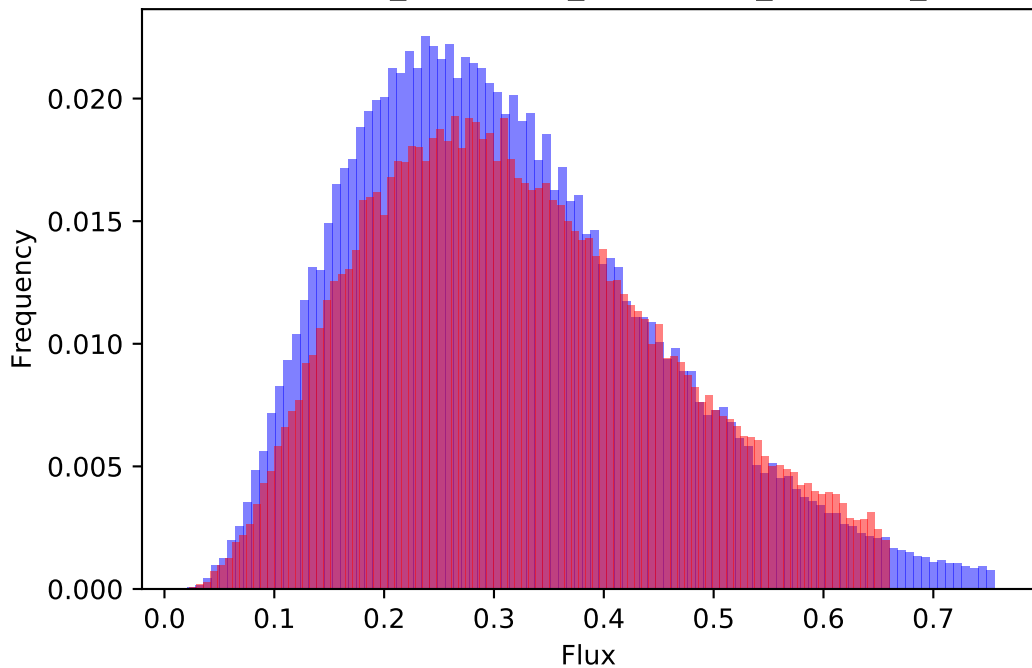


**\*\*135 : F6P\_c + PPi\_c <=> FBP\_c + H\_c + Pi\_c\*\***

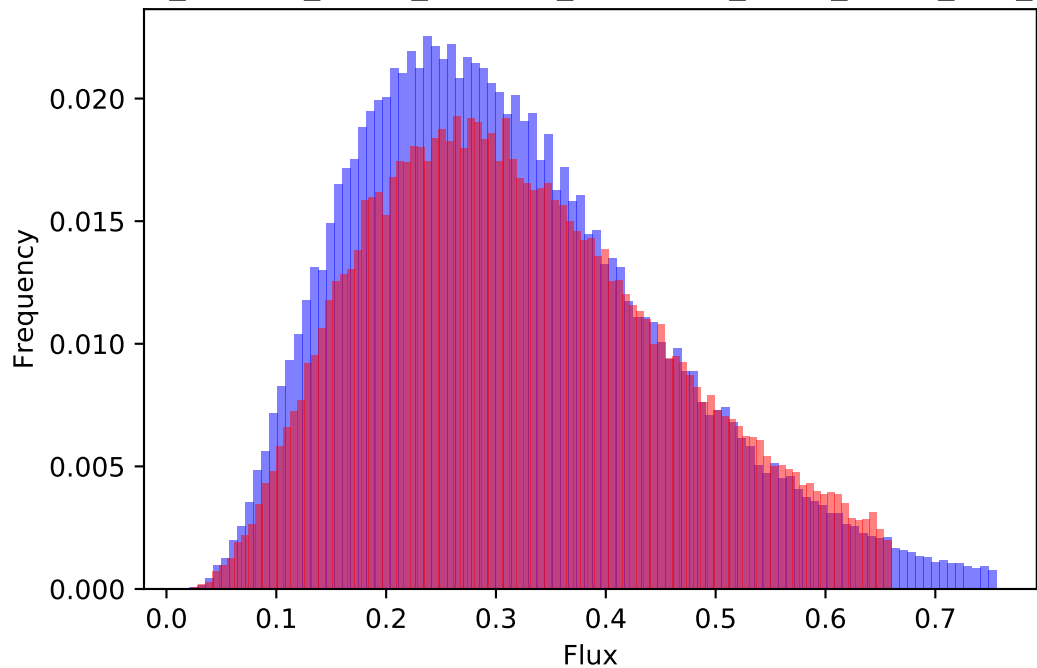




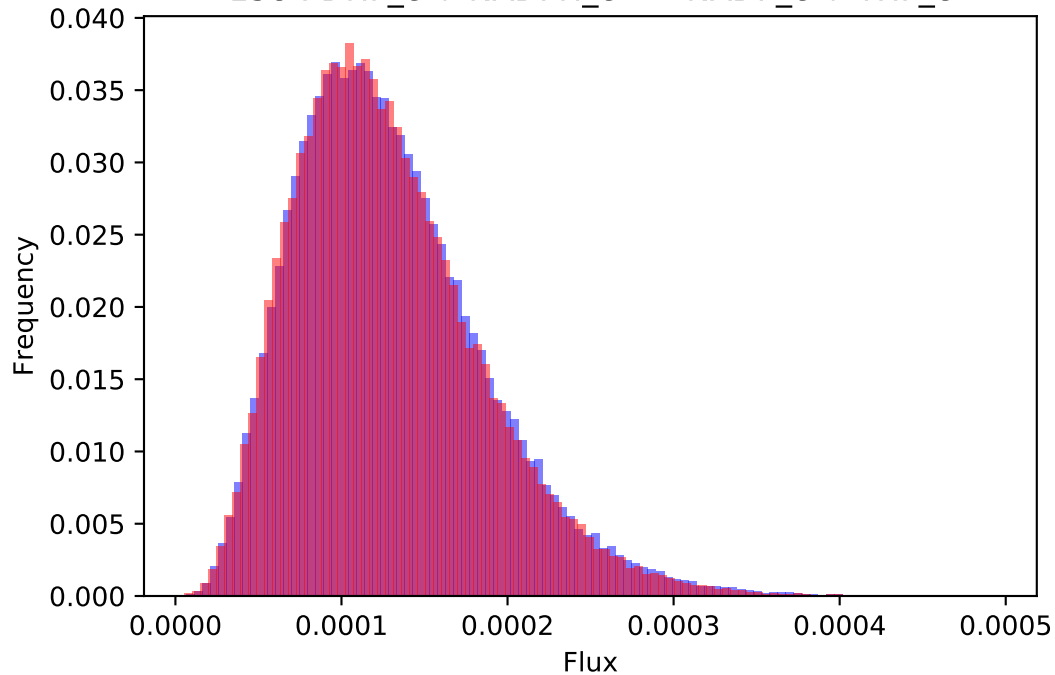
**\*\*136 : CO2\_h + NADH\_h <=> For\_h + NAD\_h\*\***



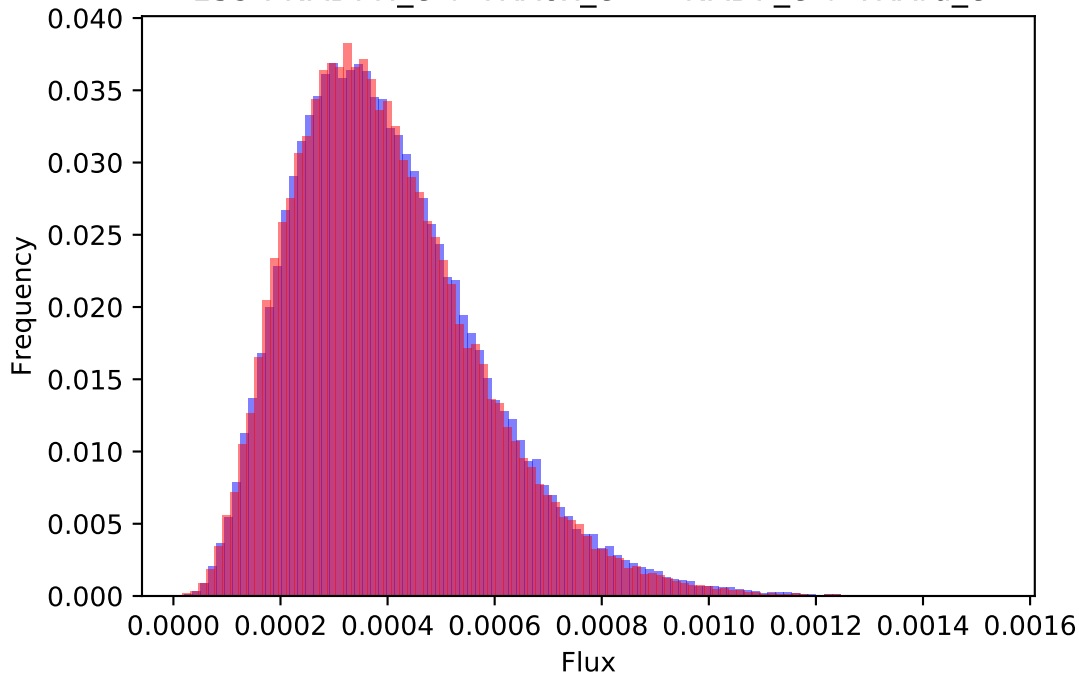
\*137 : ATP\_h + For\_h + H\_h + THF\_h --> ADP\_h + F\_DASH\_THF\_h + Pi\_h



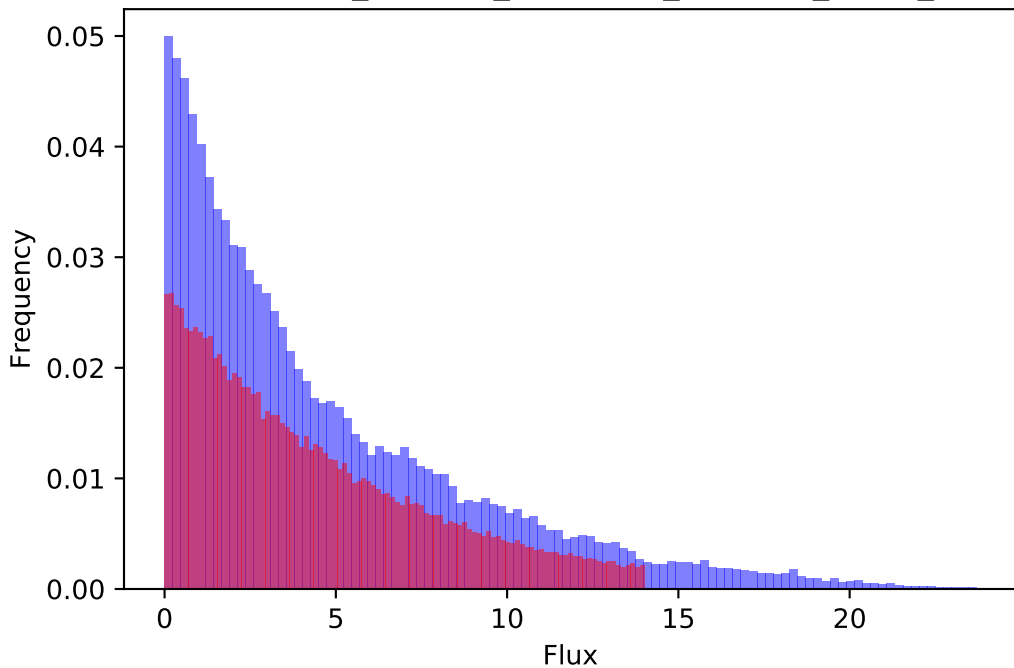
**\*\*138 : DHF\_c + NADPH\_c --> NADP\_c + THF\_c\*\***



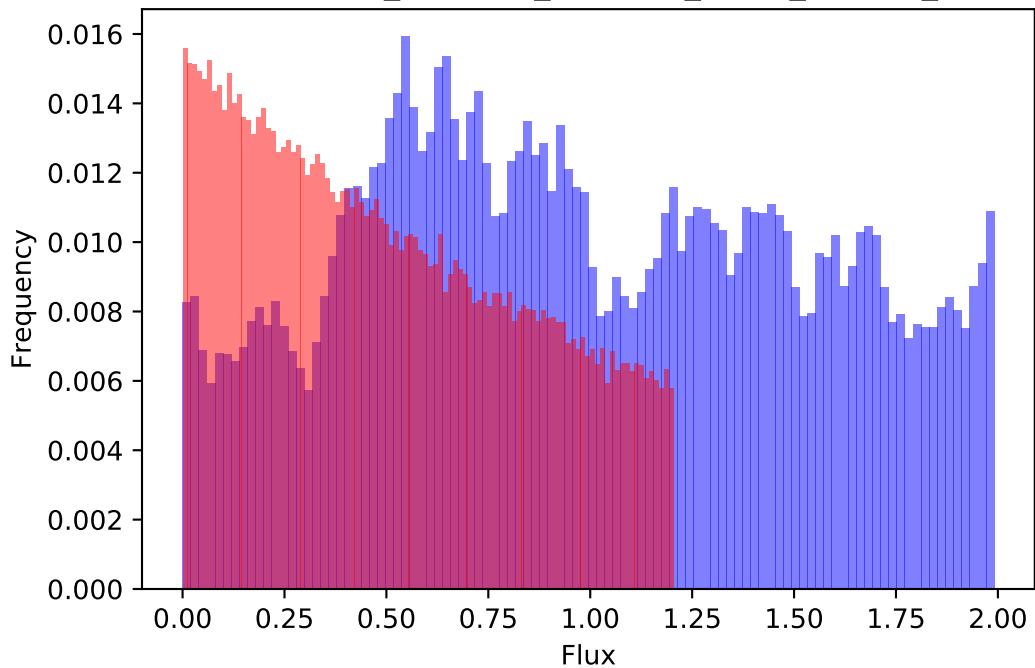
**\*\*139 : NADPH\_c + TRXox\_c --> NADP\_c + TRXrd\_c\*\***



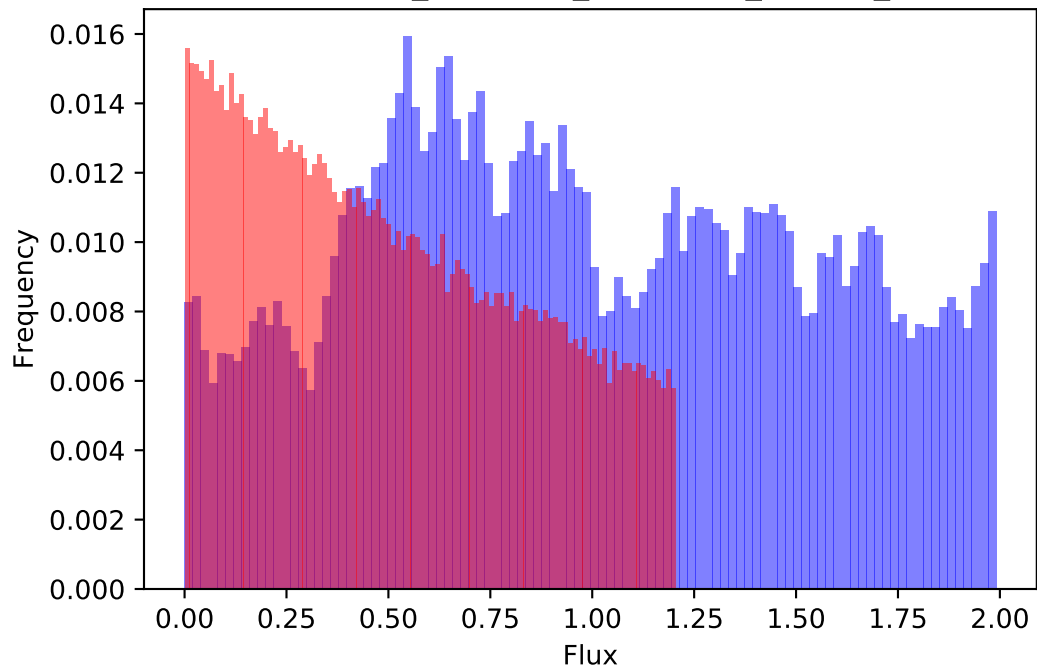
**\*\*140 : ADN\_c + ATP\_c --> ADP\_c + AMP\_c + H\_c\*\***



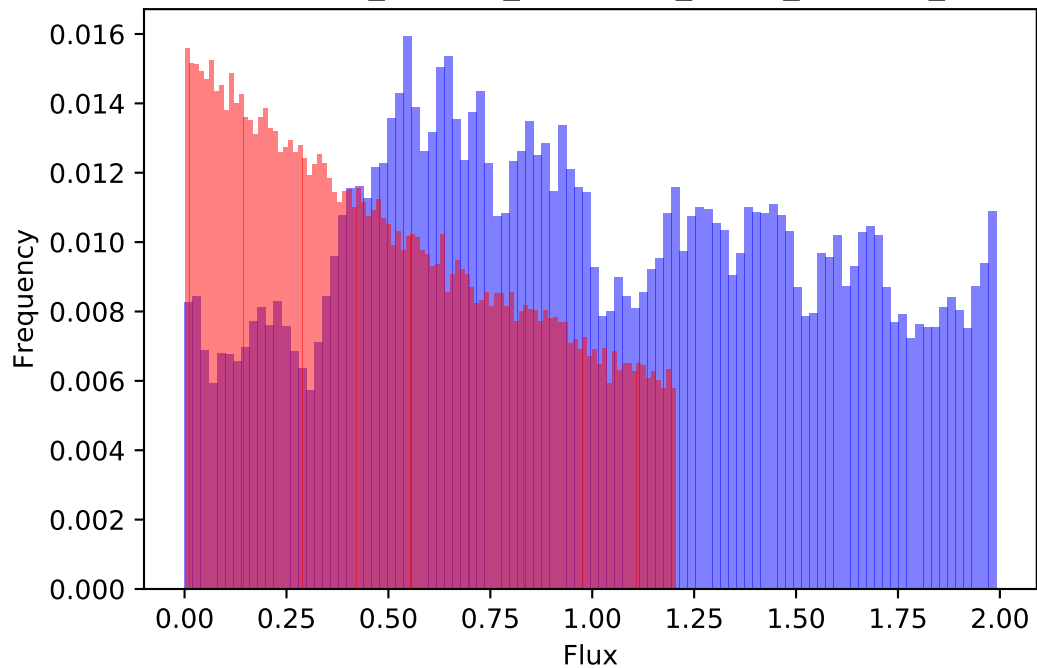
**\*\*141 : ADN\_c + H2O\_c --> AD\_c + H\_c + Rib\_c\*\***



**\*\*142 : AD\_c + PRPP\_c --> AMP\_c + PPI\_c\*\***

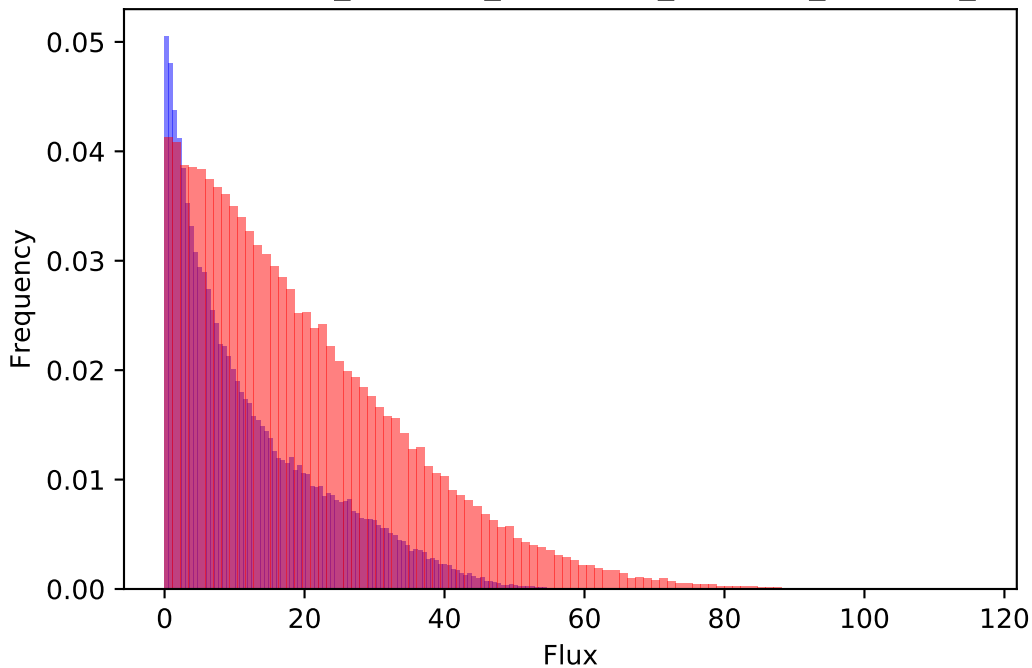


**\*\*143 : ATP\_h + Rib\_h --> ADP\_h + H\_h + R5P\_h\*\***

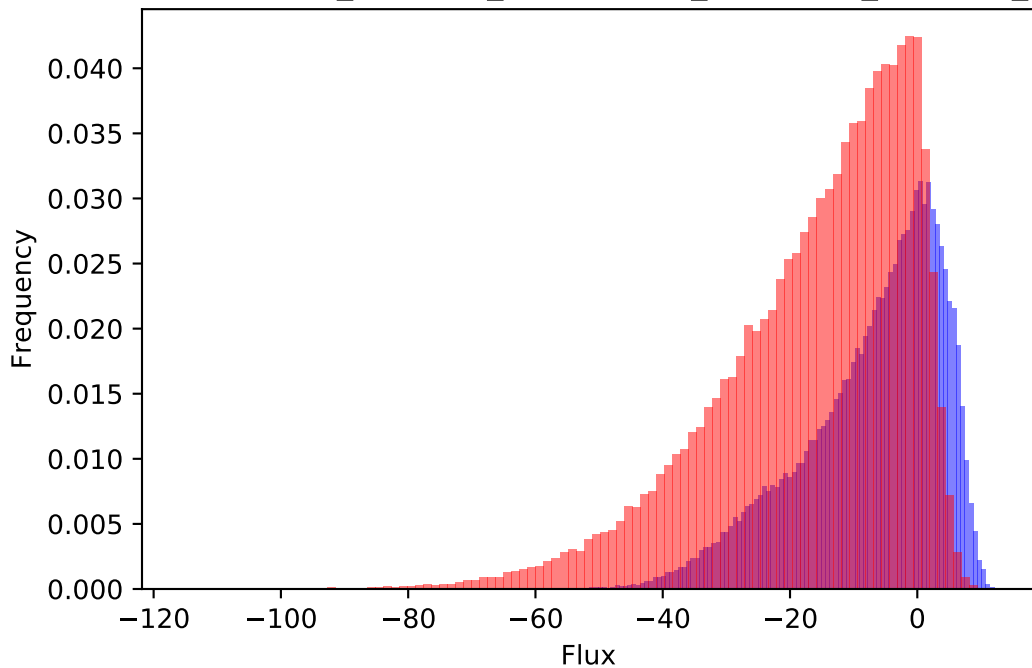




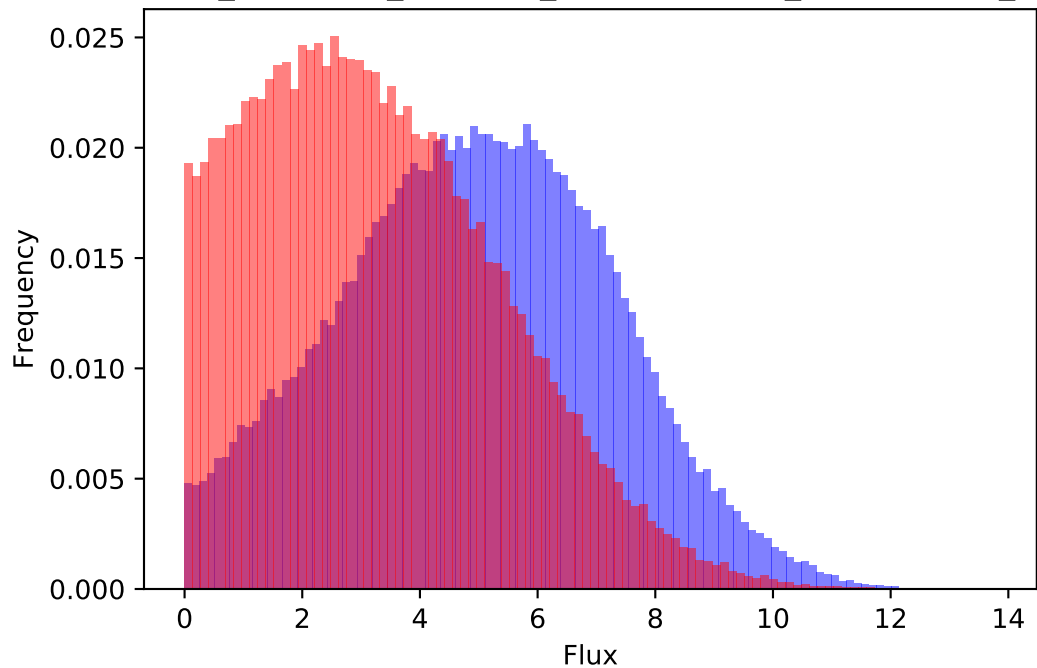
**\*\*144 : NADH\_c + NO3\_c --> H2O\_c + NAD\_c + NO2\_c\*\***



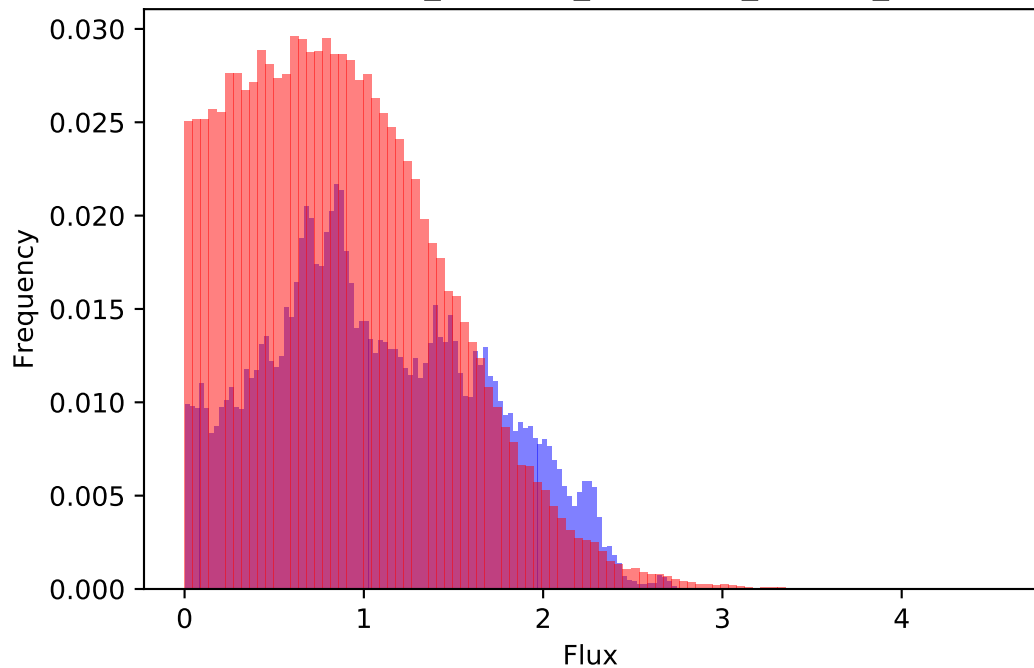
**\*\*145 :  $\text{NADPH}_c + \text{NO3}_c \rightleftharpoons \text{H2O}_c + \text{NADP}_c + \text{NO2}_c$  \*\***



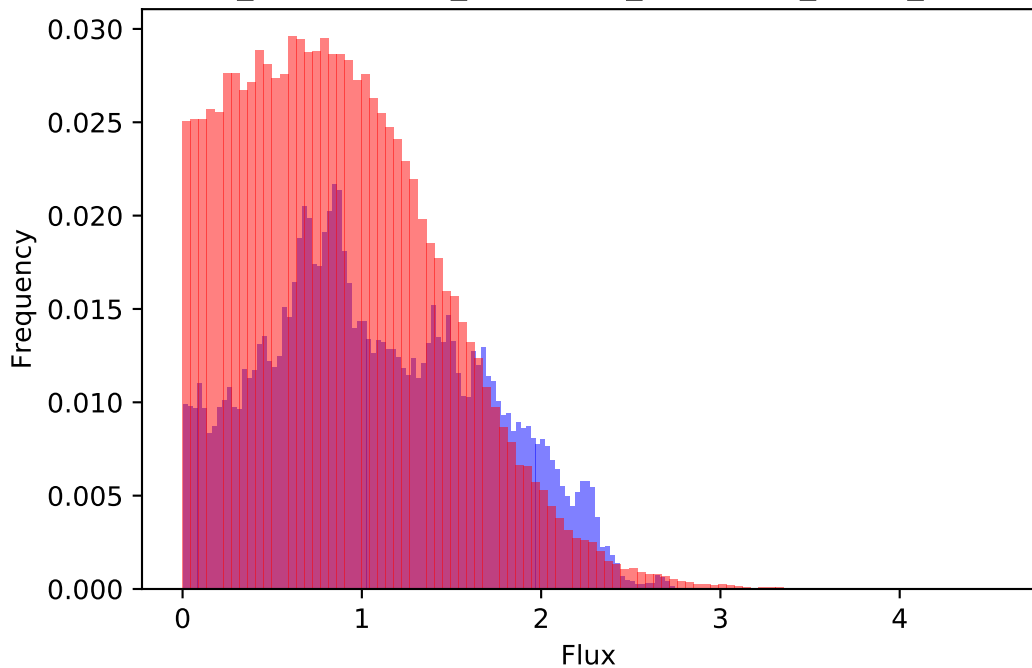
146 : 6.0 Fdrd\_h + 8.0 H\_h + NO2\_h --> 6.0 Fdox\_h + 2.0 H2O\_h + NH4\_h



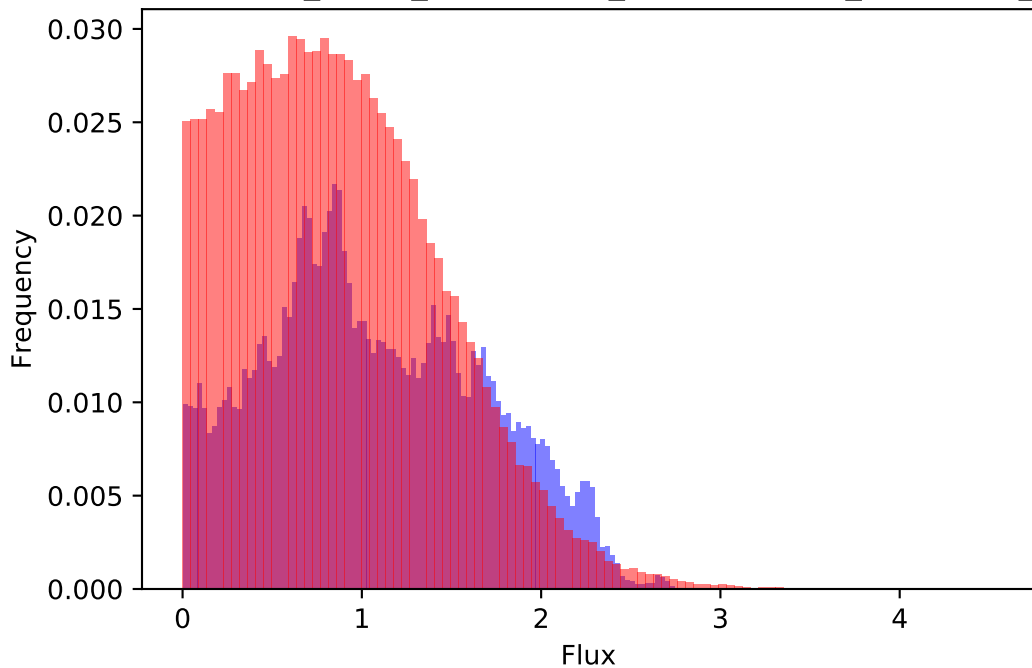
**\*\*147 : ATP\_h + SO4\_h --> APS\_h + PPI\_h\*\***



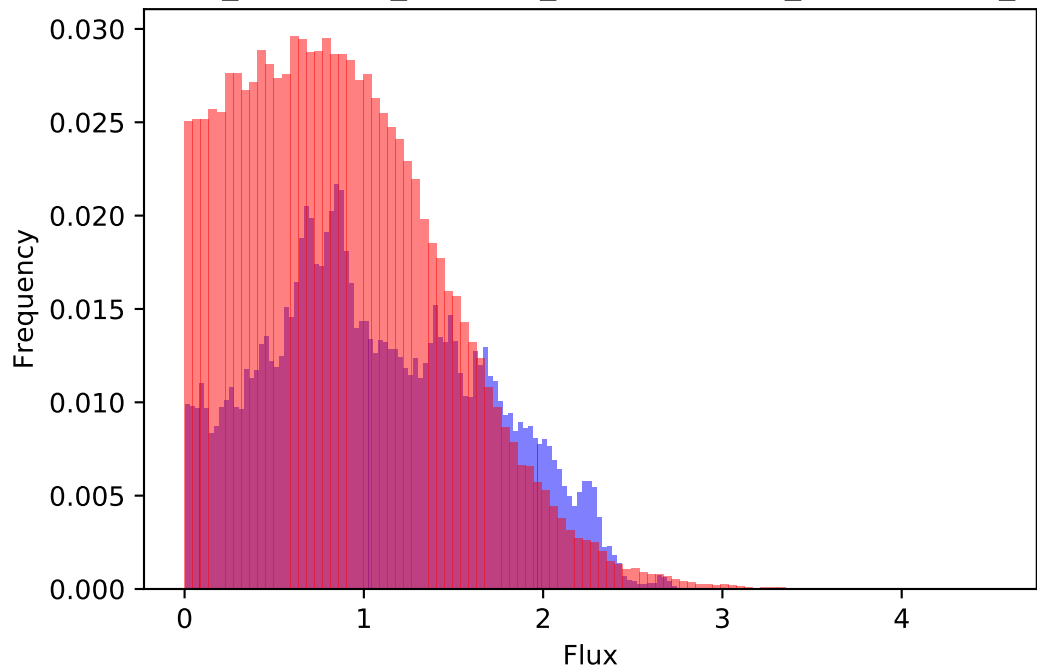
**\*\*148 : APS\_h + 2.0 GSH\_h --> AMP\_h + GSSG\_h + H\_h + SO3\_h\*\***



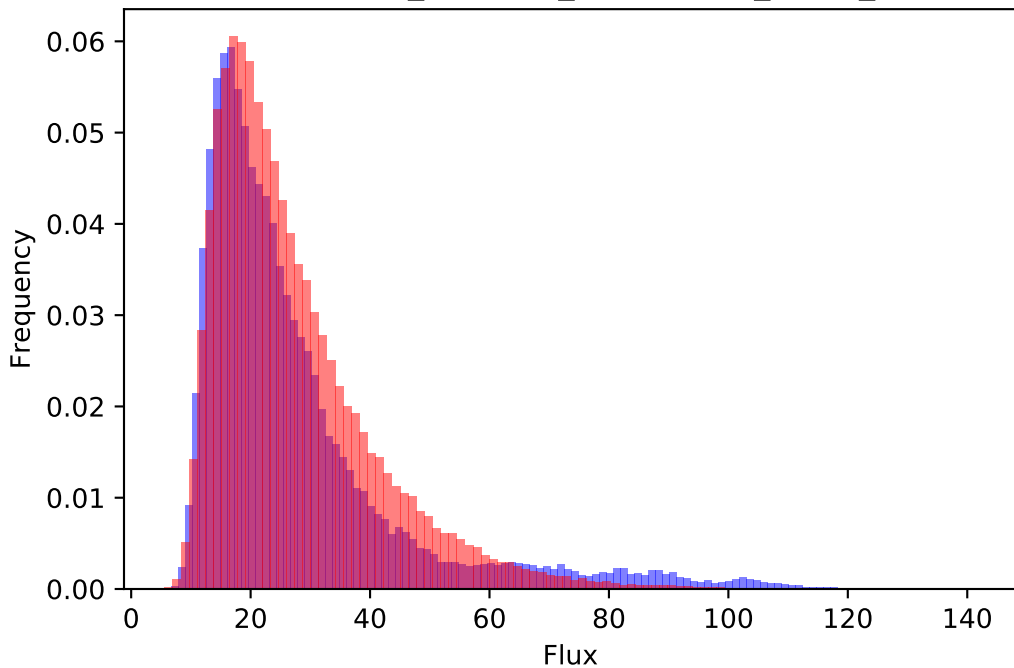
**\*\*149 : GSSG\_h + H\_h + NADPH\_h --> 2.0 GSH\_h + NADP\_h\*\***



150 : 3.0 Fdrd\_h + 7.0 H\_h + SO3\_h --> 3.0 Fdox\_h + 3.0 H2O\_h + H2S\_h

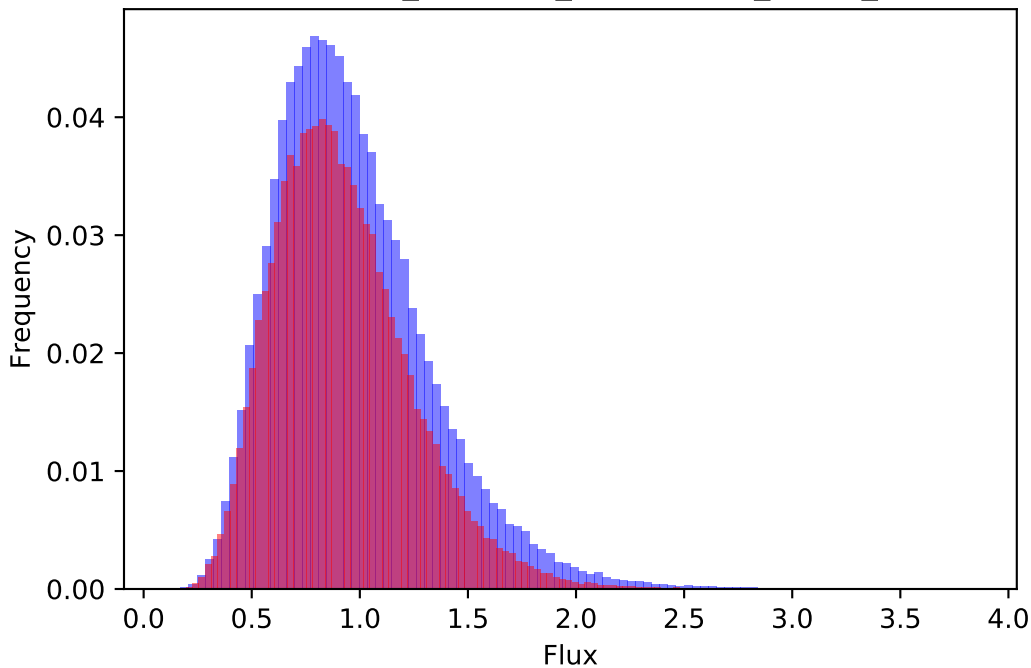


**\*\*151 : CO2\_c + H2O\_c --> HCO3\_c + H\_c\*\***

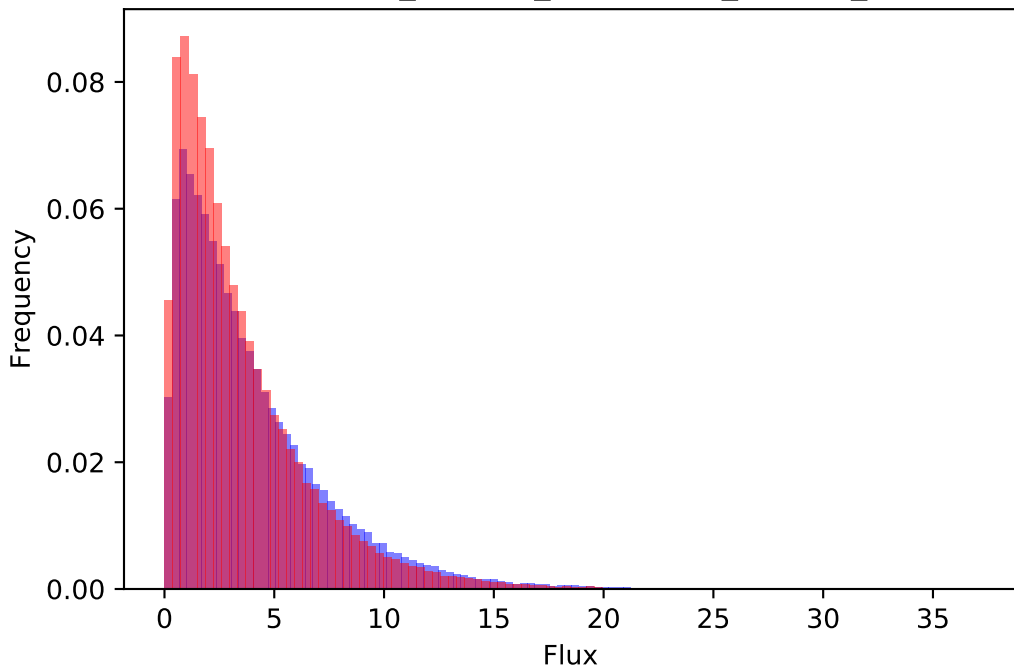




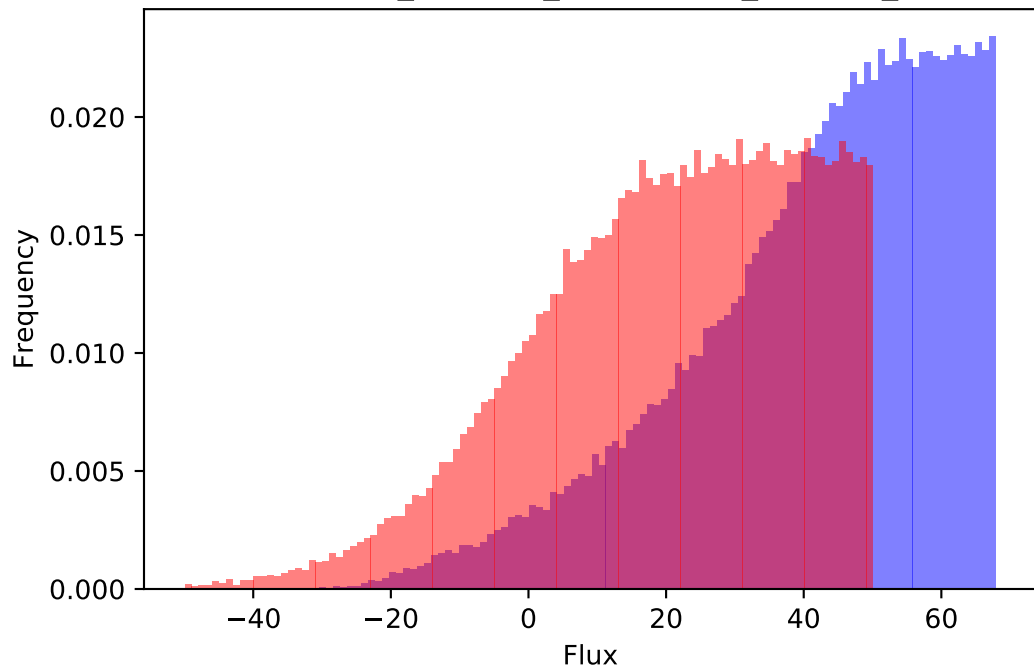
**\*\*152 : CO2\_h + H2O\_h --> HCO3\_h + H\_h\*\***



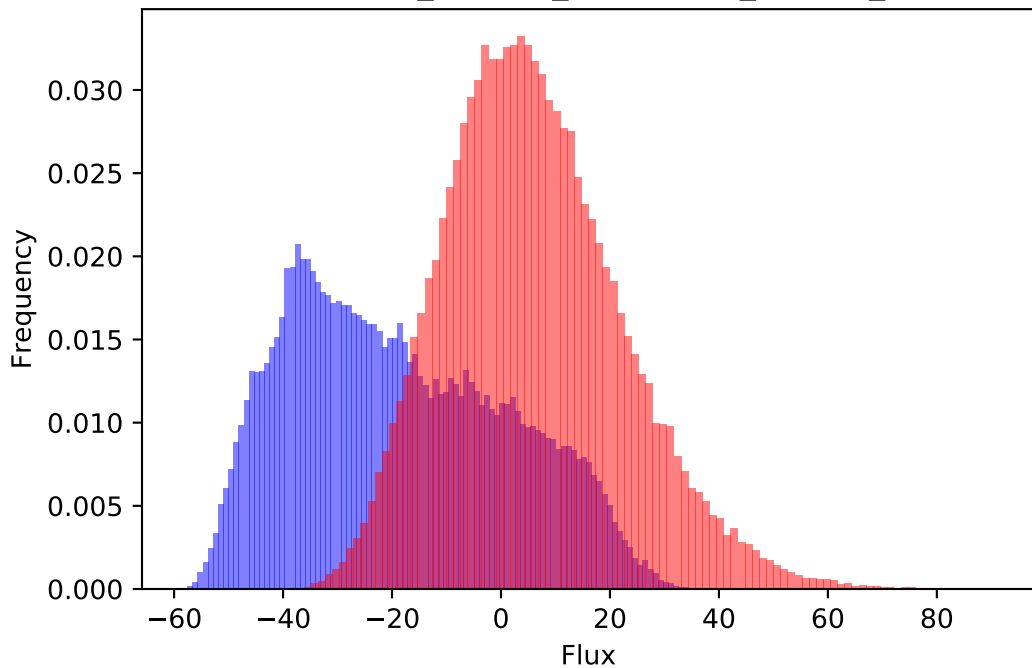
**\*\*153 : Glu\_h + Pyr\_h <=> Ala\_h + KG\_h\*\***



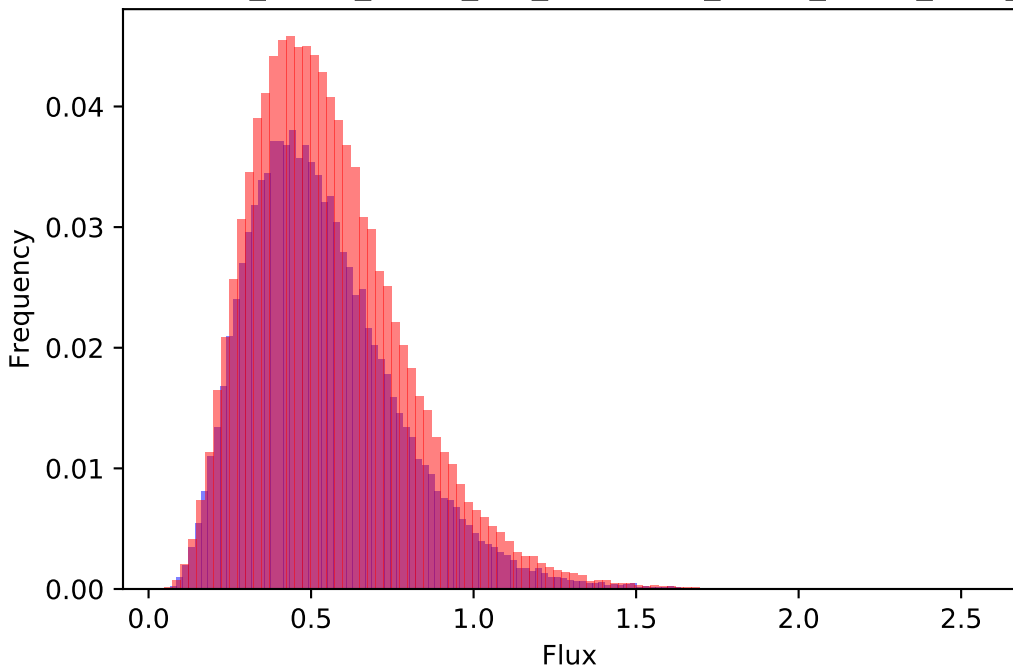
**\*\*154 : Glu\_m + Pyr\_m <=> Ala\_m + KG\_m\*\***



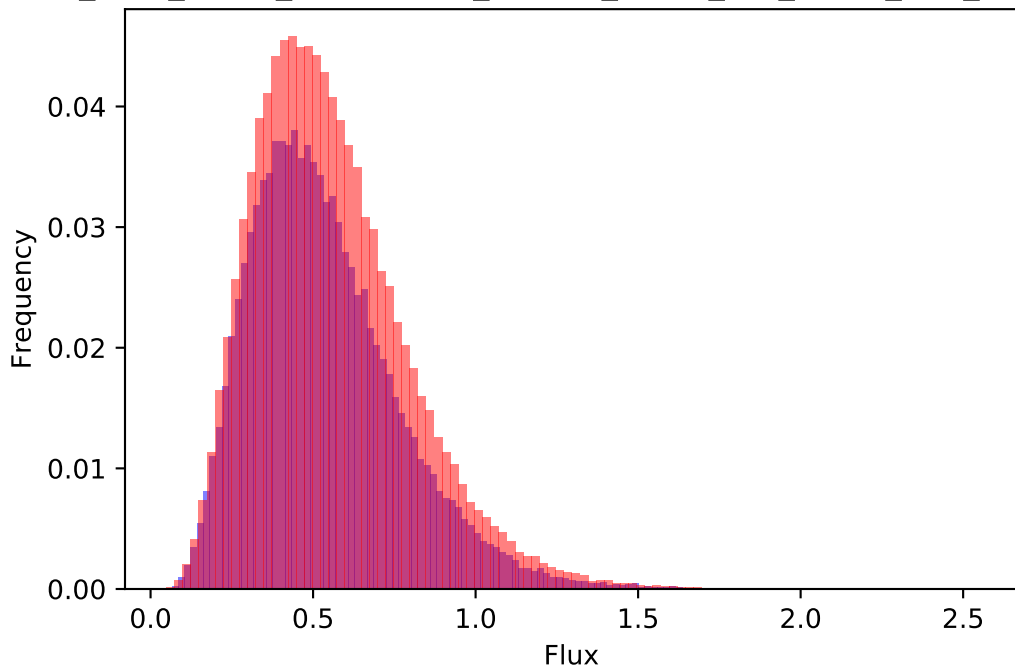
**\*\*155 : Glu\_p + Pyr\_p <=> Ala\_p + KG\_p\*\***



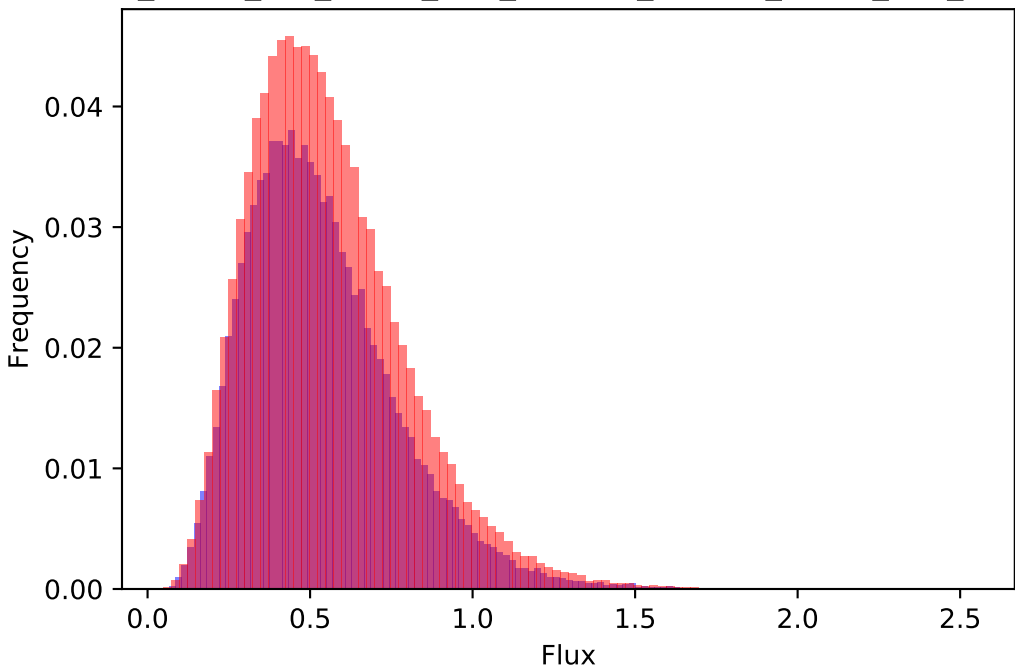
**\*\*156 : ATP\_h + A\_DASH\_Glu\_h --> ADP\_h + A\_DASH\_GluP\_h\*\***



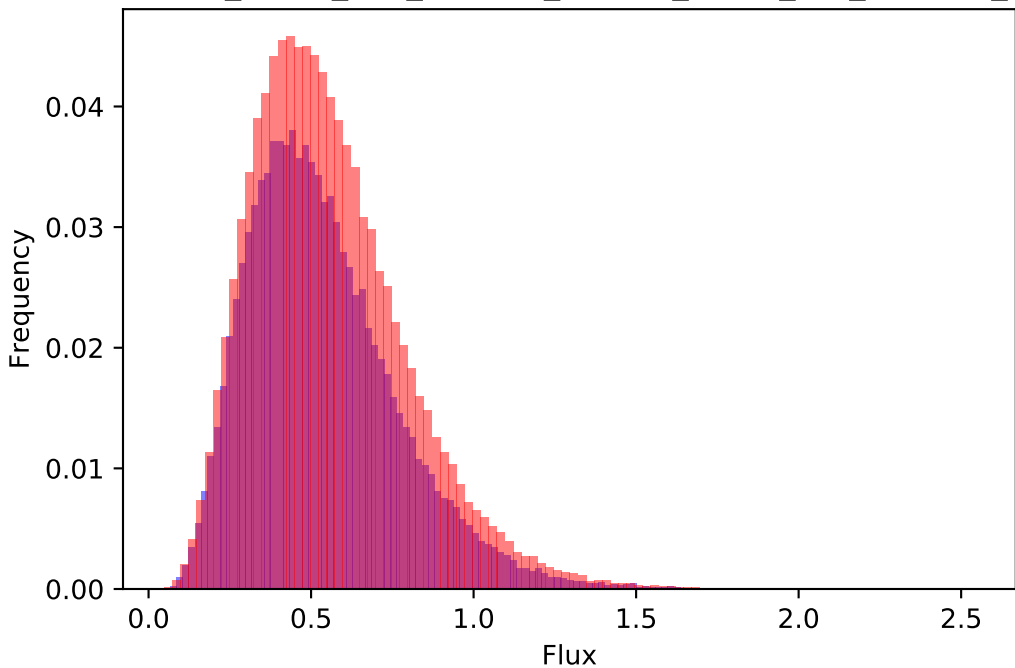
$\text{DASH\_GluP\_h} + \text{H\_h} + \text{NADPH\_h} \rightarrow \text{A\_DASH\_Glu\_DASH\_SeA\_h} + \text{NADP}$



**\*\*158 : A\_DASH\_Glu\_DASH\_SeA\_h + Glu\_h --> A\_DASH\_Orn\_h + KG\_h\***

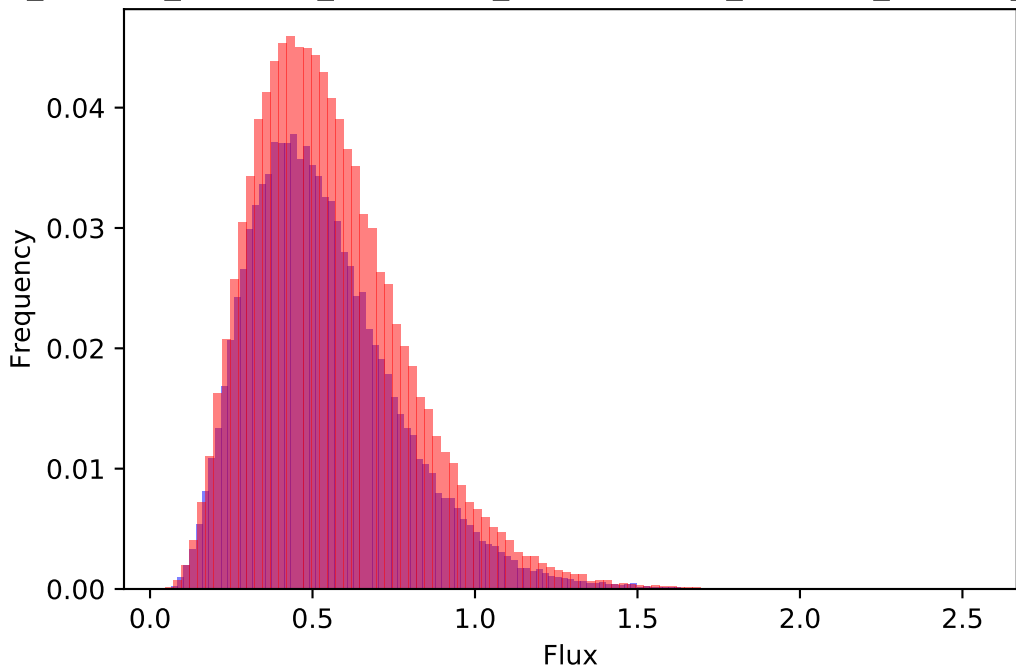


**\*\*159 : A\_DASH\_Orn\_h + Glu\_h --> A\_DASH\_Glu\_h + Orn\_h\*\***

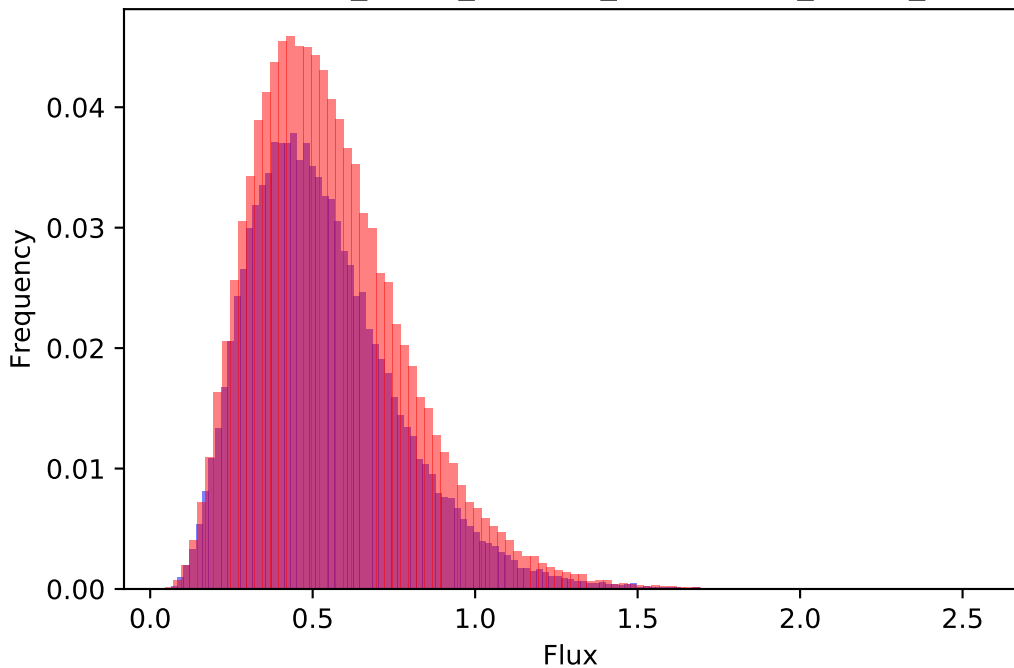




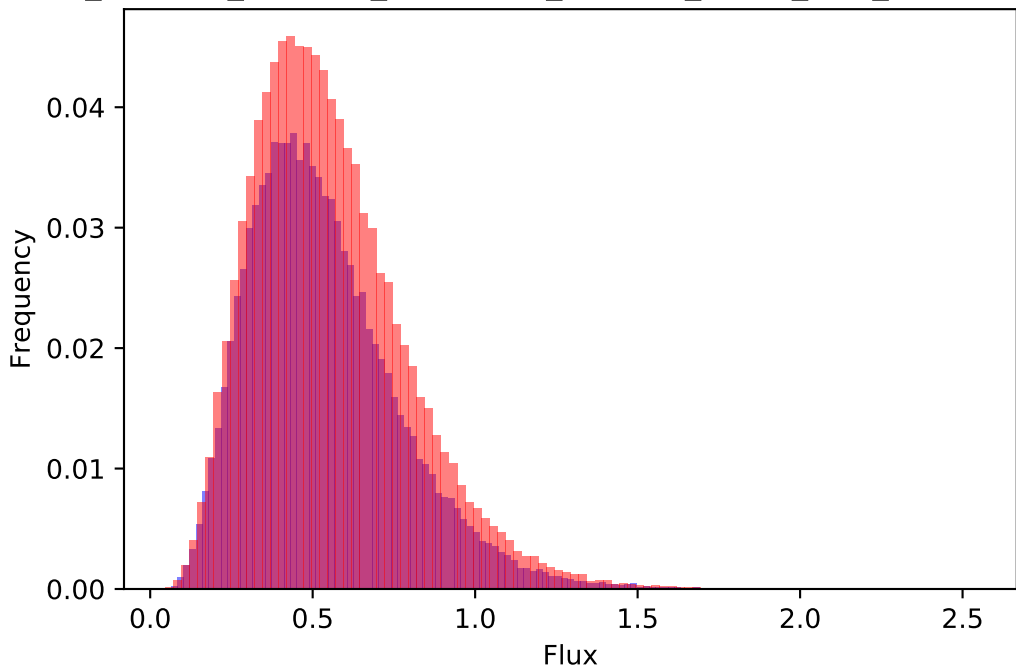
ATP\_h + Gln\_h + H2O\_h + HCO3\_h --> 2.0 ADP\_h + CBP\_h + Glu\_h + 3.0



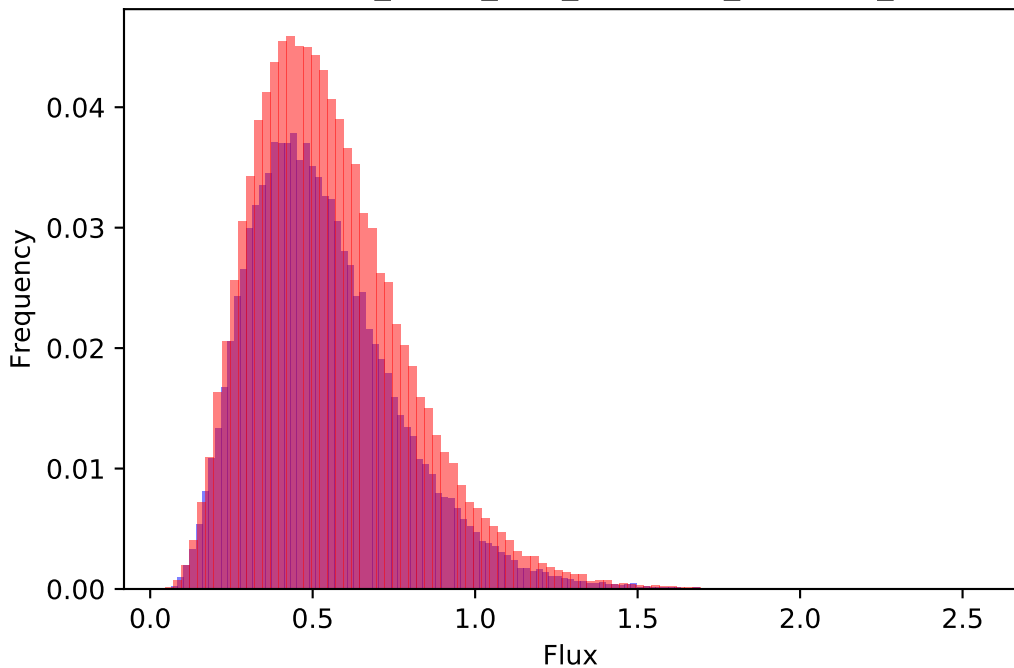
**\*\*161 : CBP\_h + H\_h + Orn\_h <=> CTL\_h + Pi\_h\*\***



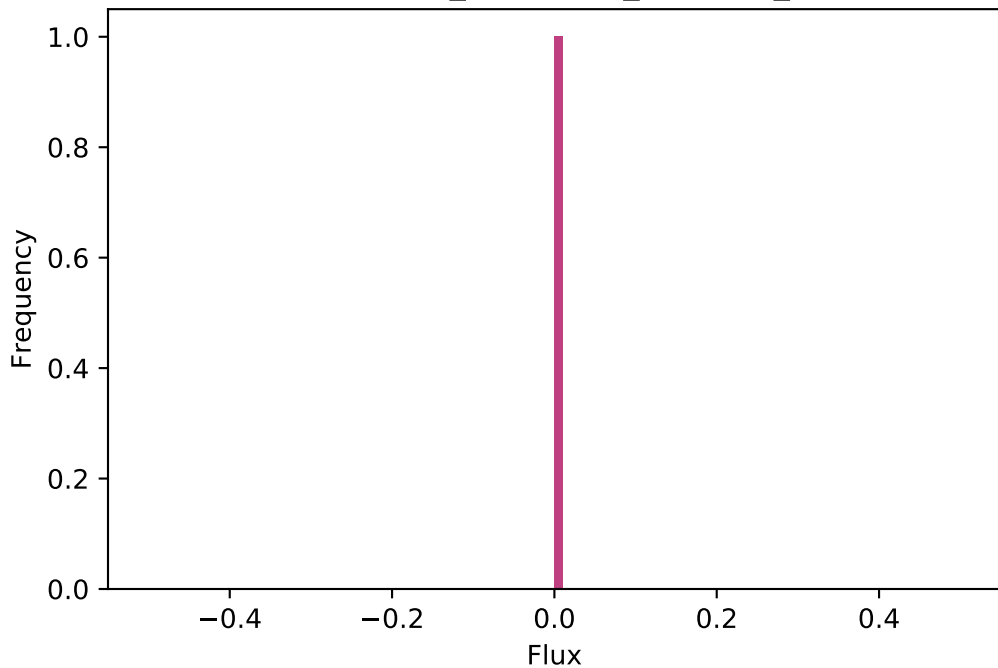
2 : ATP\_h + Asp\_h + CTL\_h --> AMP\_h + Arg\_DASH\_SCA\_h + 3.0 H\_h + P



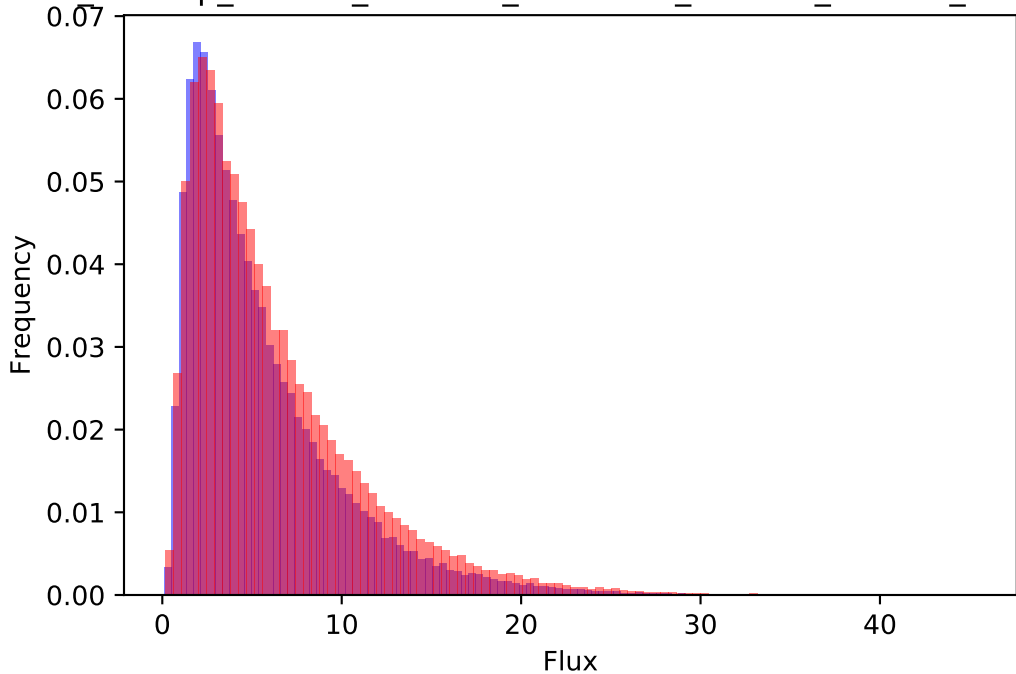
**\*\*163 : Arg\_DASH\_SCA\_h --> Arg\_h + Fum\_h\*\***



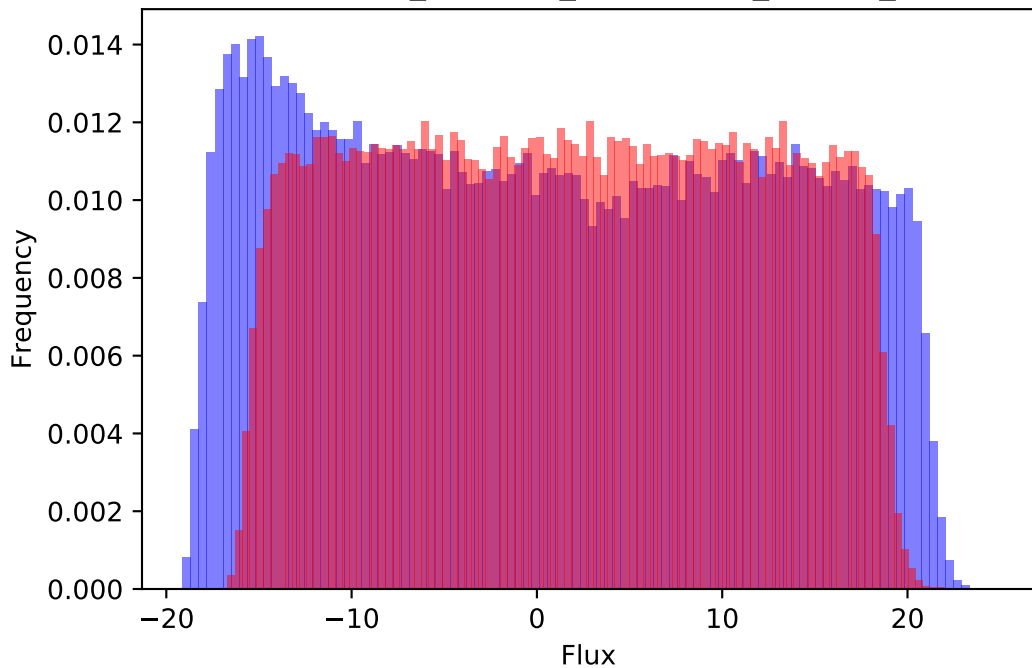
164 : Mal\_c --> Fum\_c + H2O\_c



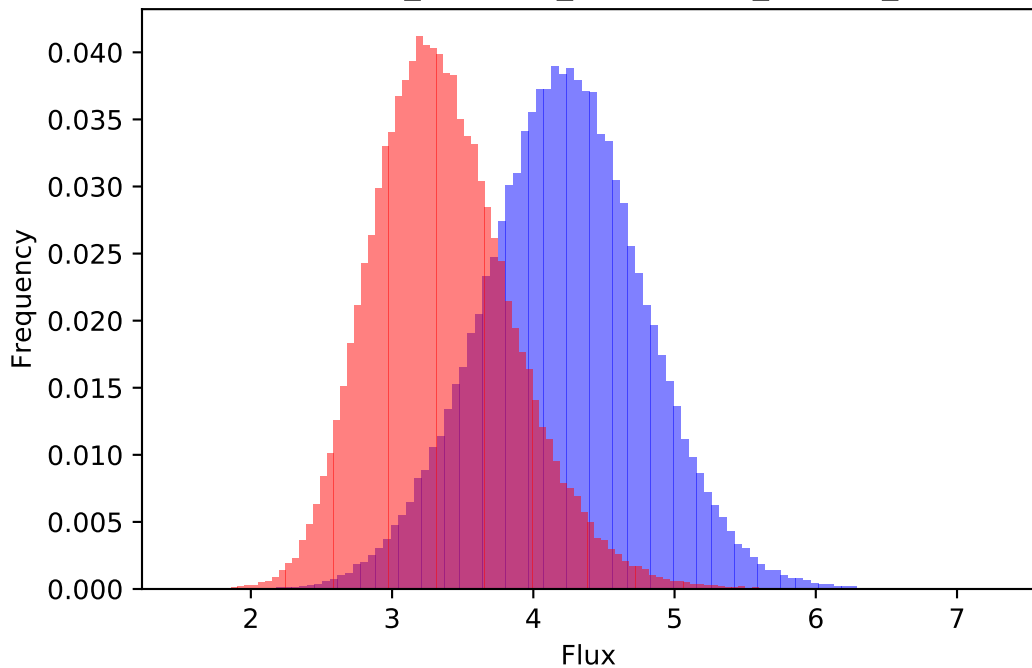
5 : ATP\_c + Asp\_c + Gln\_c + H2O\_c --> AMP\_c + Asn\_c + Glu\_c + H\_c +



**\*\*166 : Glu\_c + OAA\_c <=> Asp\_c + KG\_c\*\***

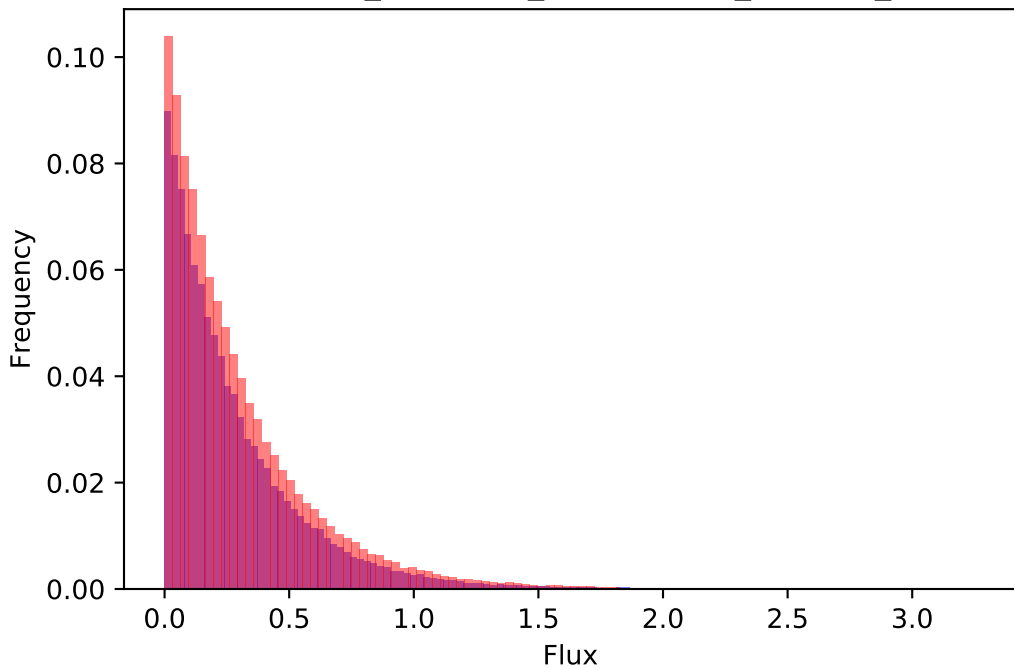


**\*\*167 : Glu\_h + OAA\_h <=> Asp\_h + KG\_h\*\***

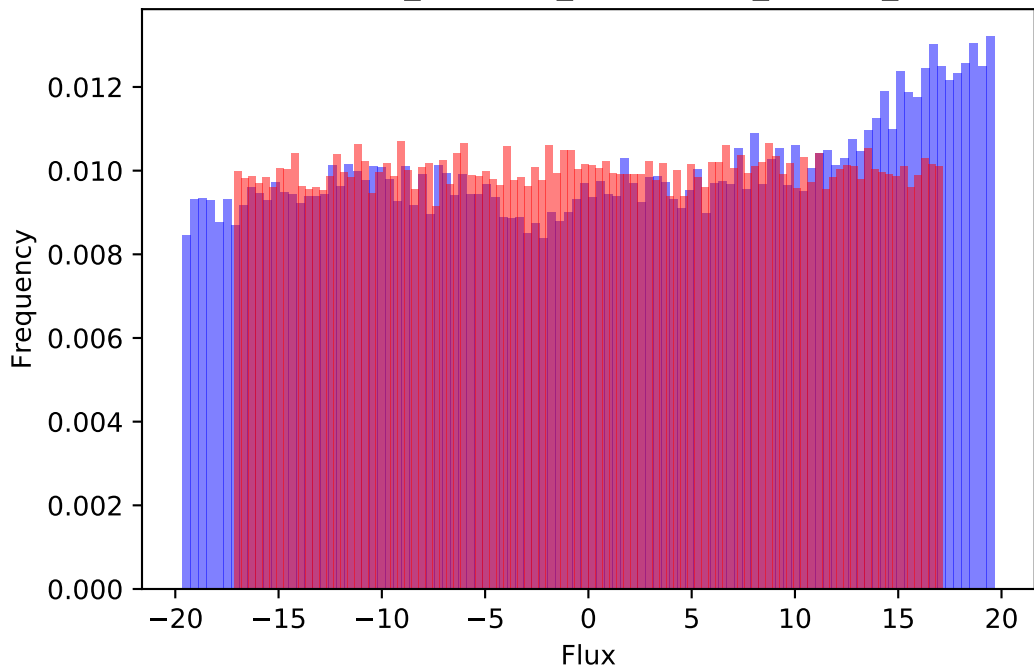




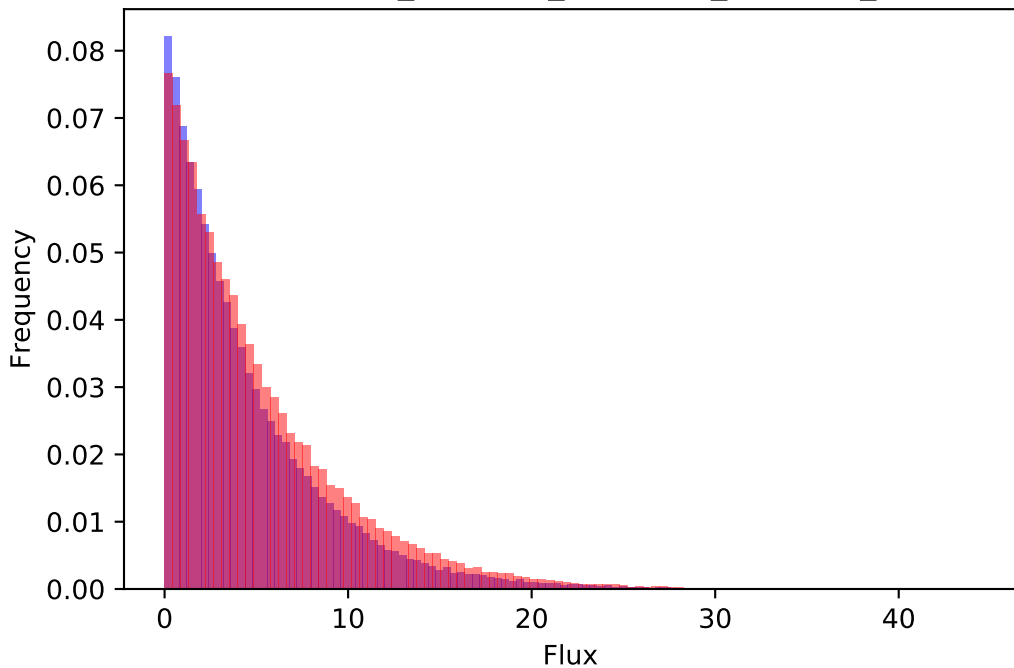
**\*\*168 : Glu\_m + OAA\_m <=> Asp\_m + KG\_m\*\***



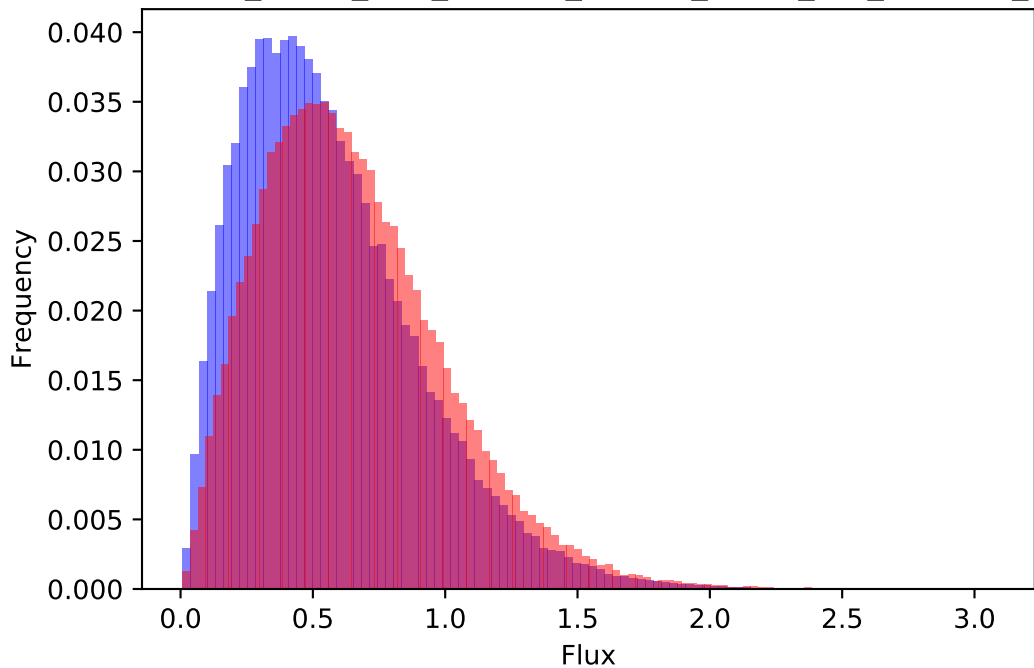
**\*\*169 : Glu\_p + OAA\_p <=> Asp\_p + KG\_p\*\***



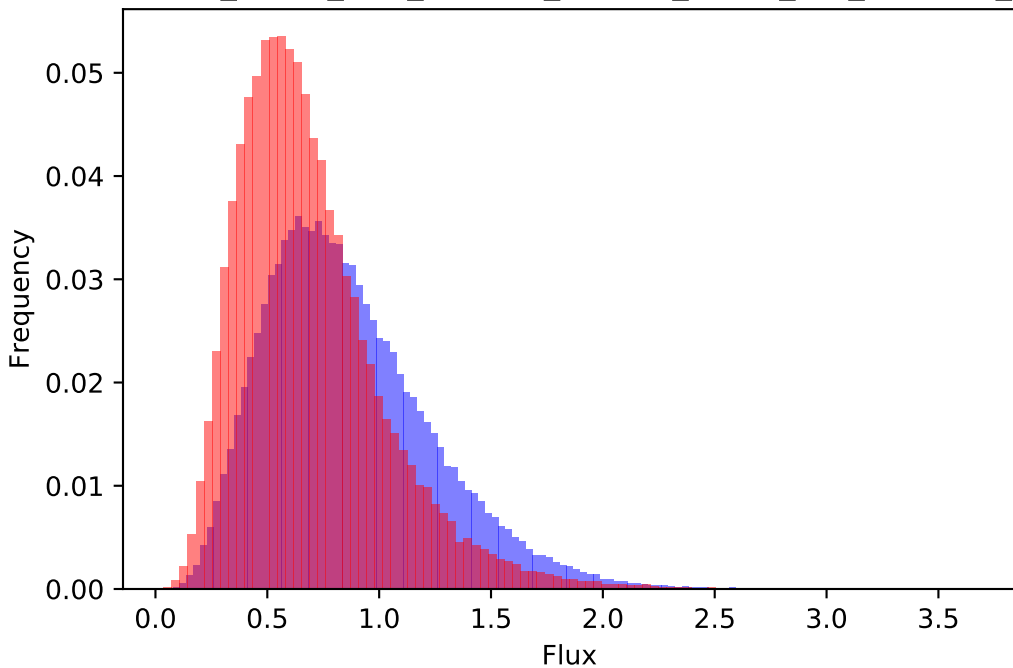
**\*\*170 : Asn\_c + H2O\_c --> Asp\_c + NH4\_c\*\***



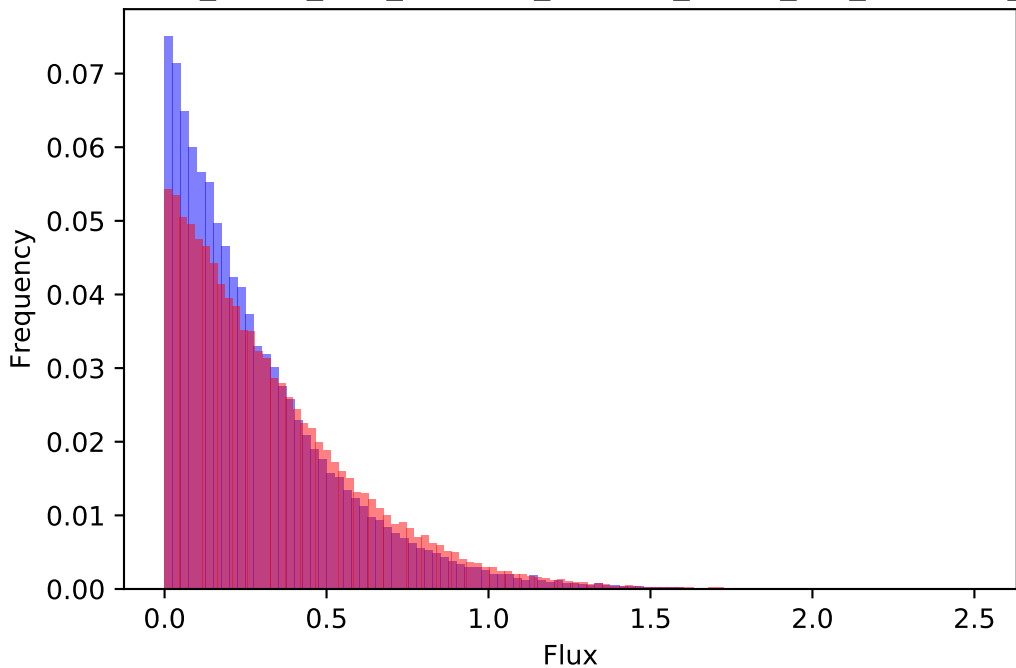
**\*\*171 : A\_DASH\_CoA\_c + Ser\_c --> A\_DASH\_Ser\_c + CoA\_c\*\***



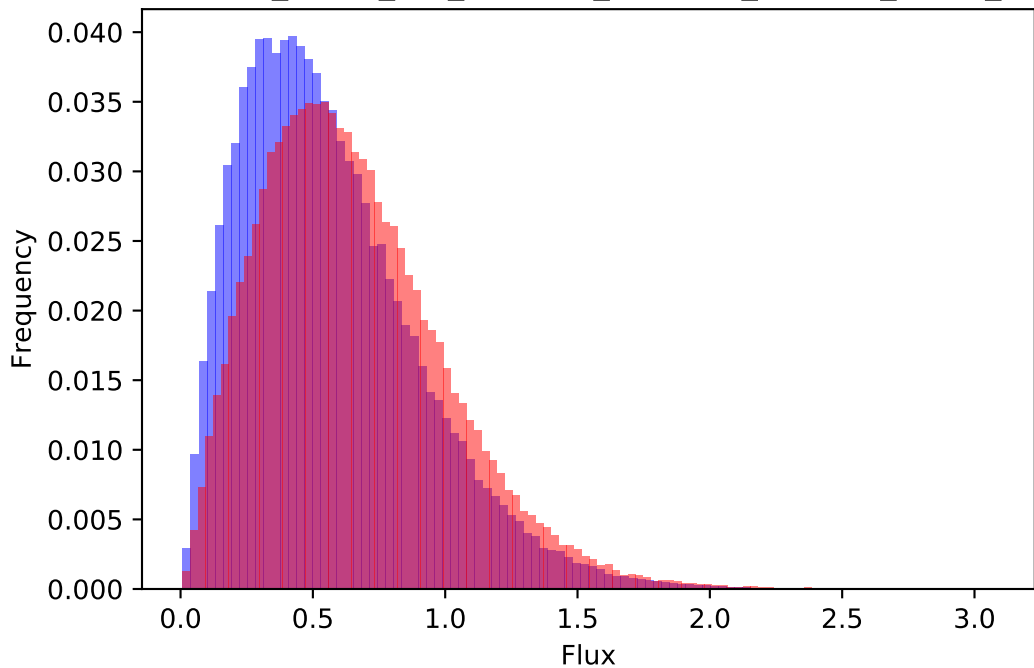
**\*\*172 : A\_DASH\_CoA\_h + Ser\_h --> A\_DASH\_Ser\_h + CoA\_h\*\***



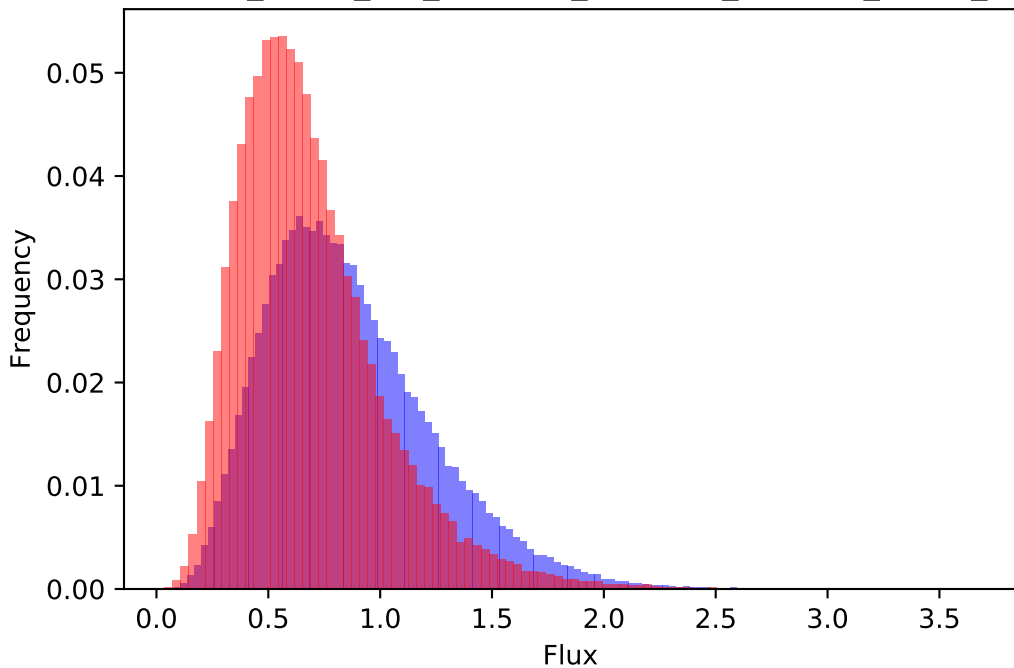
**\*\*173 : A\_DASH\_CoA\_m + Ser\_m --> A\_DASH\_Ser\_m + CoA\_m\*\***



**\*\*174 : A\_DASH\_Ser\_c + H2S\_c --> AC\_c + Cys\_c + H\_c\*\***

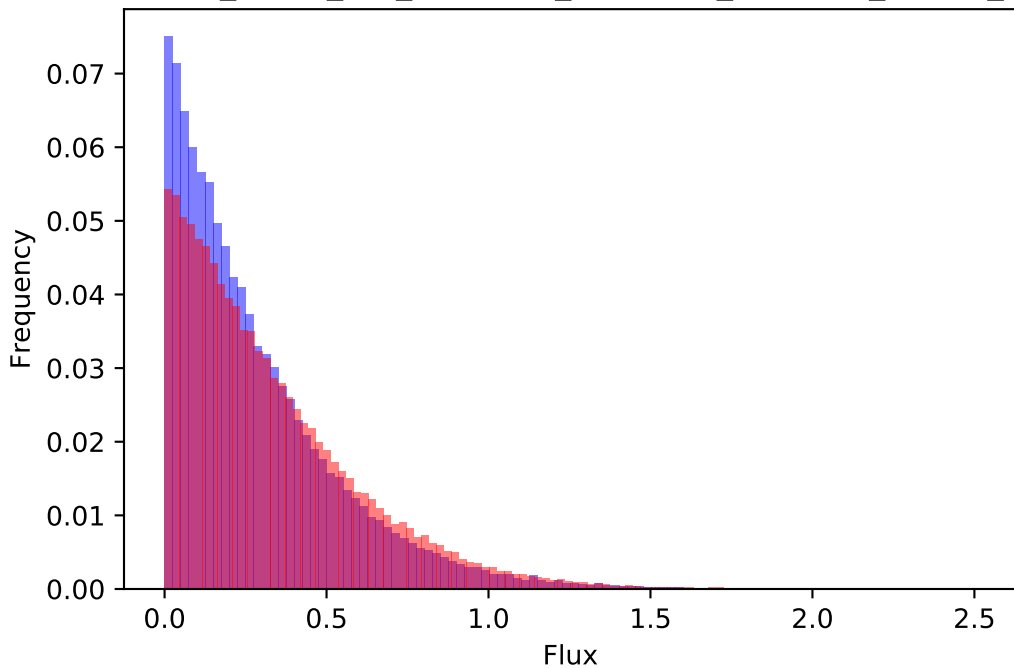


**\*\*175 : A\_DASH\_Ser\_h + H2S\_h --> AC\_h + Cys\_h + H\_h\*\***

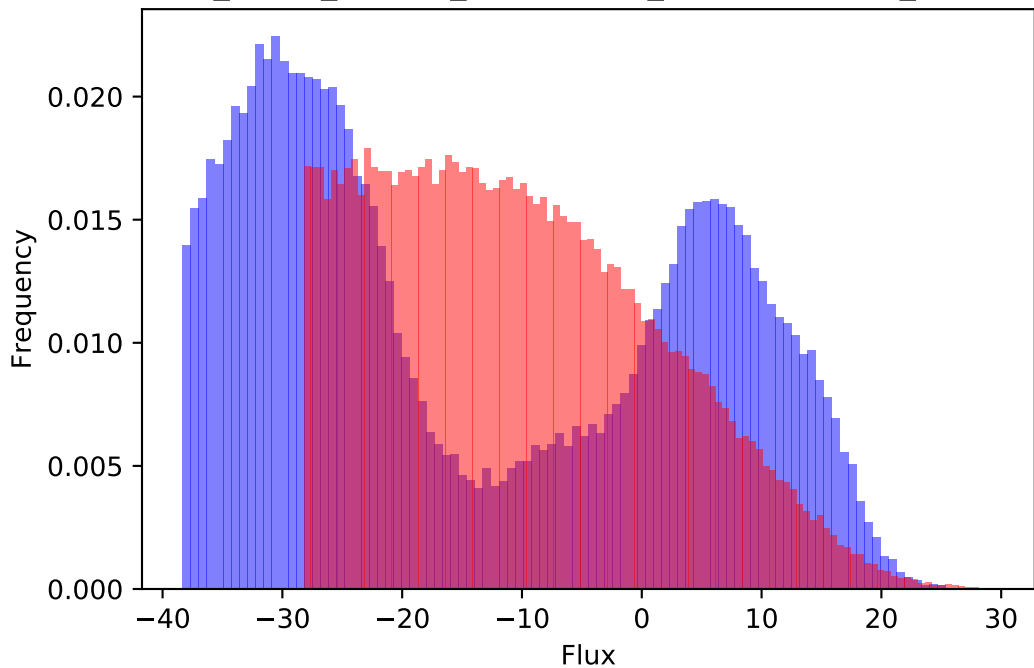




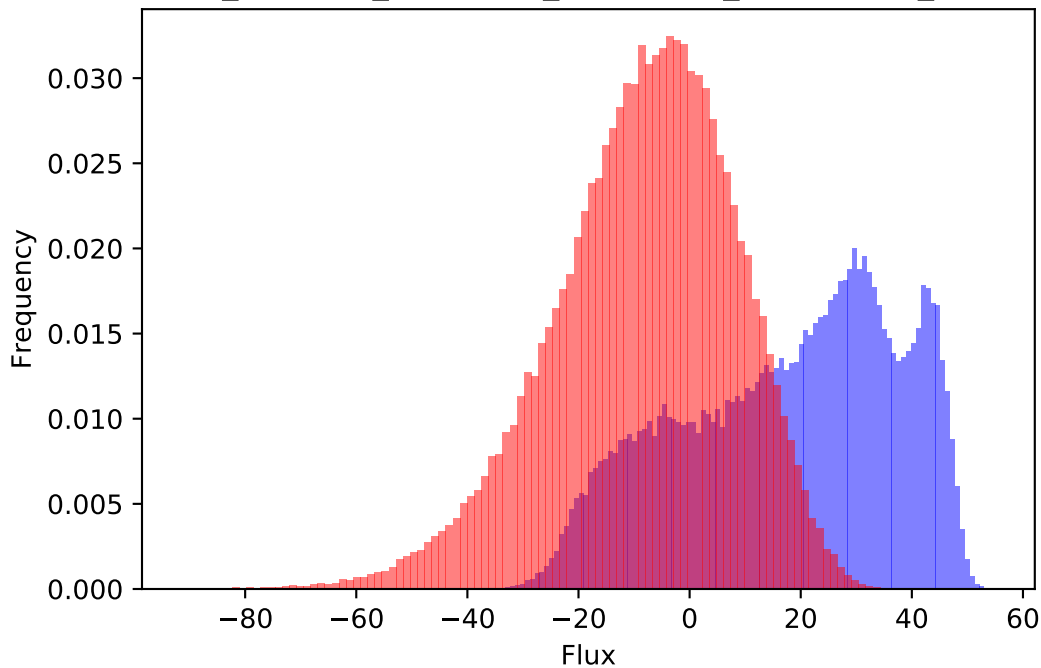
**\*\*176 : A\_DASH\_Ser\_m + H2S\_m --> AC\_m + Cys\_m + H\_m\*\***



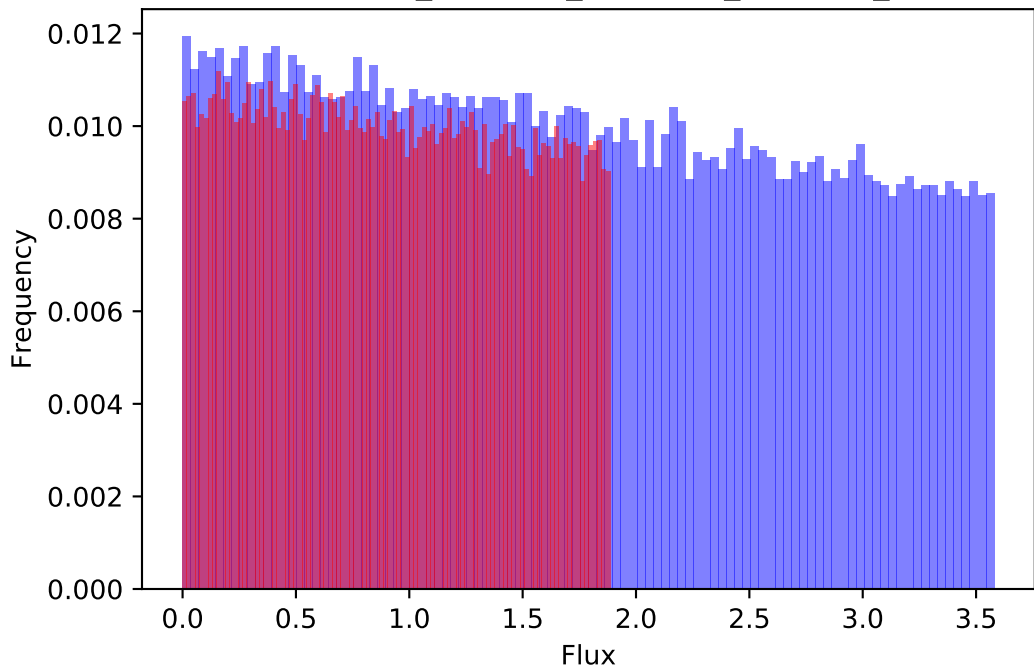
**\*\*177 : Gln\_h + H\_h + KG\_h + NADPH\_h <=> 2.0 Glu\_h + NADP\_h\*\***



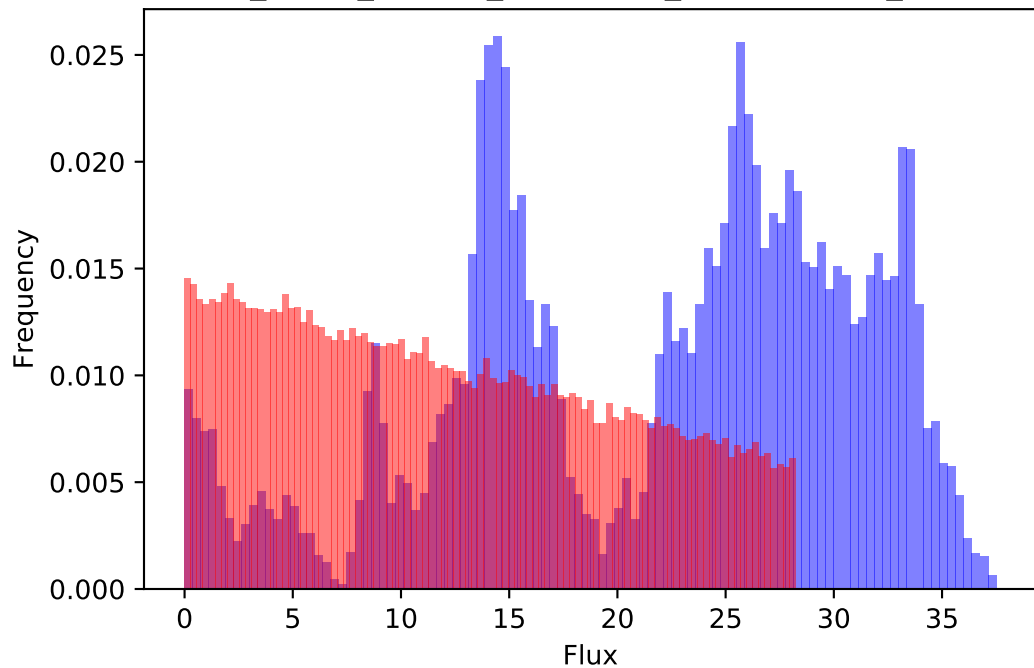
**\*\*178 : Glu\_c + H2O\_c + NADP\_c <=> KG\_c + NADPH\_c + NH4\_c\*\***



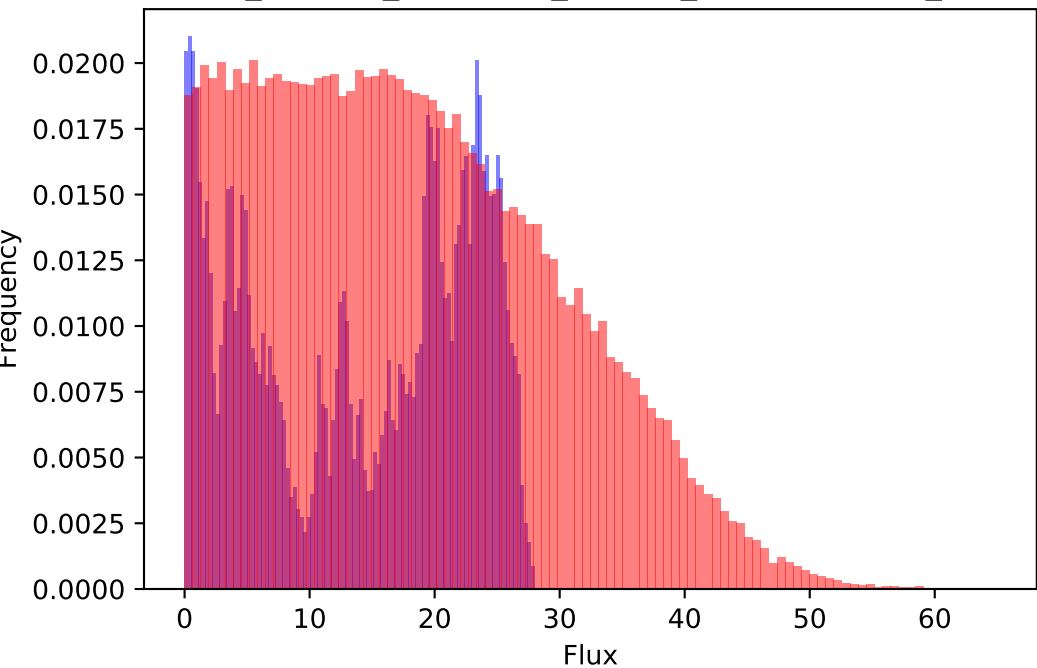
**\*\*179 : Gln\_c + H2O\_c --> Glu\_c + NH4\_c\*\***



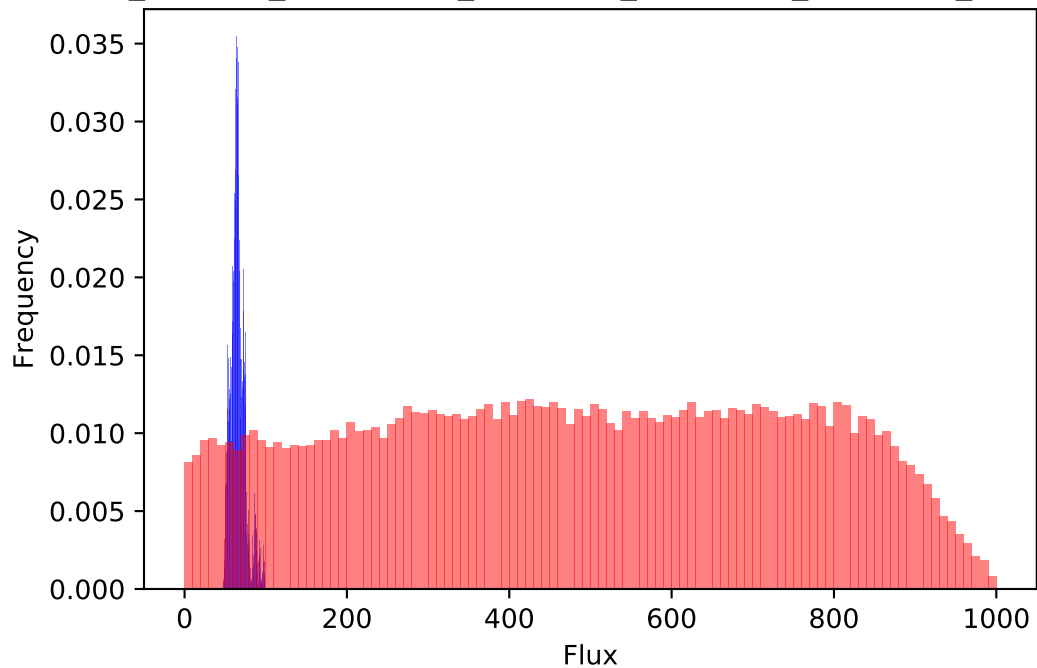
**\*\*180 : Gln\_h + H\_h + KG\_h + NADH\_h --> 2.0 Glu\_h + NAD\_h\*\***



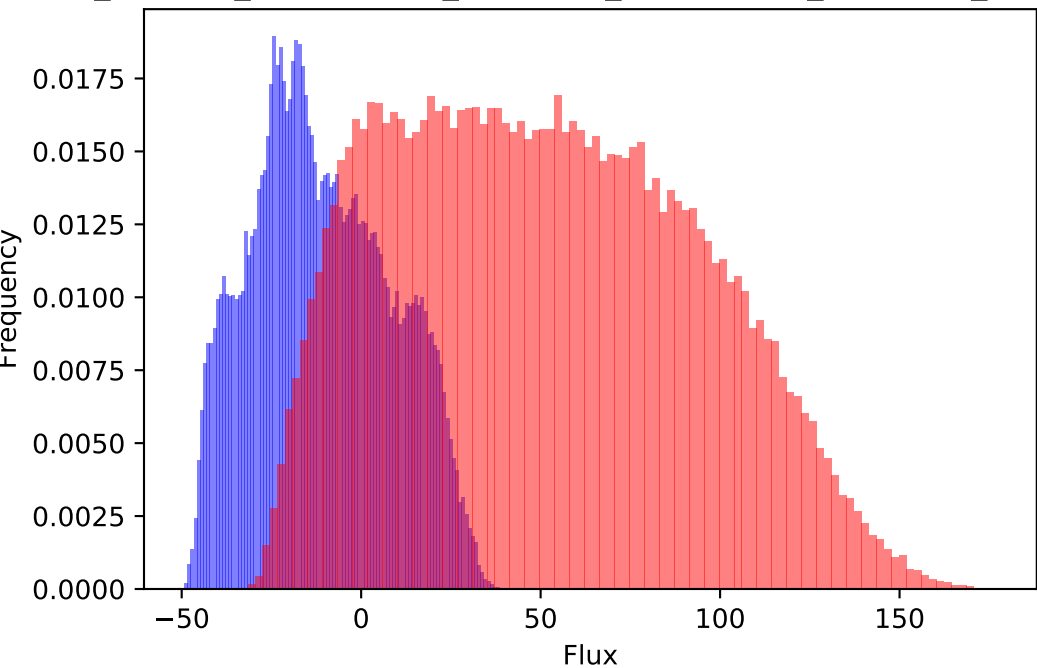
\*181 : 2.0 Fdrd\_h + Gln\_h + 2.0 H\_h + KG\_h --> 2.0 Fdox\_h + 2.0 Glu\_h



\*182 : H\_m + KG\_m + NADH\_m + NH4\_m --> Glu\_m + H2O\_m + NAD\_n

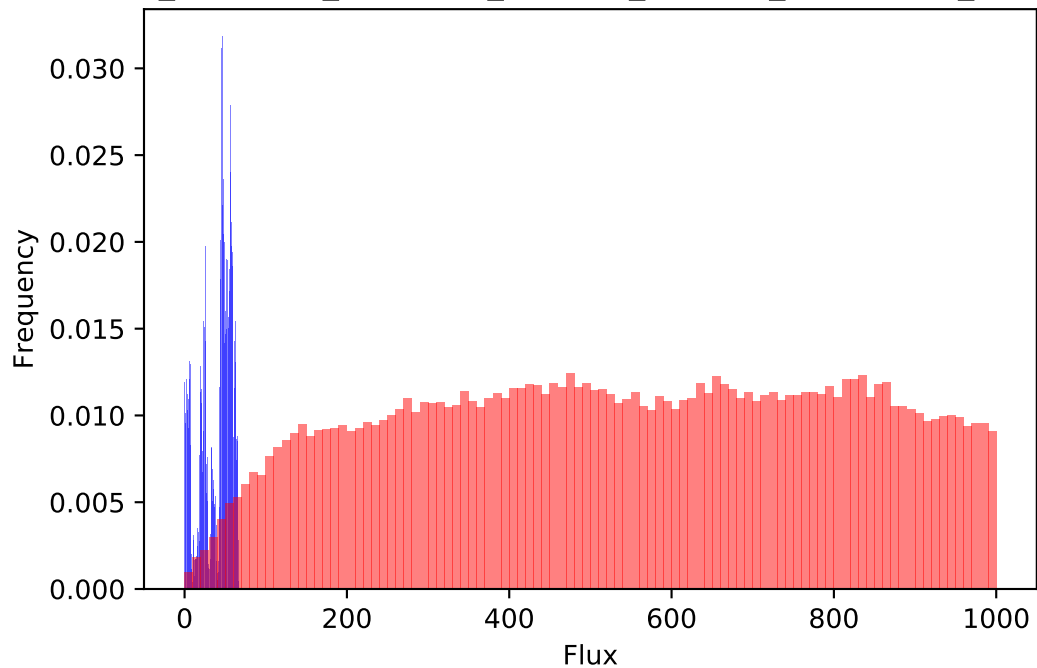


83 :  $H\_m + KG\_m + NADPH\_m + NH4\_m \rightleftharpoons Glu\_m + H2O\_m + NADP$

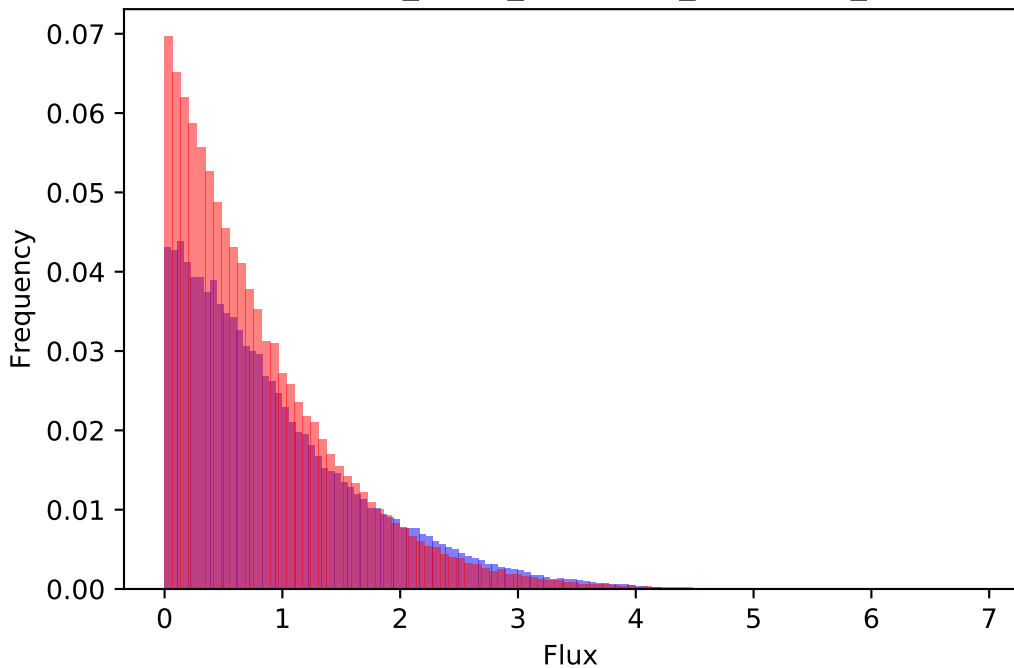




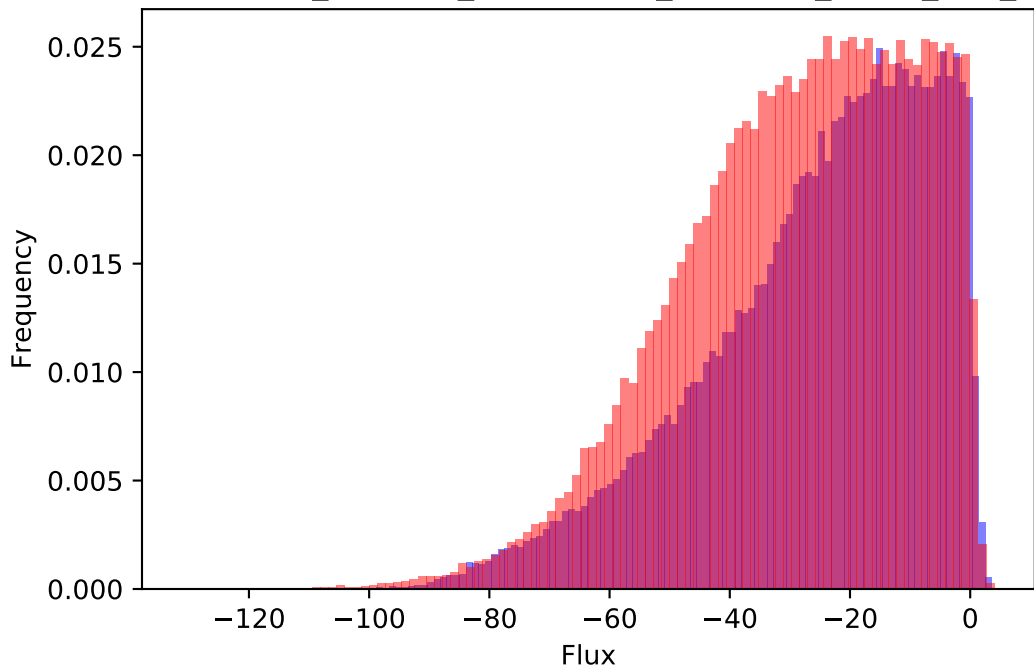
\*184 : Glu\_m + H2O\_m + NAD\_m --> H\_m + KG\_m + NADH\_m + NH4\_m



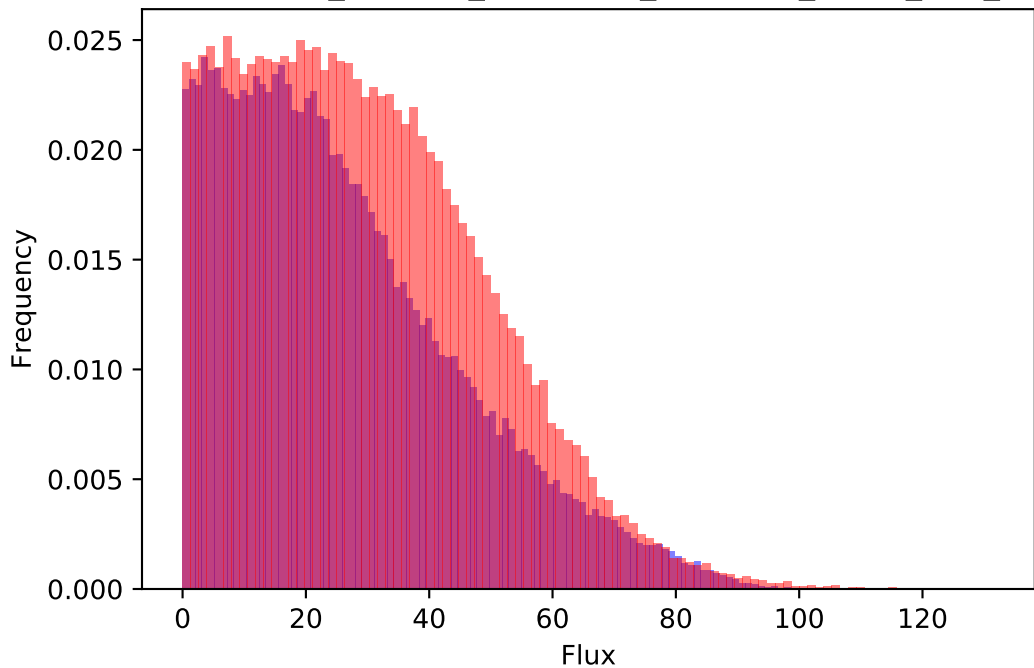
**\*\*185 : Glu\_c + H\_c --> CO2\_c + GABA\_c\*\***



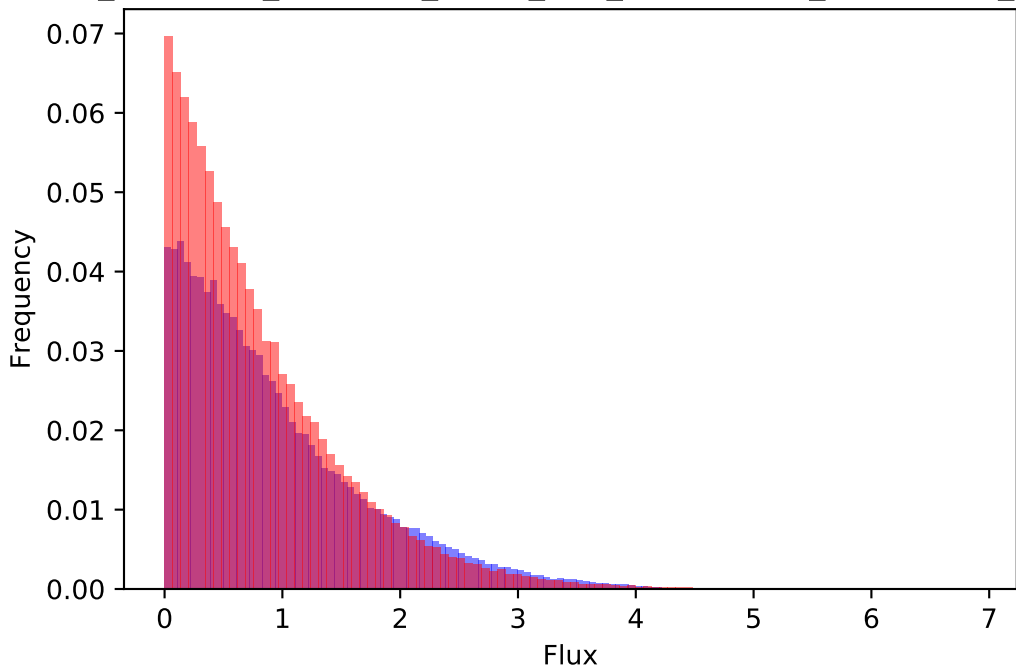
**\*\*186 : GABA\_m + Pyr\_m <=> Ala\_m + SCA\_DASH\_SeA\_m\*\***



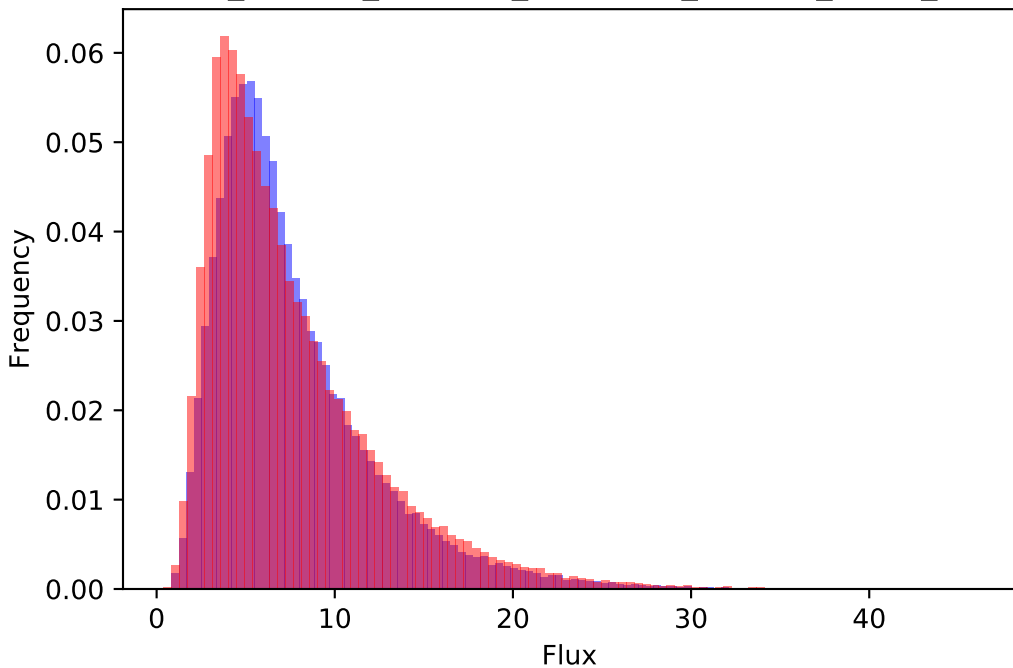
**\*\*187 : GABA\_m + KG\_m --> Glu\_m + SCA\_DASH\_SeA\_m\*\***



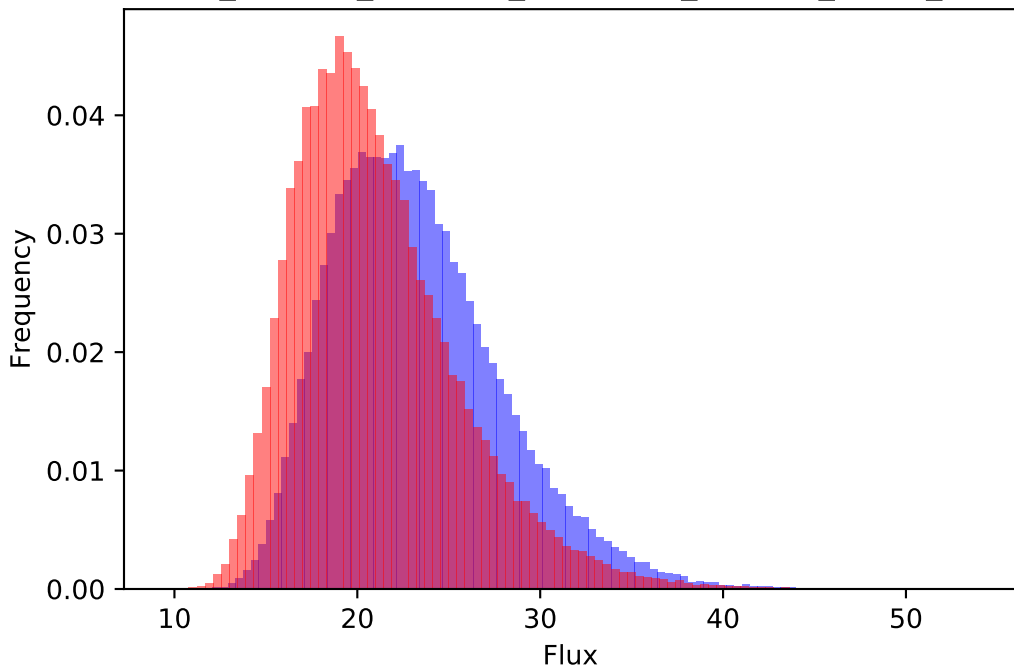
8 : H2O\_m + NAD\_m + SCA\_DASH\_SeA\_m --> 2.0 H\_m + NADH\_m + SC



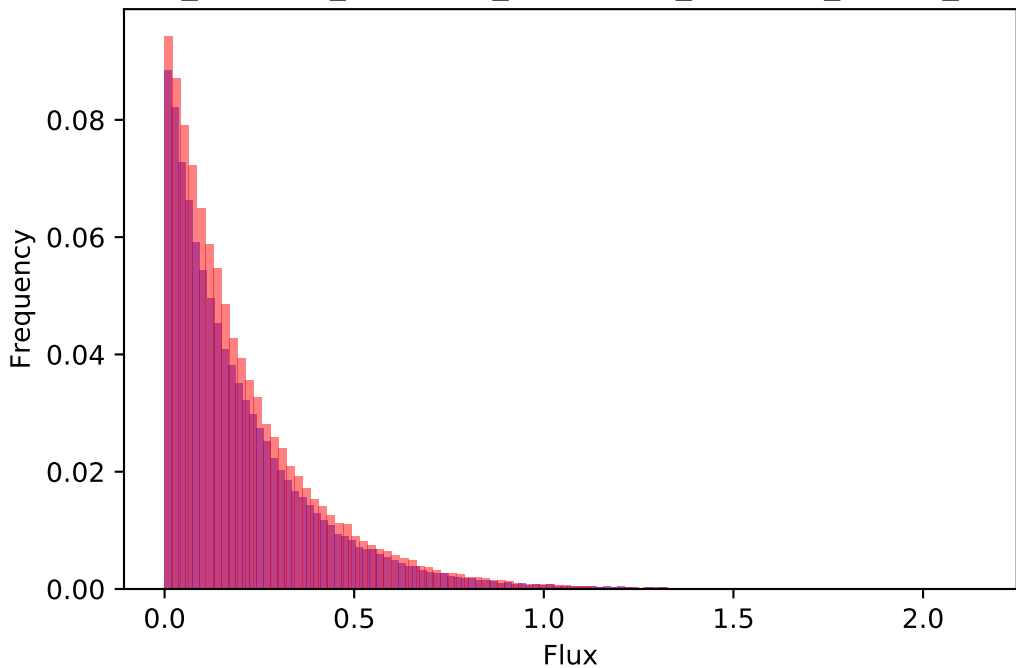
**\*\*189 : ATP\_c + Glu\_c + NH4\_c --> ADP\_c + Gln\_c + H\_c + Pi\_c\*\***



**\*\*190 : ATP\_h + Glu\_h + NH4\_h --> ADP\_h + Gln\_h + H\_h + Pi\_h\*\***

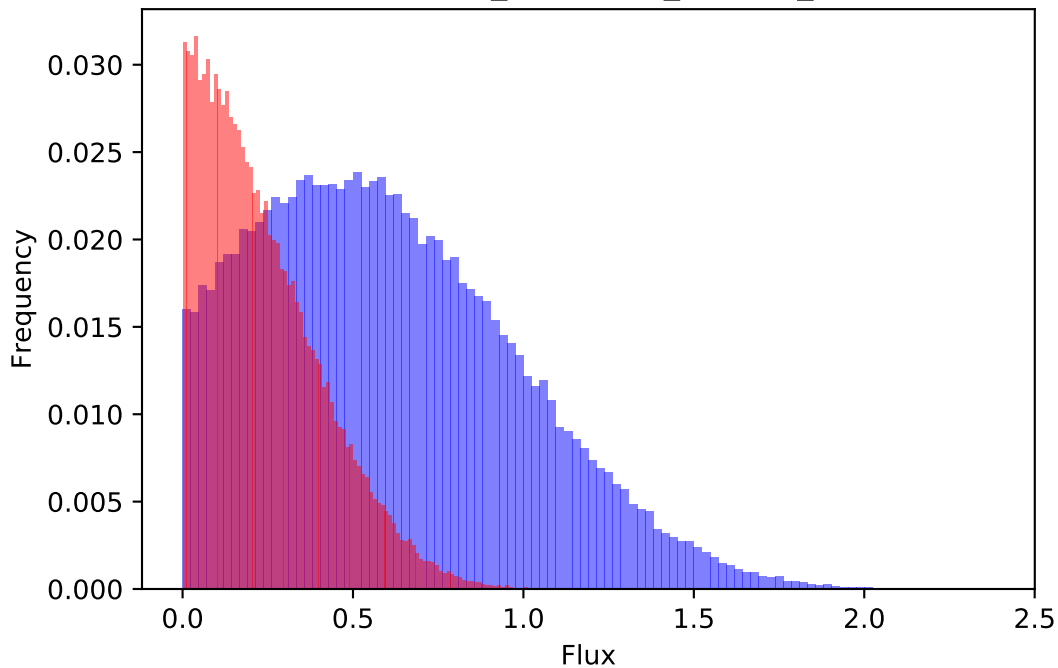


**\*\*191 : ATP\_m + Glu\_m + NH4\_m --> ADP\_m + Gln\_m + H\_m + Pi\_m\*\***

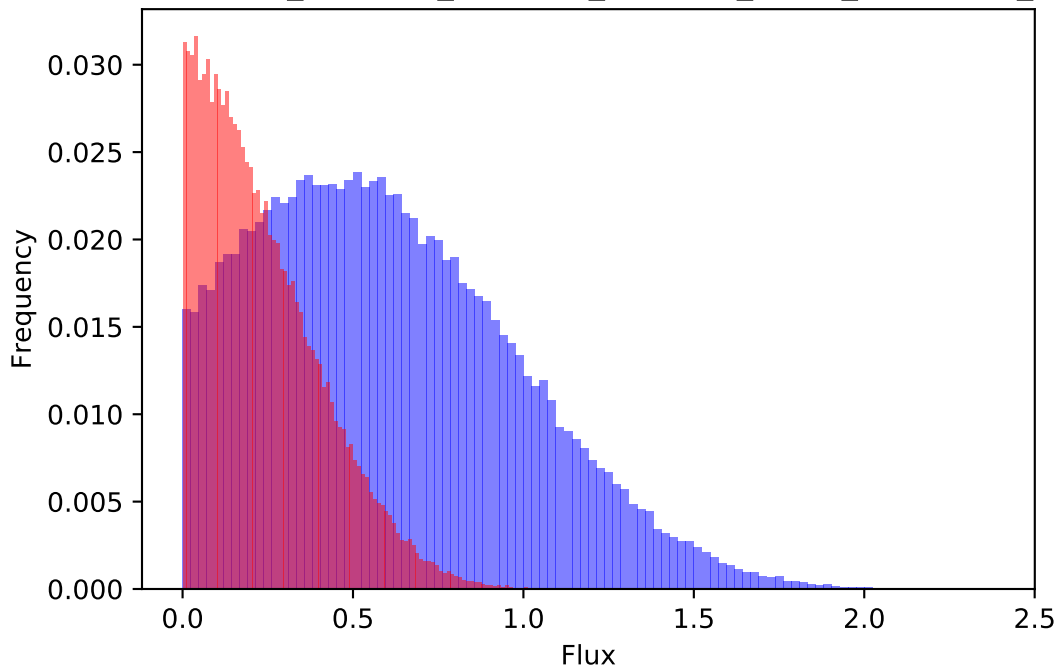




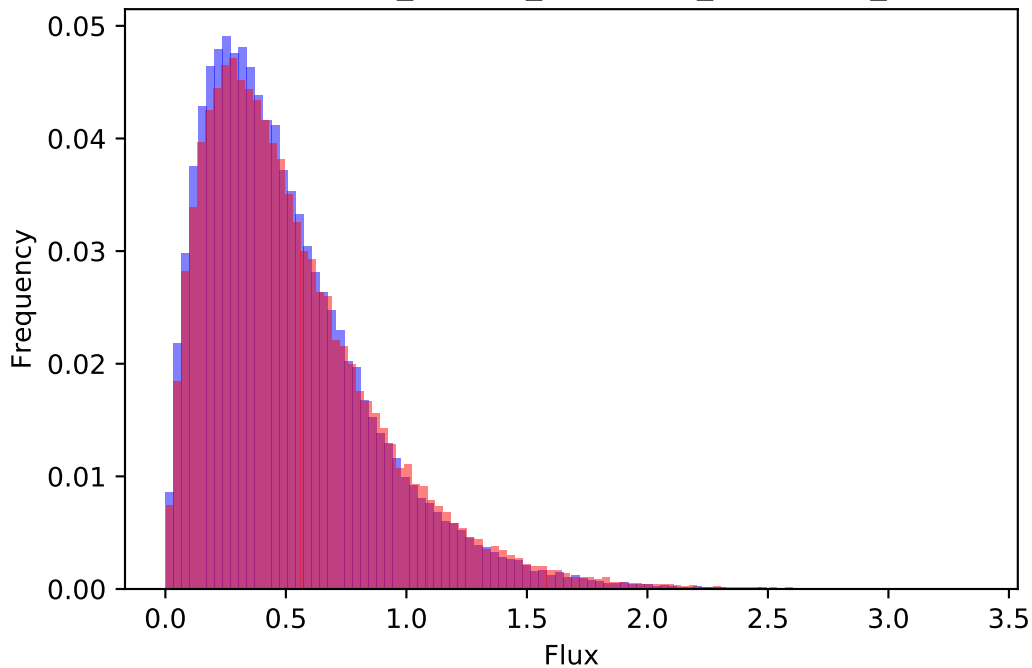
**\*\*192 : Thr\_c --> ACD\_c + Gly\_c\*\***



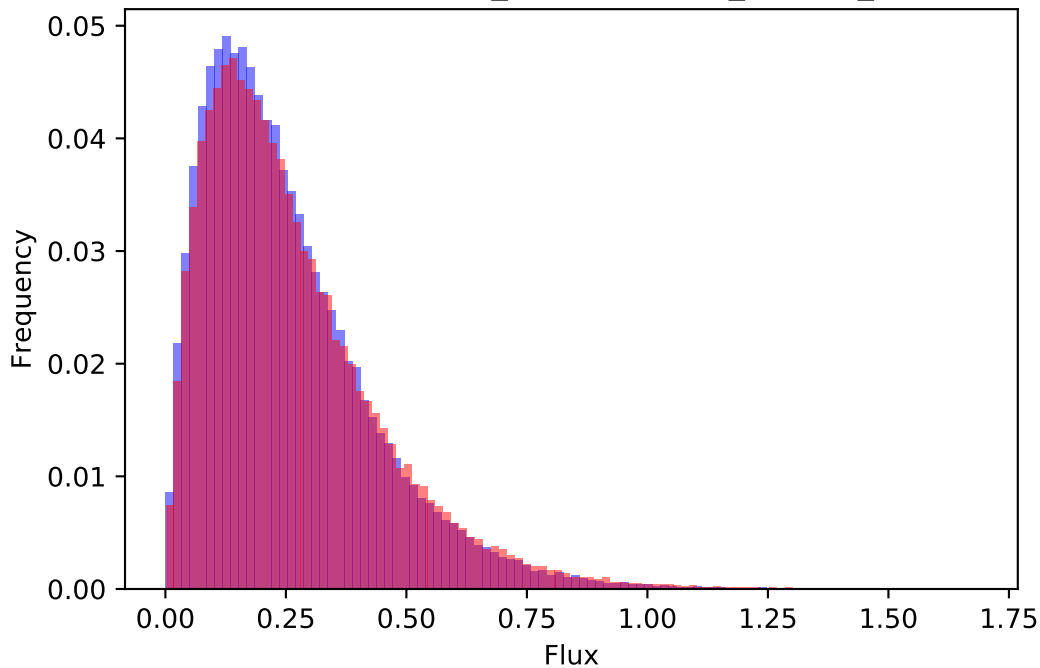
**\*\*193 : ACD\_c + H2O\_c + NAD\_c --> AC\_c + H\_c + NADH\_c\*\***



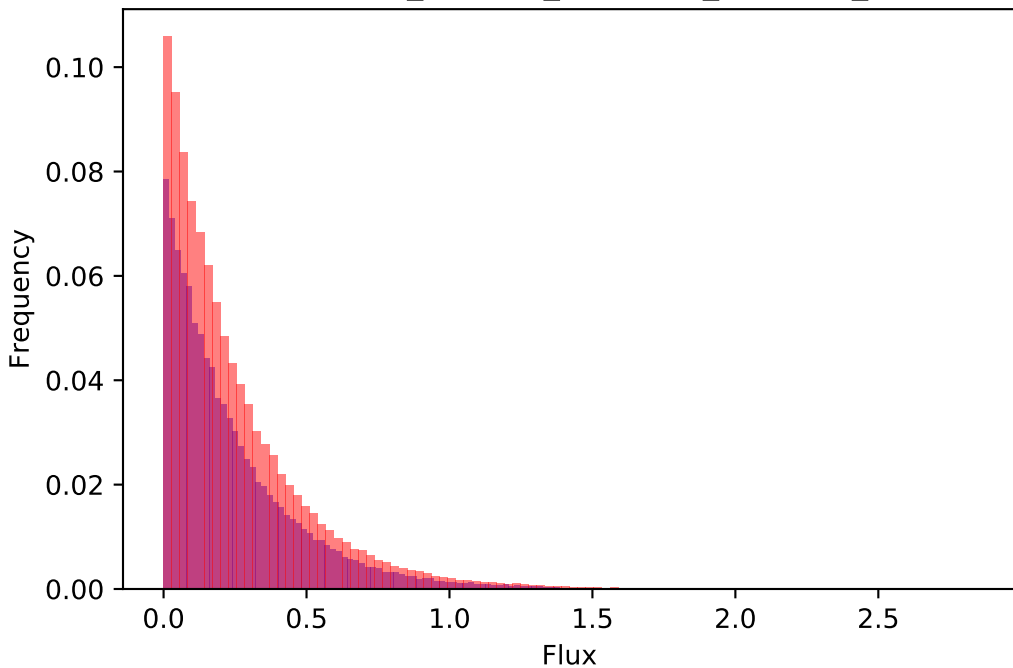
**\*\*194 : GCA\_h + O2\_h --> GLX\_h + H2O2\_h\*\***



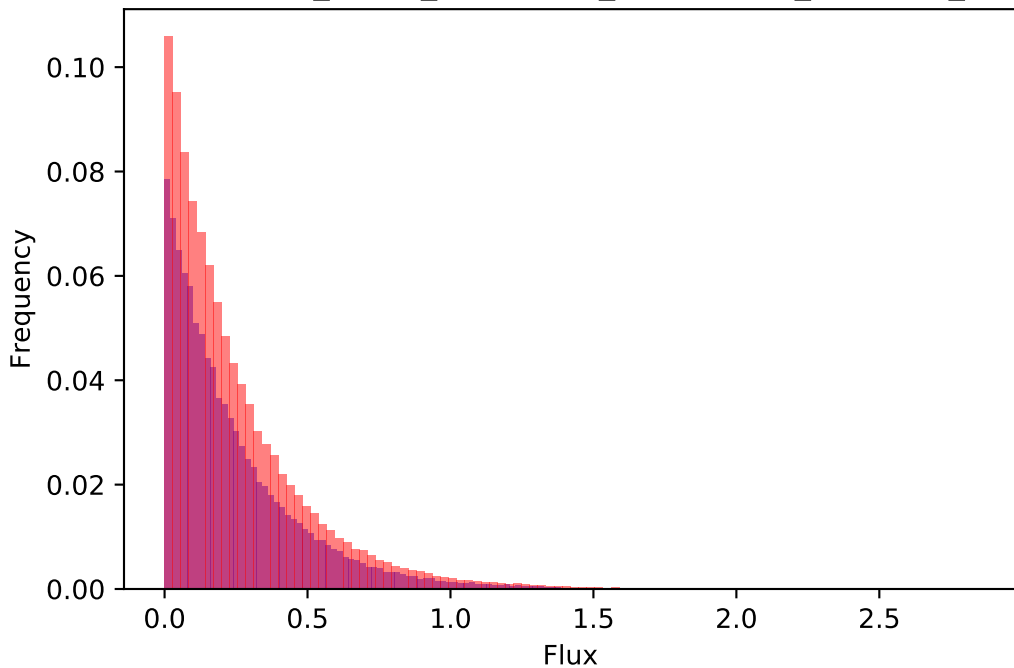
**\*\*195 : 2.0 H2O2\_h --> 2.0 H2O\_h + O2\_h\*\***



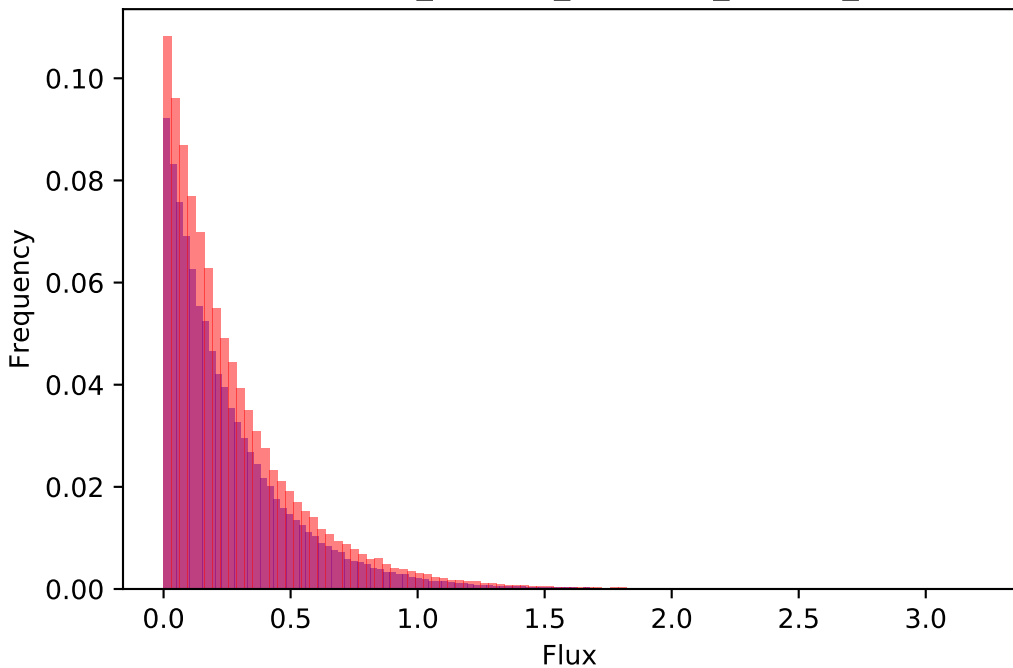
**\*\*196 : GLX\_h + Ser\_h --> Gly\_h + HPR\_h\*\***



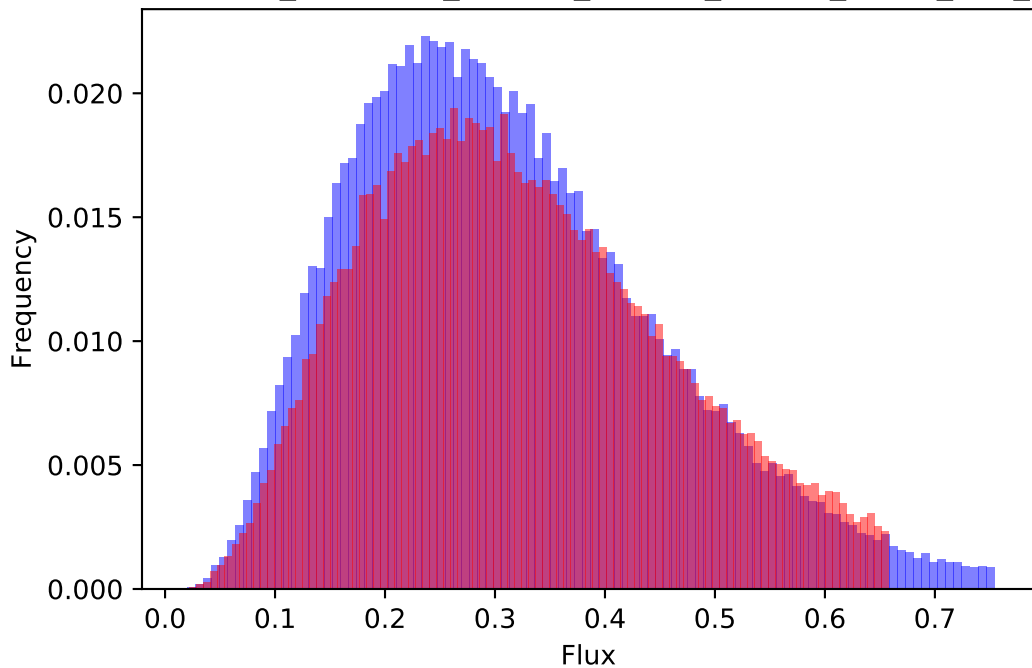
**\*\*197 : HPR\_h + H\_h + NADH\_h --> GCEA\_h + NAD\_h\*\***



**\*\*198 : GLX\_h + Glu\_h --> Gly\_h + KG\_h\*\***

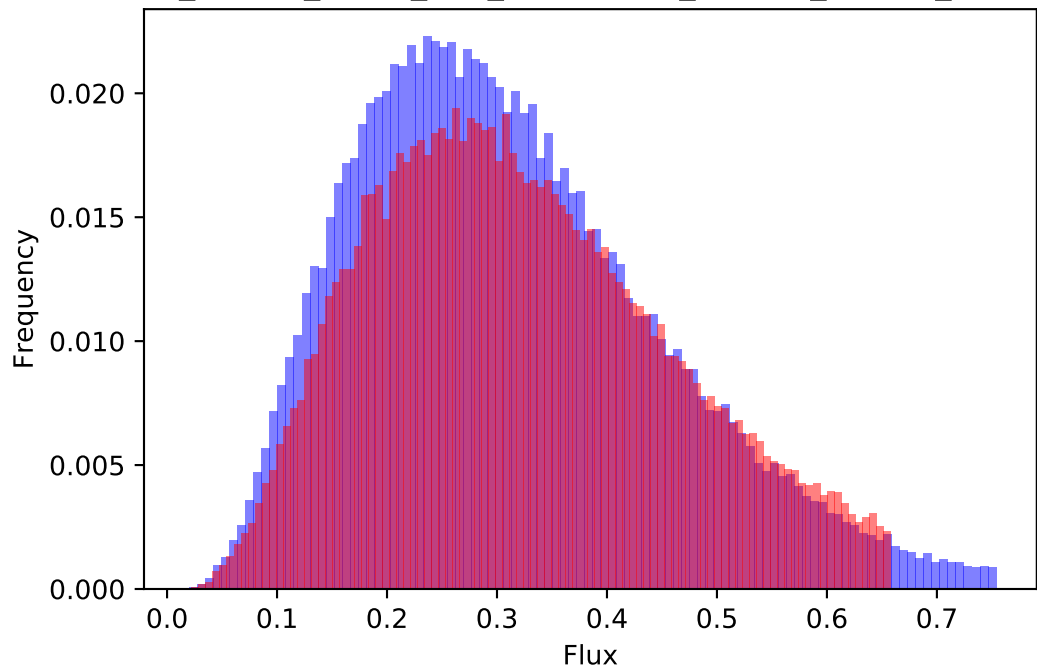


**\*\*199 : ATP\_h + PRPP\_h --> H\_h + PPi\_h + PR\_DASH\_ATP\_h\*\***

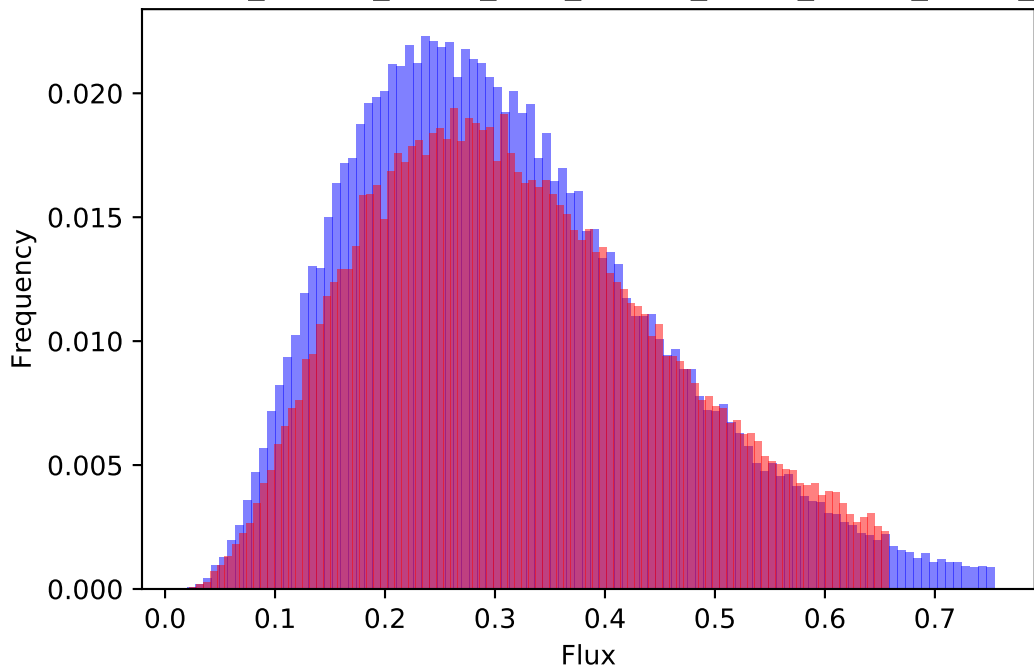




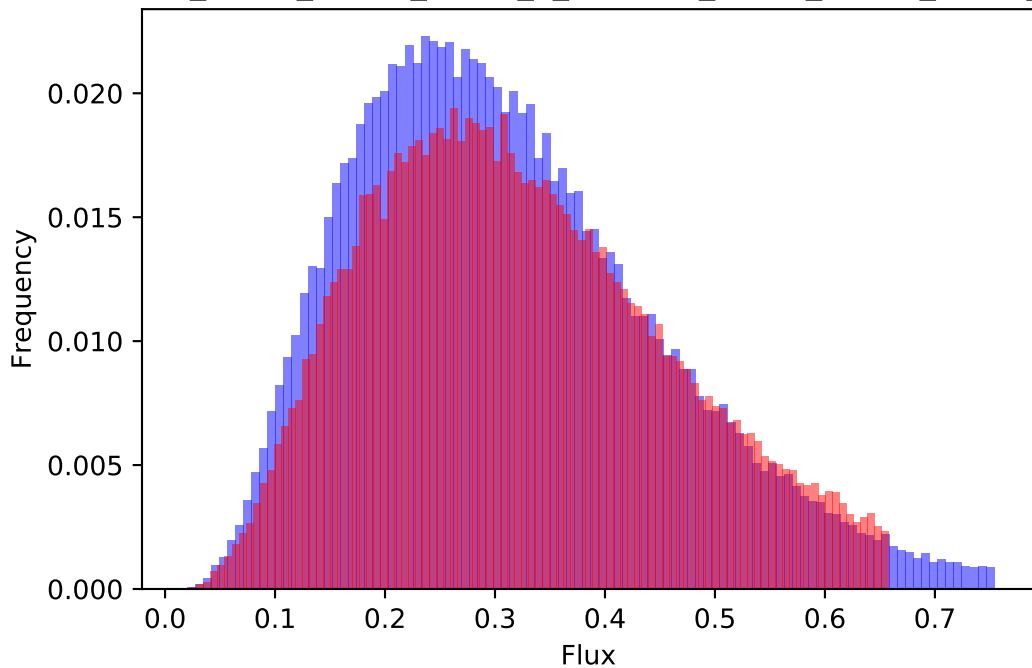
\*200 : H2O\_h + PR\_DASH\_ATP\_h --> 2.0 H\_h + PPI\_h + PR\_DASH\_AMP\_h



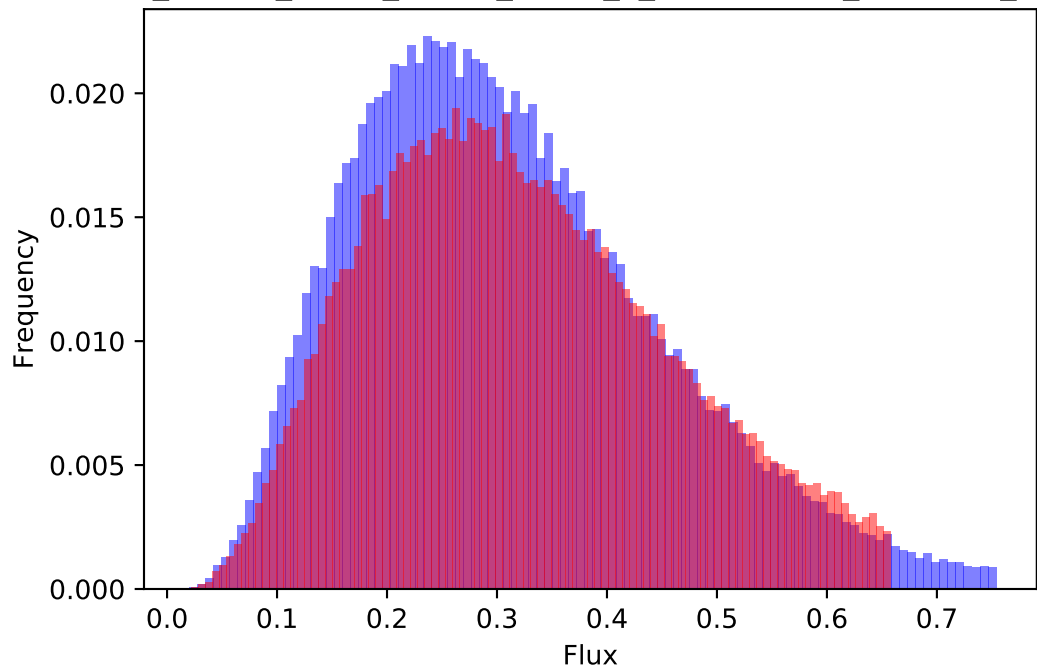
**\*\*201 : H2O\_h + PR\_DASH\_AMP\_h --> P\_DASH\_AICAR\_DASH\_P\_h\*\***



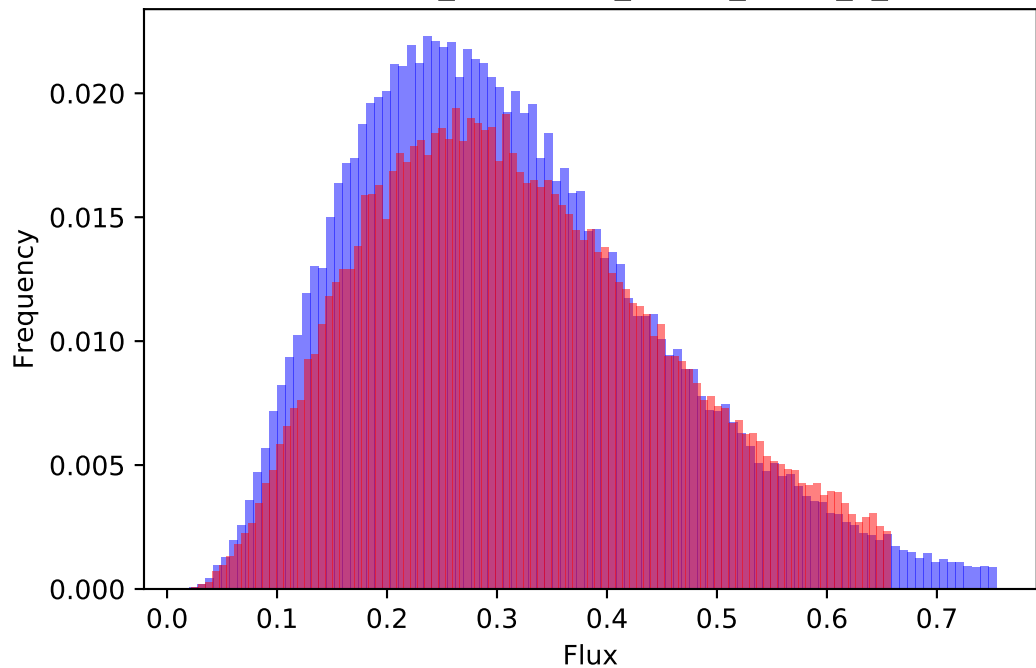
**\*\*202 : P\_DASH\_AICAR\_DASH\_P\_h --> Pu\_DASH\_AICAR\_DASH\_P\_h\*\***



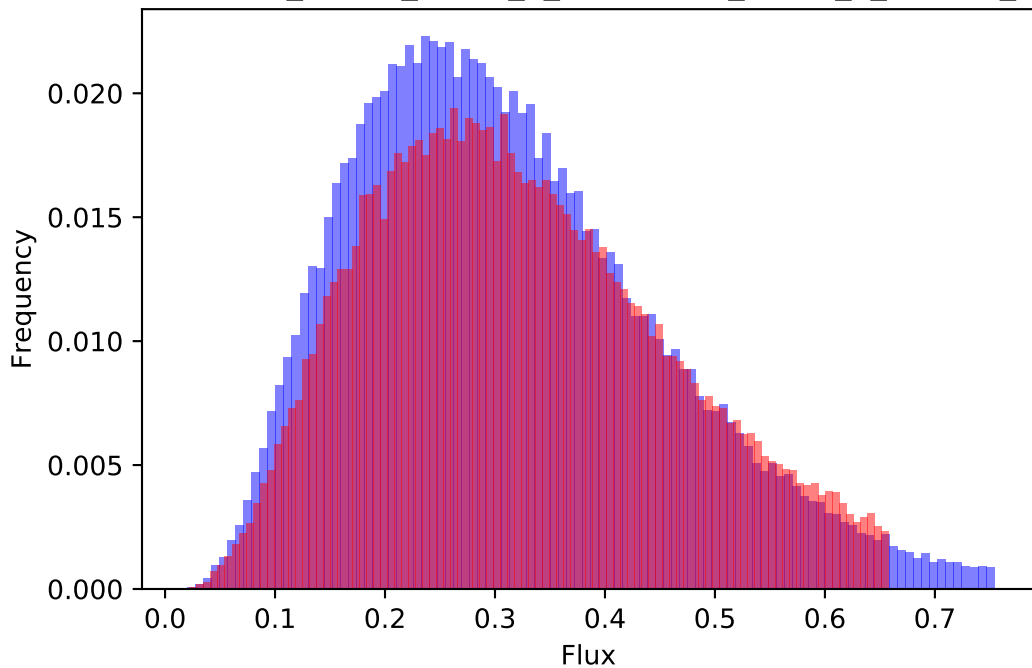
<203 : Gln\_h + Pu\_DASH\_AICAR\_DASH\_P\_h --> AICAR\_h + EIGP\_h + Glu\_h



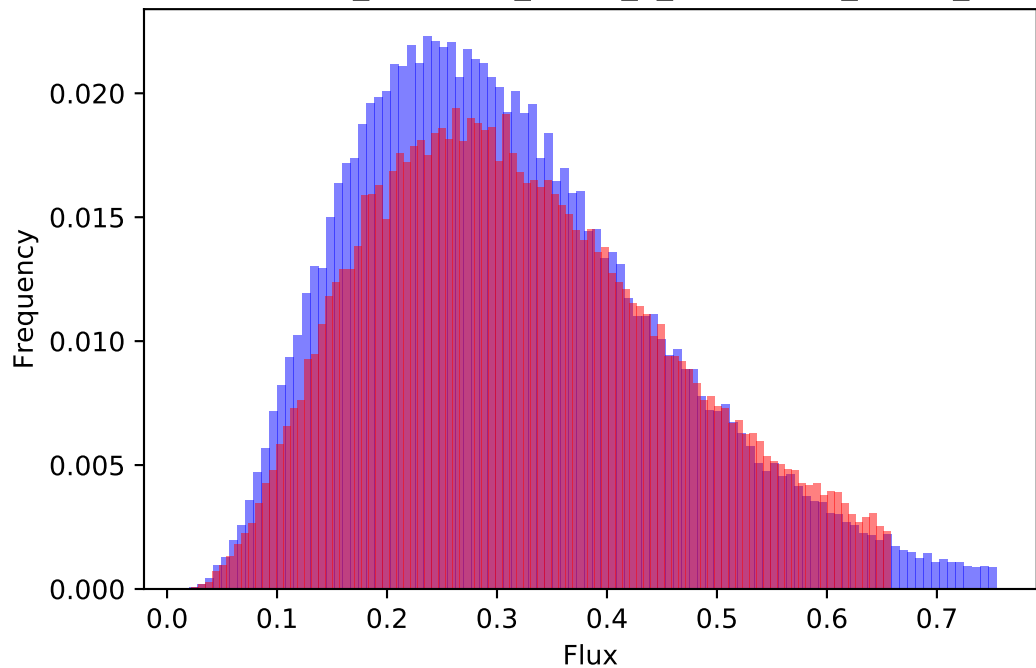
**\*\*204 : EIGP\_h --> H2O\_h + IA\_DASH\_P\_h\*\***



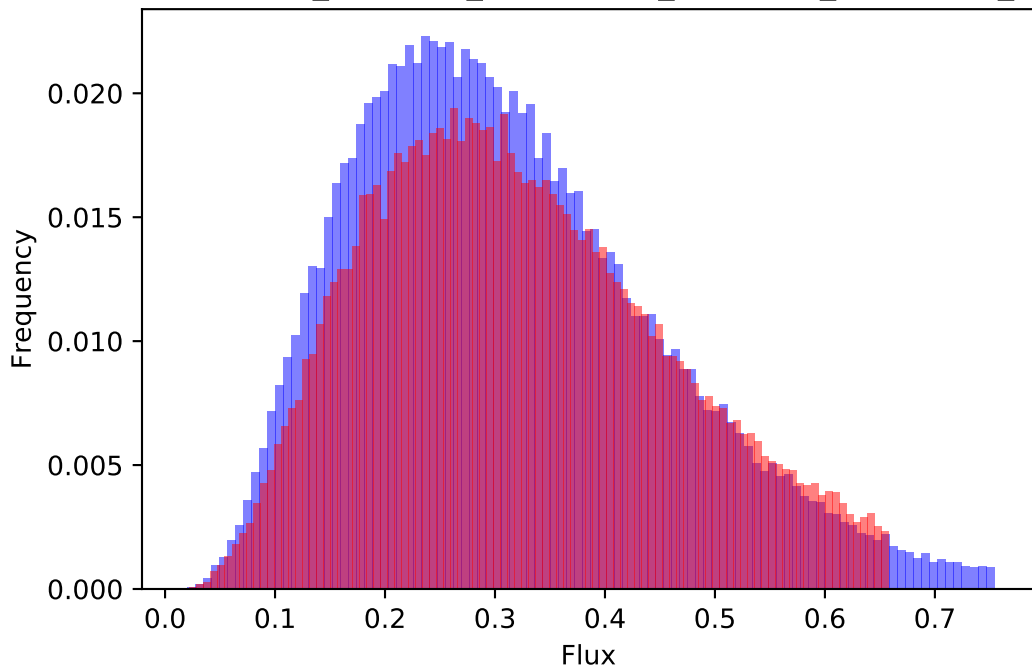
**\*\*205 : Glu\_h + IA\_DASH\_P\_h --> Hisol\_DASH\_P\_h + KG\_h\*\***



**\*\*206 : H2O\_h + Hisol\_DASH\_P\_h --> Hisol\_h + Pi\_h\*\***

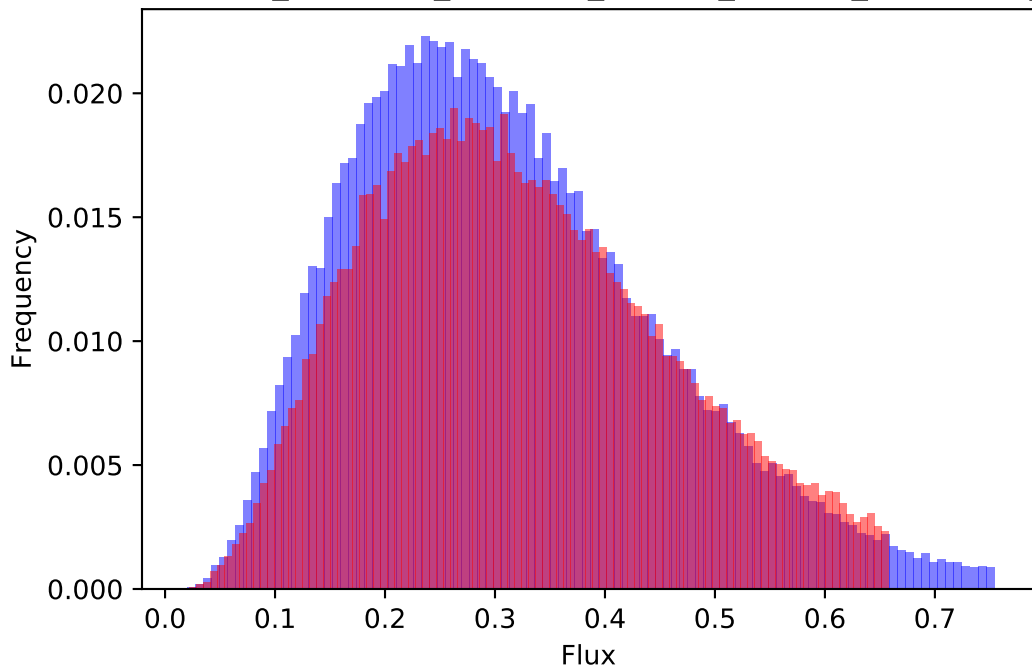


**\*\*207 : Hisol\_h + NAD\_h --> 2.0 H\_h + Hisal\_h + NADH\_h\*\***

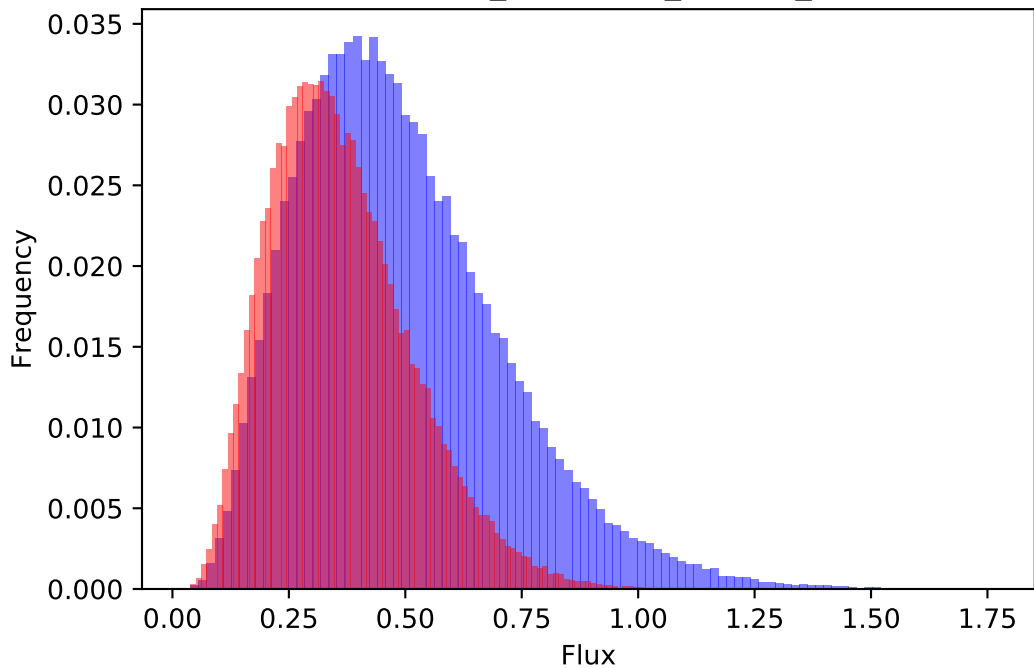




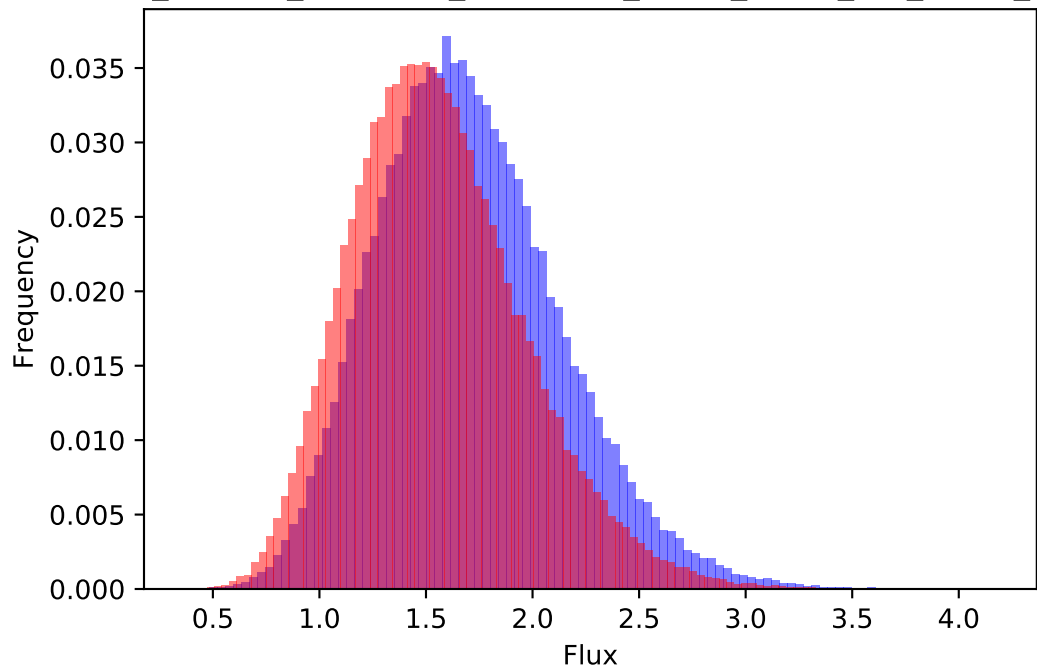
**\*\*208 : H2O\_h + Hisal\_h + NAD\_h --> H\_h + His\_h + NADH\_h\*\***



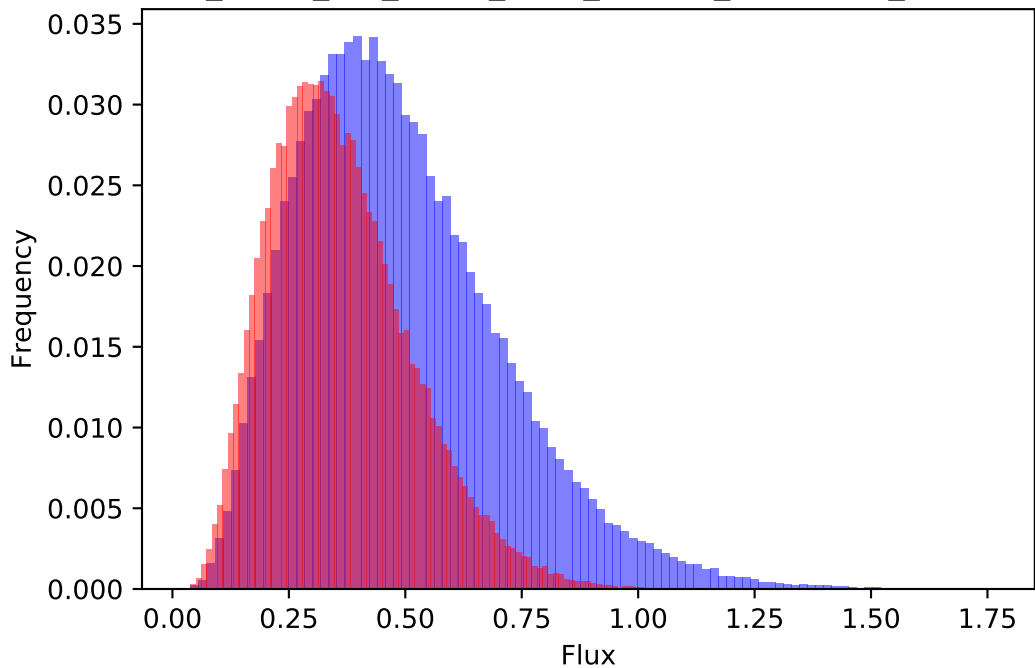
**\*\*209 : Thr\_h --> NH4\_h + OB\_h\*\***



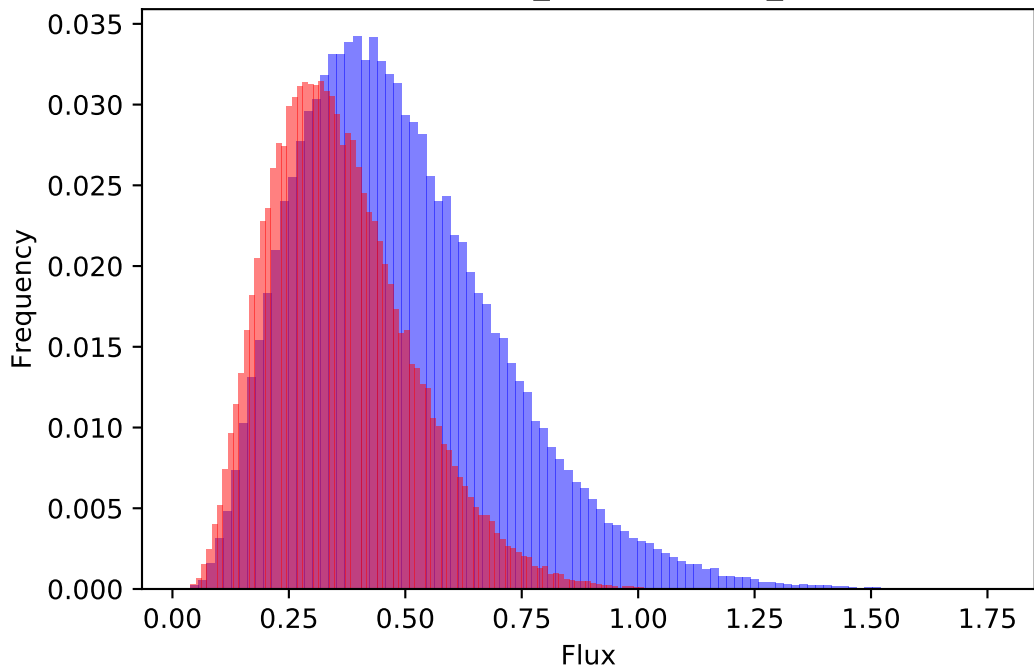
**\*\*210 : H\_h + Pyr\_h + ThPP\_h --> CO2\_h + H\_DASH\_Eth\_DASH\_ThPP\_h\***



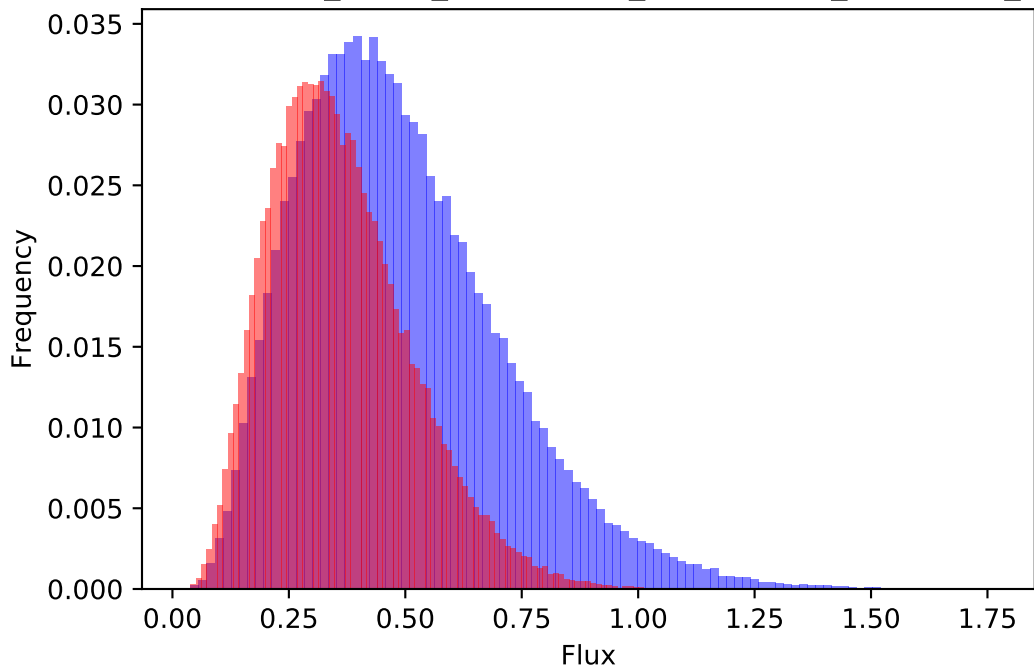
**\*\*211 : H\_DASH\_Eth\_DASH\_ThPP\_h + OB\_h --> AHB\_h + ThPP\_h\*\***



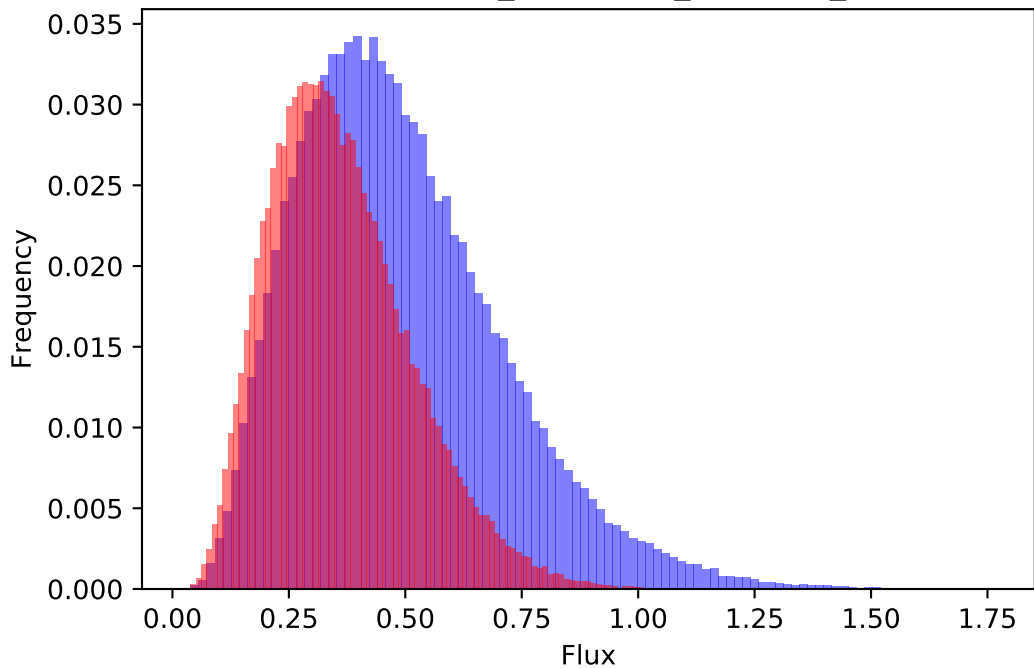
**\*\*212 : AHB\_h <=> HMOP\_h\*\***



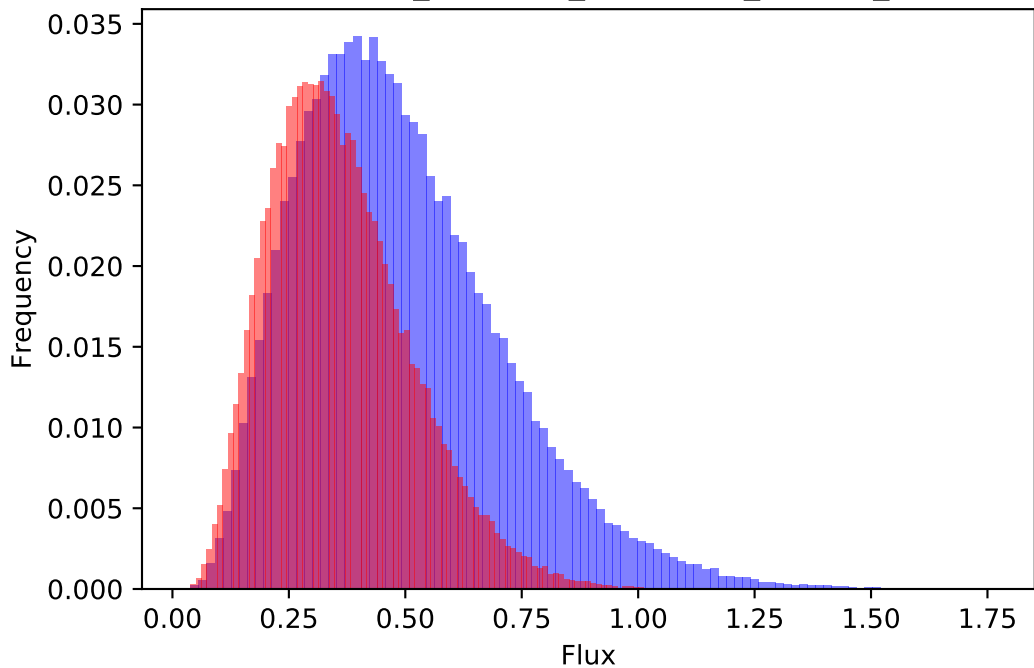
**\*\*213 : HMOP\_h + H\_h + NADPH\_h --> DHMP\_h + NADP\_h\*\***



**\*\*214 : DHMP\_h --> H2O\_h + MOP\_h\*\***

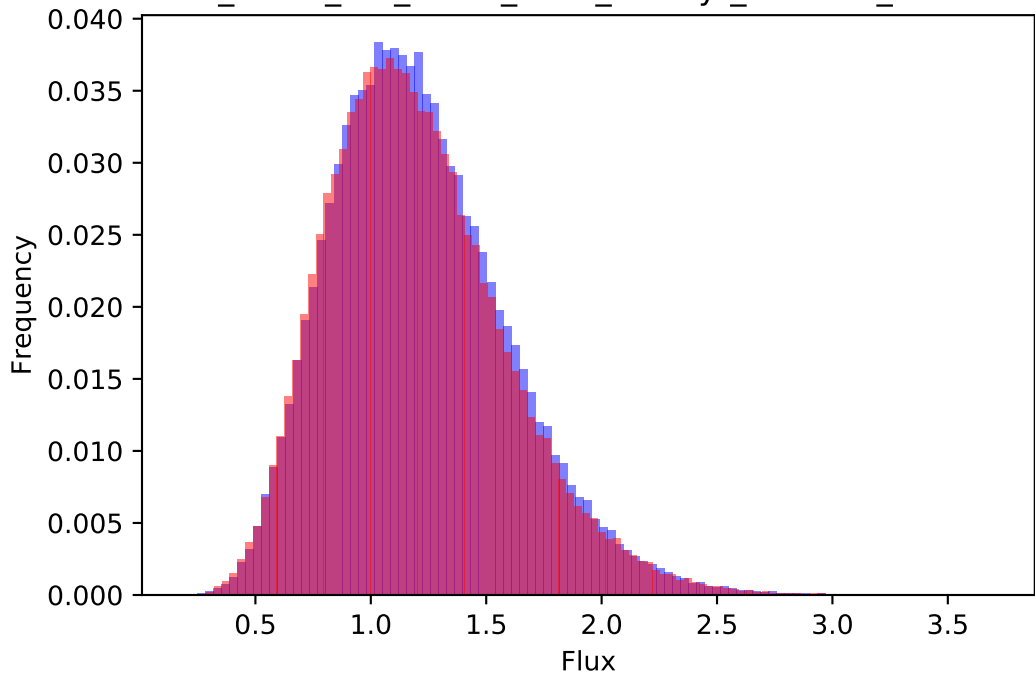


**\*\*215 : Glu\_h + MOP\_h <=> Ile\_h + KG\_h\*\***

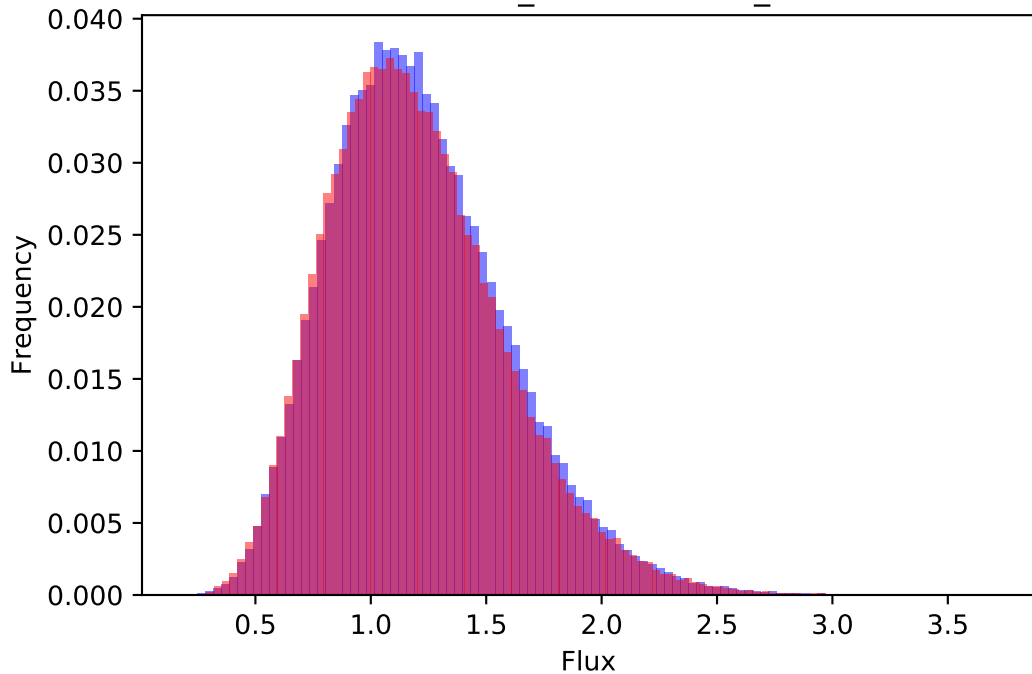




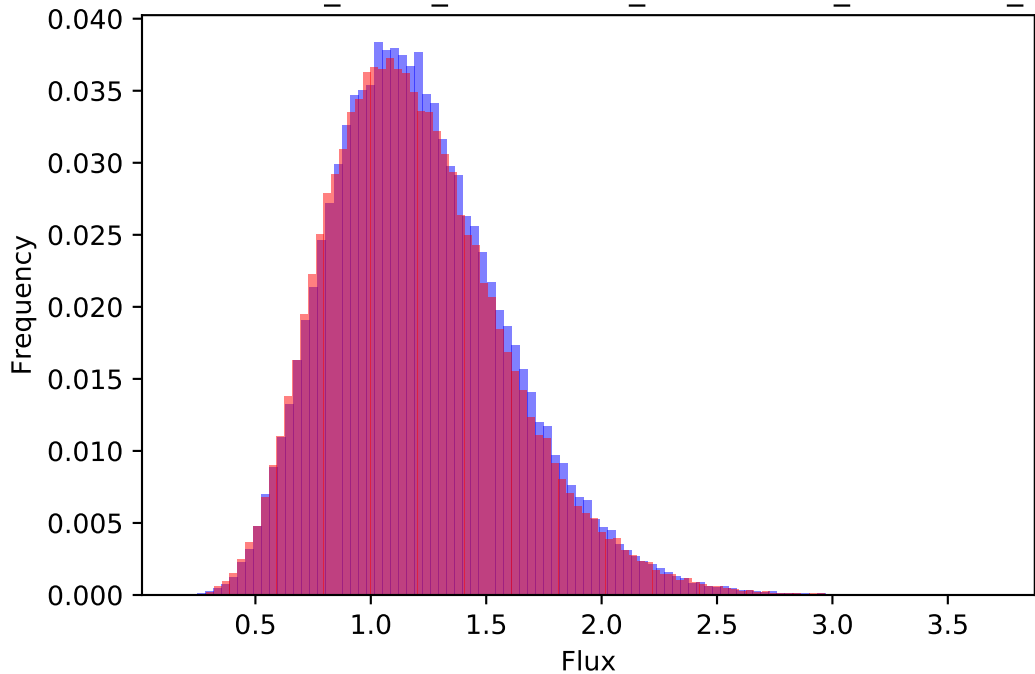
**\*\*216 : H\_DASH\_Eth\_DASH\_ThPP\_h + Pyr\_h --> AL\_h + ThPP\_h\*\***



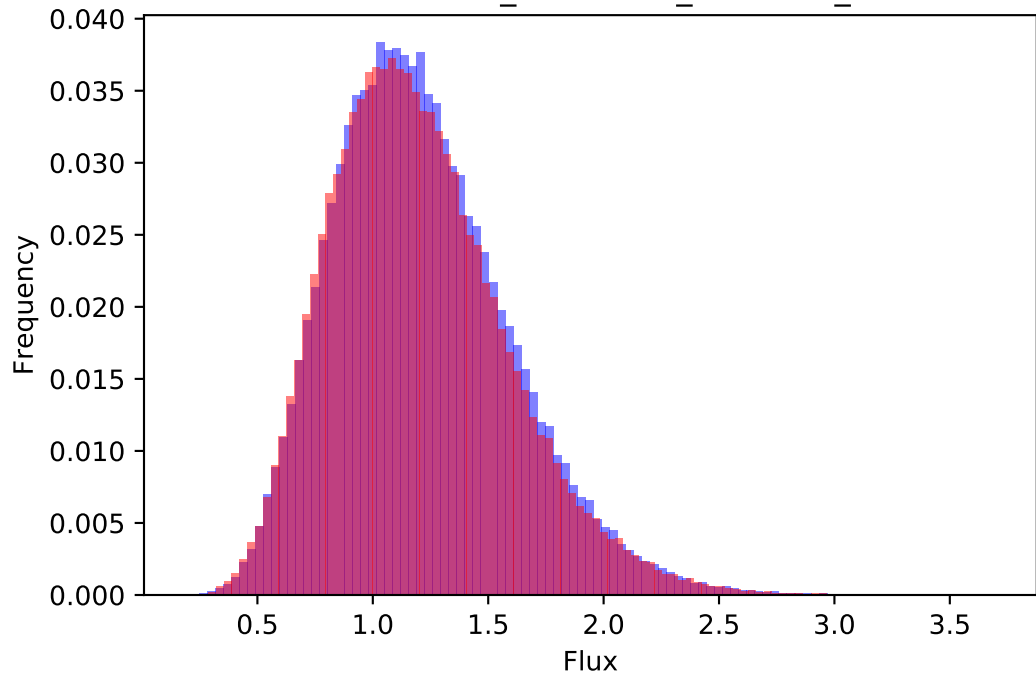
**\*\*217 : AL\_h <=> HMOB\_h\*\***



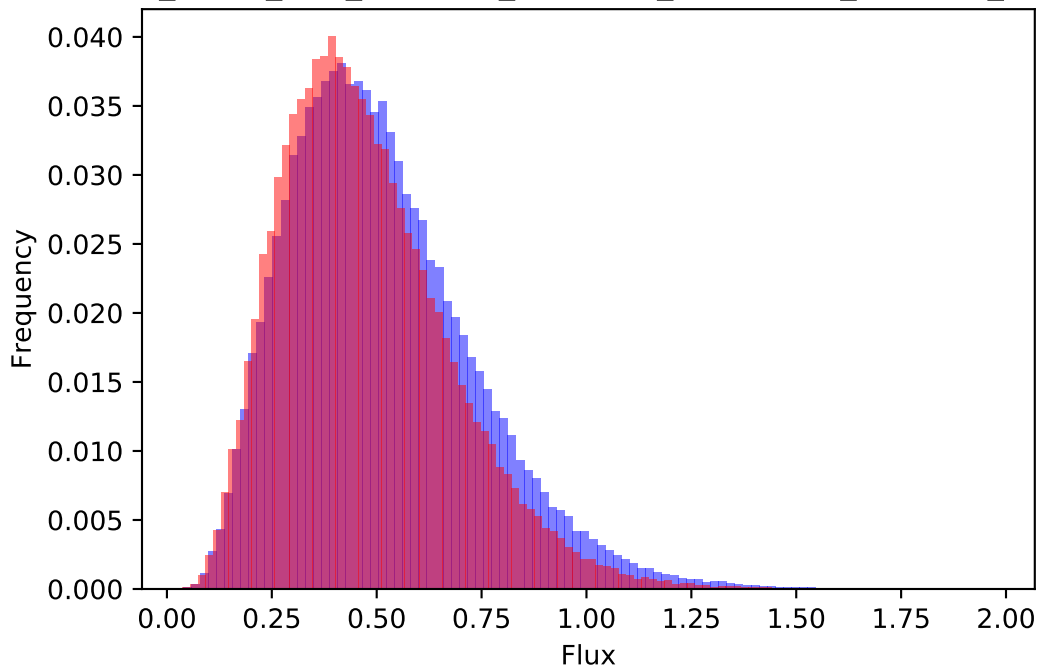
**\*\*218 : HMOB\_h + H\_h + NADPH\_h --> DHMB\_h + NADP\_h\*\***



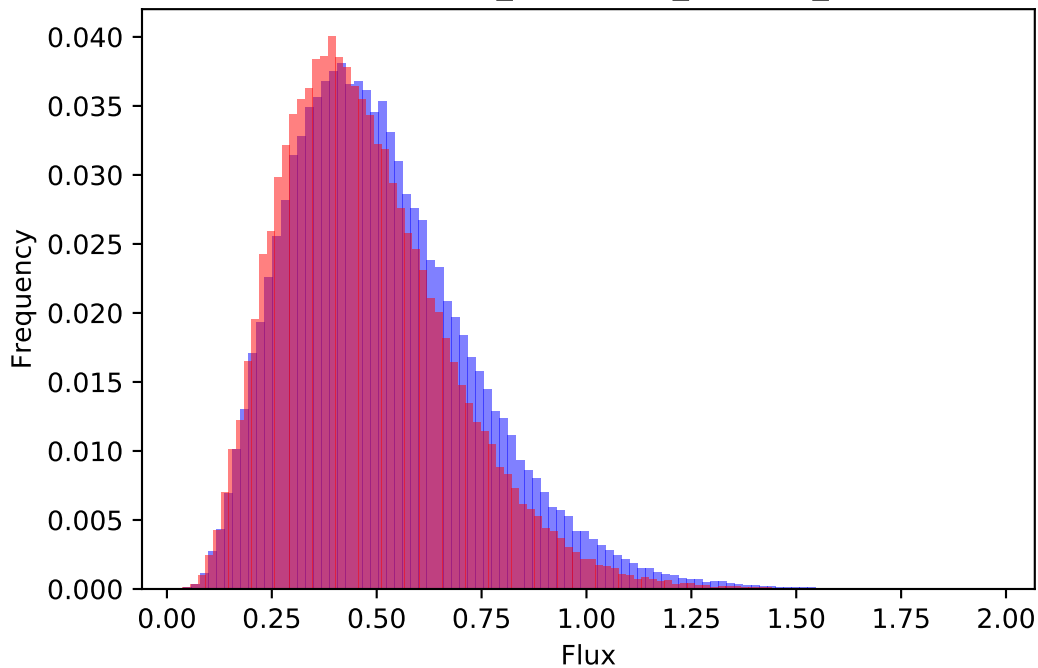
**\*\*219 : DHMB\_h --> H2O\_h + MOB\_h\*\***



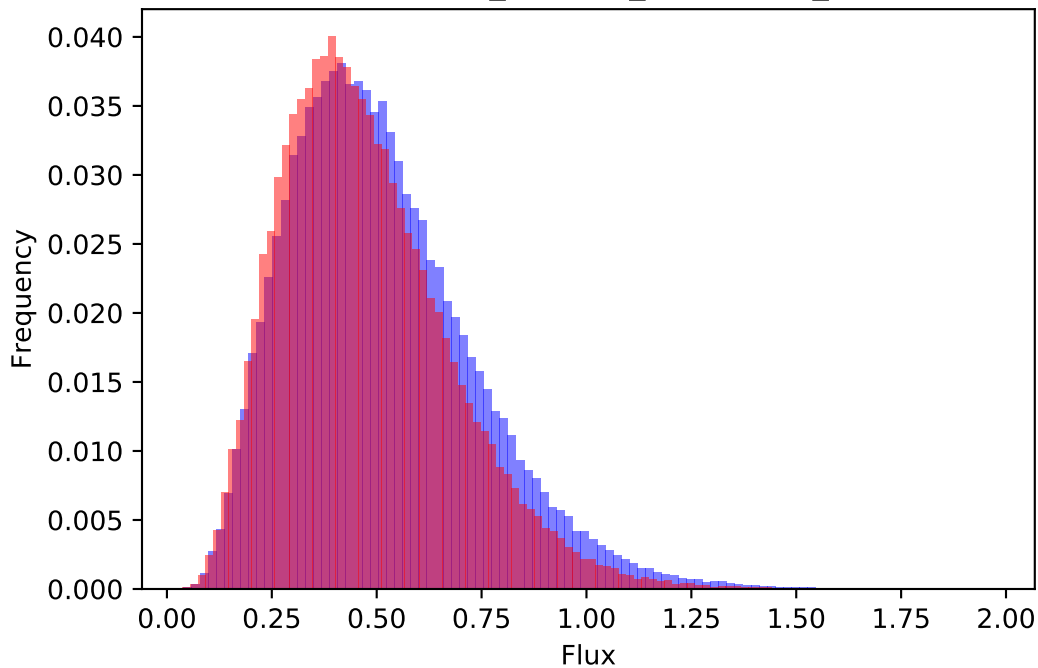
**\*\*220 : A\_DASH\_CoA\_h + H2O\_h + MOB\_h --> 2IPM\_h + CoA\_h + H\_h\***



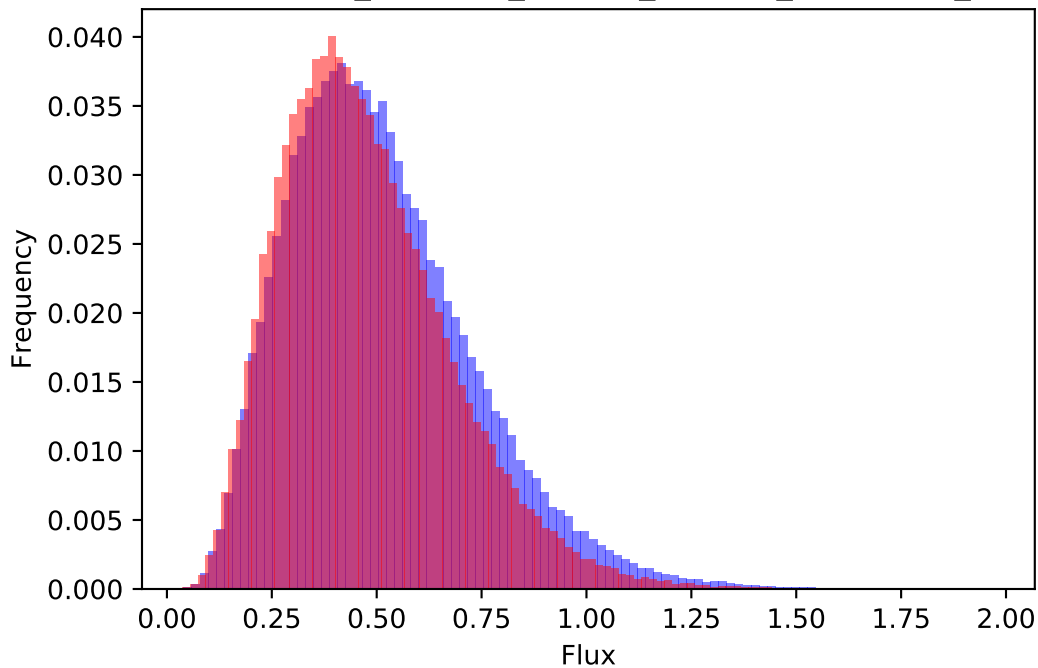
**\*\*221 : 2IPM\_h --> H2O\_h + IPM\_h\*\***



**\*\*222 : H2O\_h + IPM\_h --> 3IPM\_h\*\***

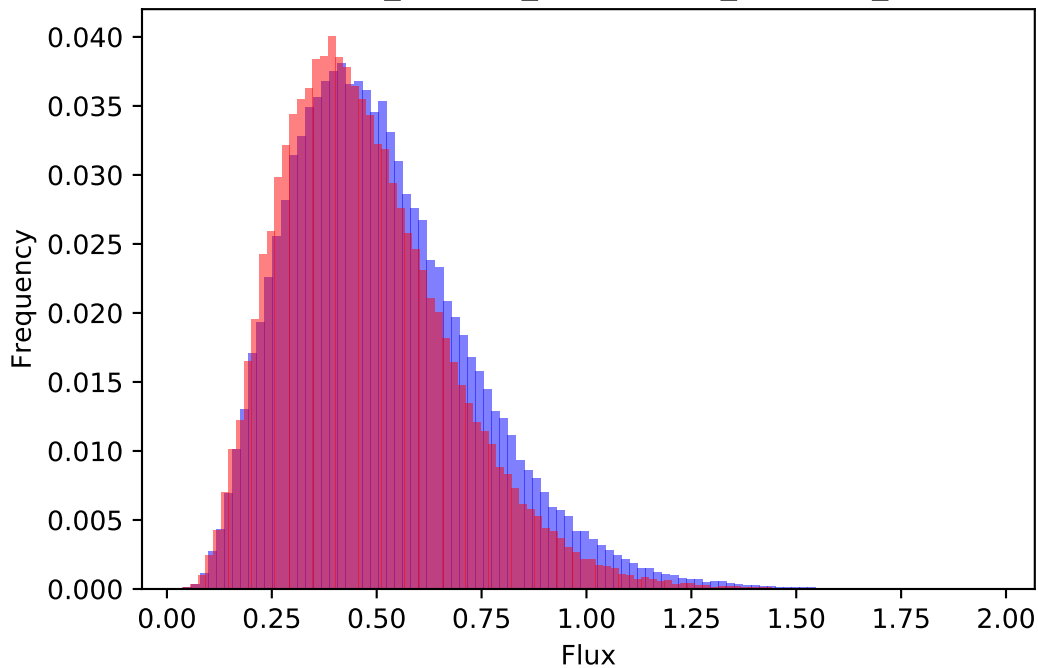


**\*\*223 : 3IPM\_h + NAD\_h --> H\_h + IPO\_h + NADH\_h\*\***

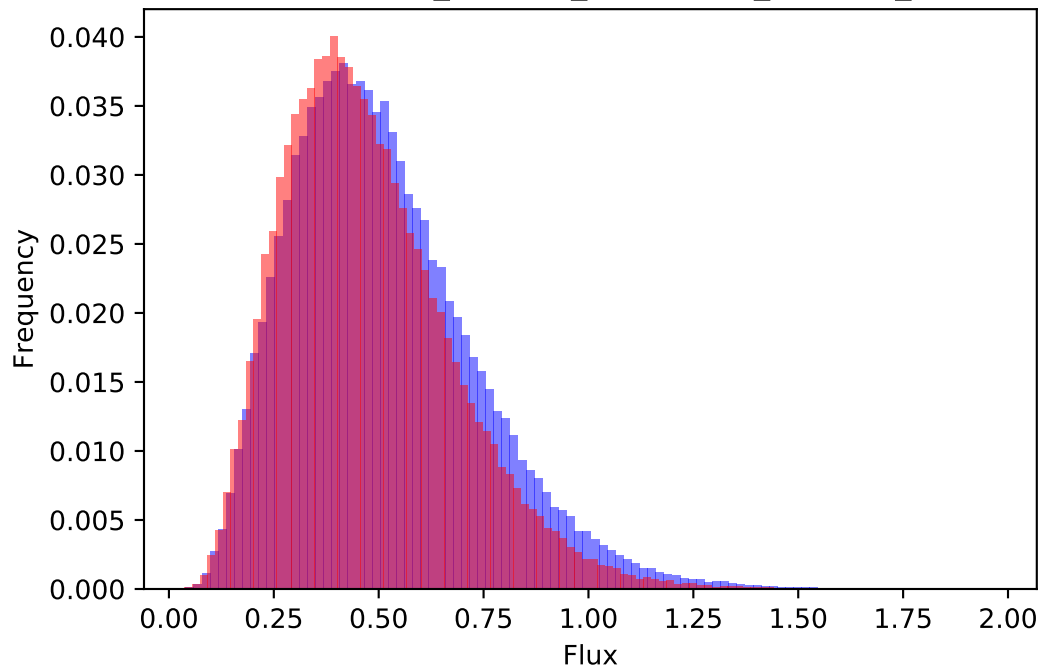




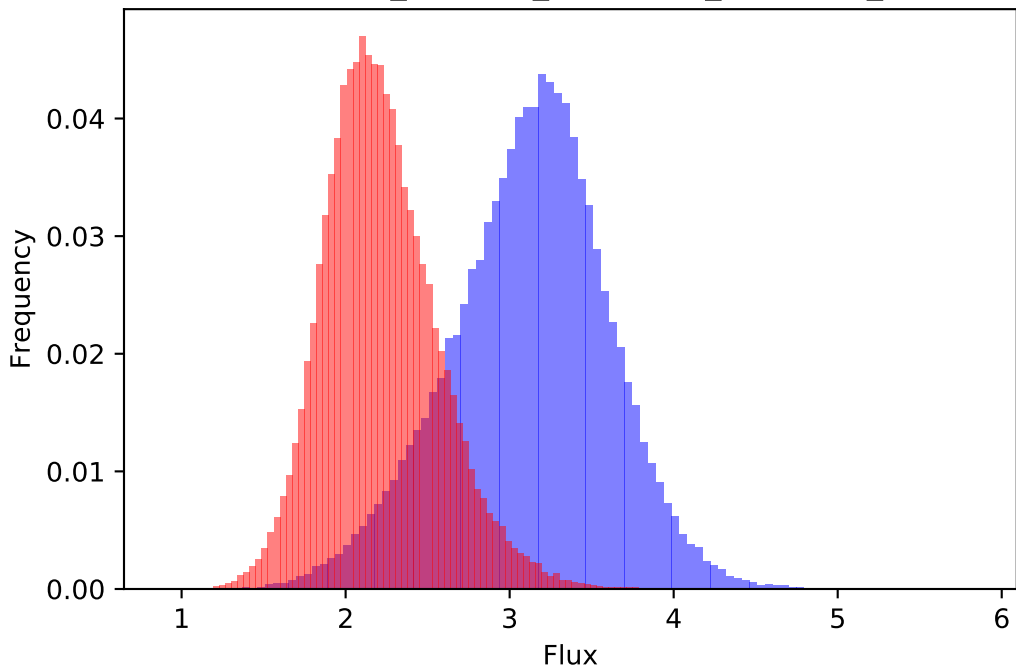
**\*\*224 : H\_h + IPO\_h --> 4MOP\_h + CO2\_h\*\***



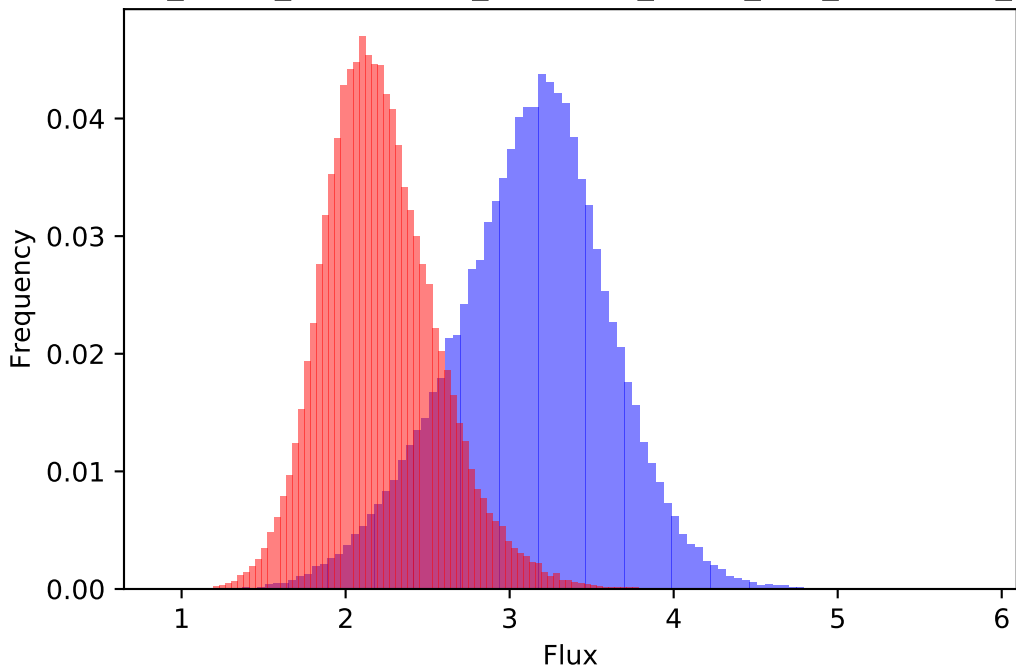
**\*\*225 : 4MOP\_h + Glu\_h <=> KG\_h + Leu\_h\*\***



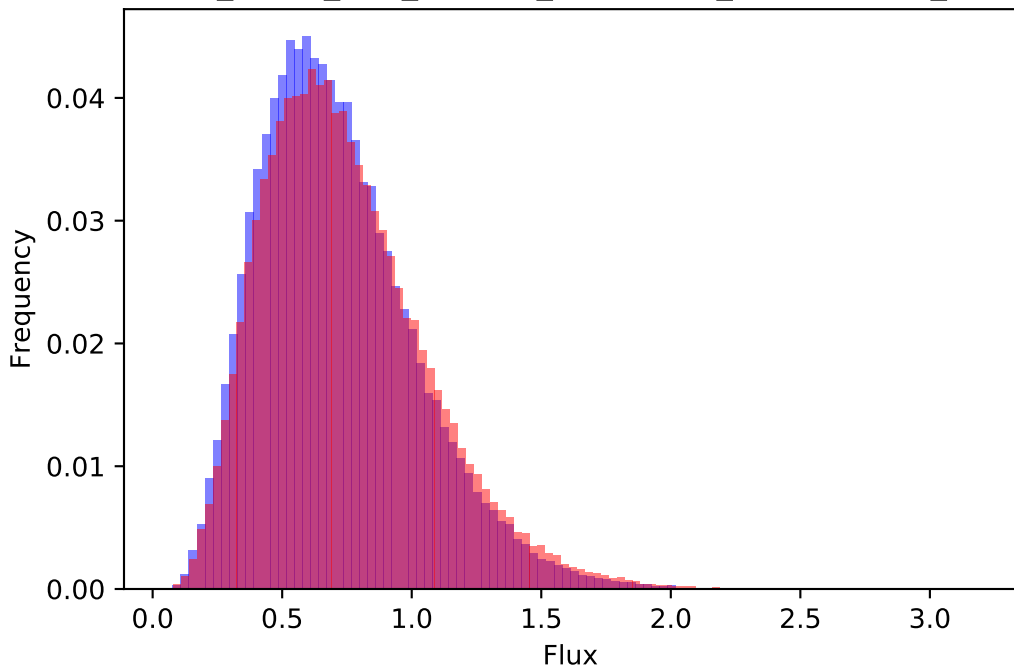
**\*\*226 : ATP\_h + Asp\_h --> ADP\_h + AspP\_h\*\***



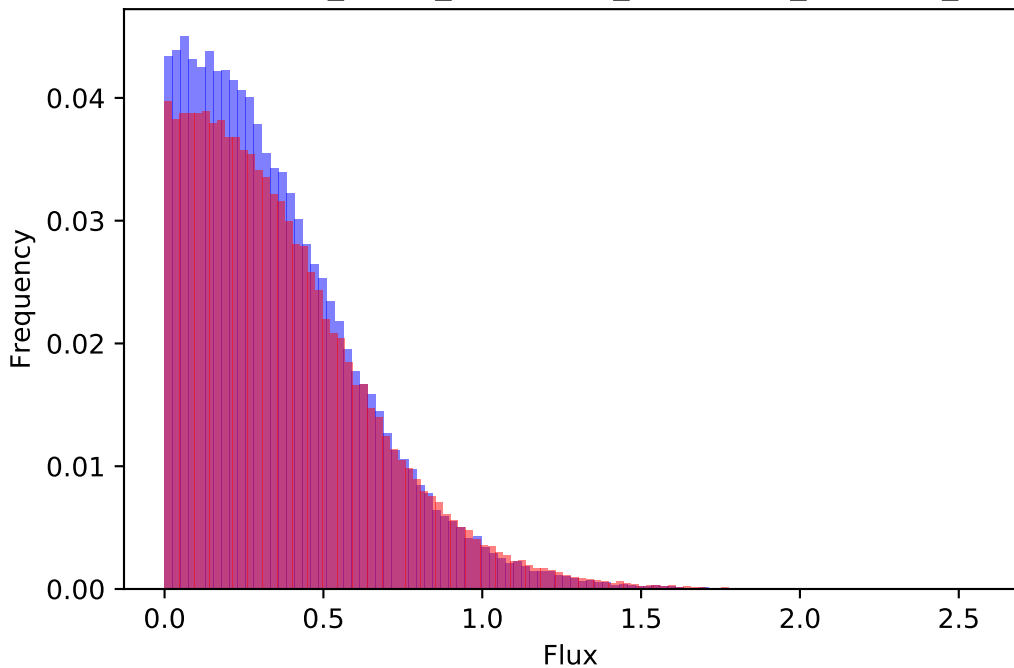
\*227 : AspP\_h + H\_h + NADPH\_h --> Asp\_DASH\_SeA\_h + NADP\_h + Pi\_h



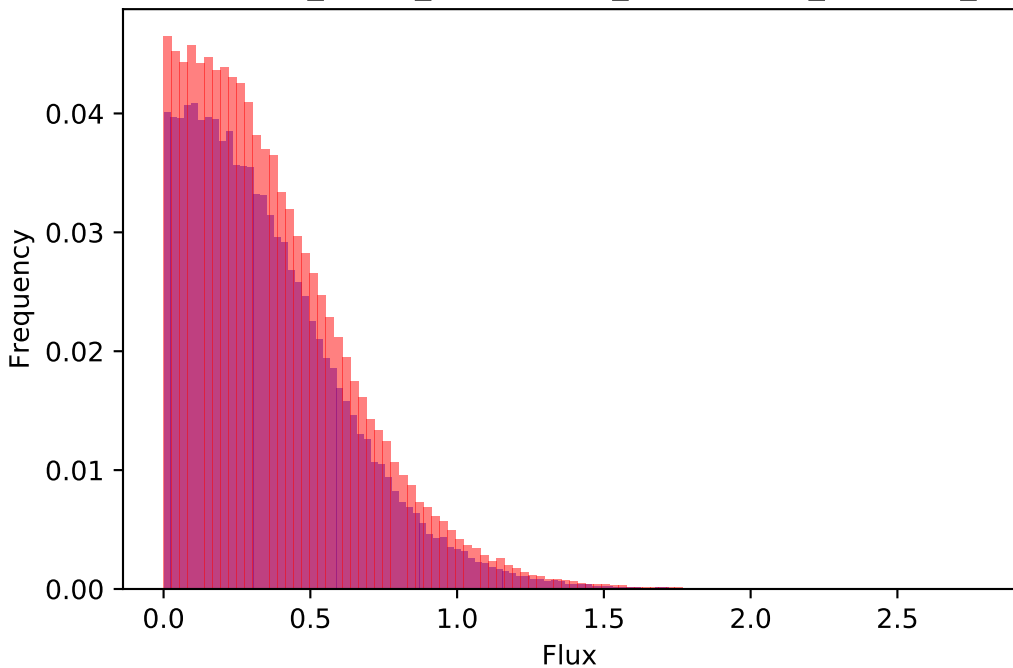
**\*\*228 : Asp\_DASH\_SeA\_h + Pyr\_h --> DHD\_h + 2.0 H2O\_h + H\_h\*\***



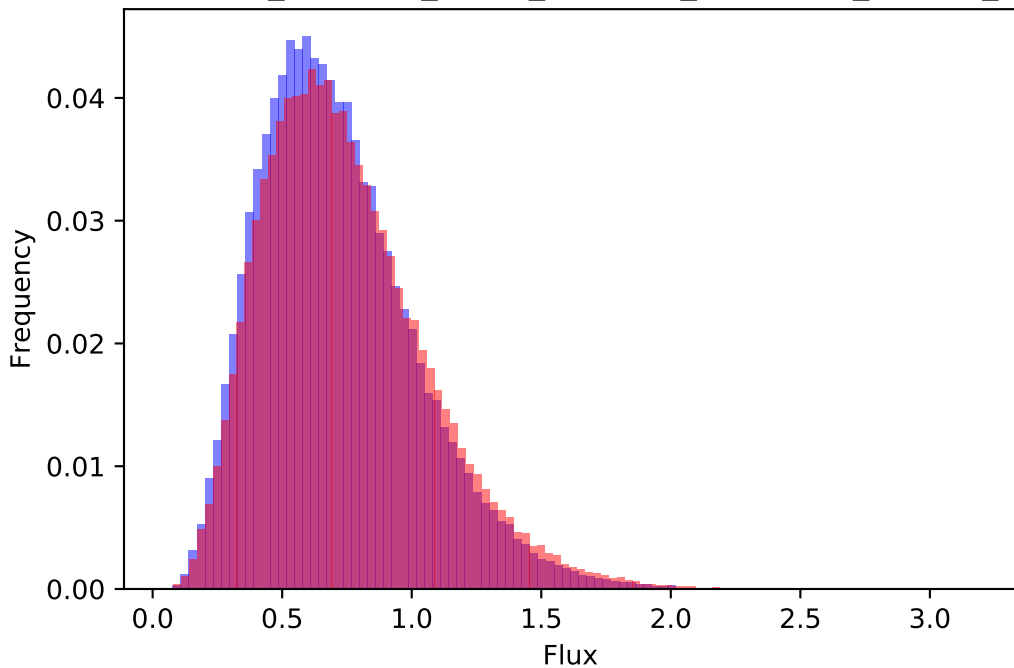
**\*\*229 : DHD\_h + H\_h + NADH\_h --> NAD\_h + THD\_h\*\***



**\*\*230 : DHD\_h + H\_h + NADPH\_h --> NADP\_h + THD\_h\*\***

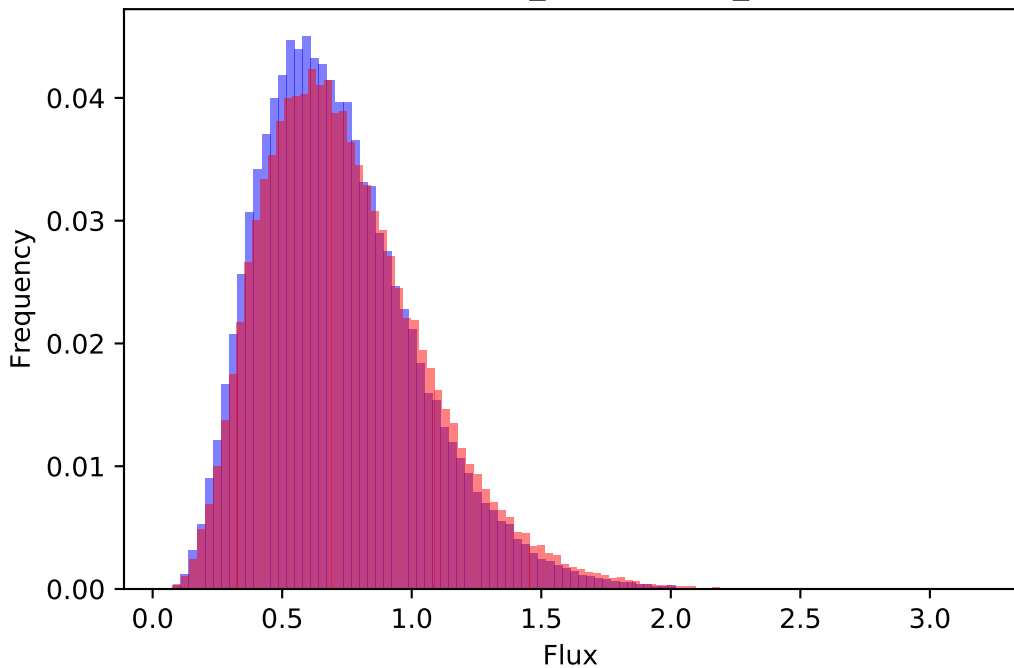


**\*\*231 : Glu\_h + H2O\_h + H\_h + THD\_h --> DAP\_h + KG\_h\*\***

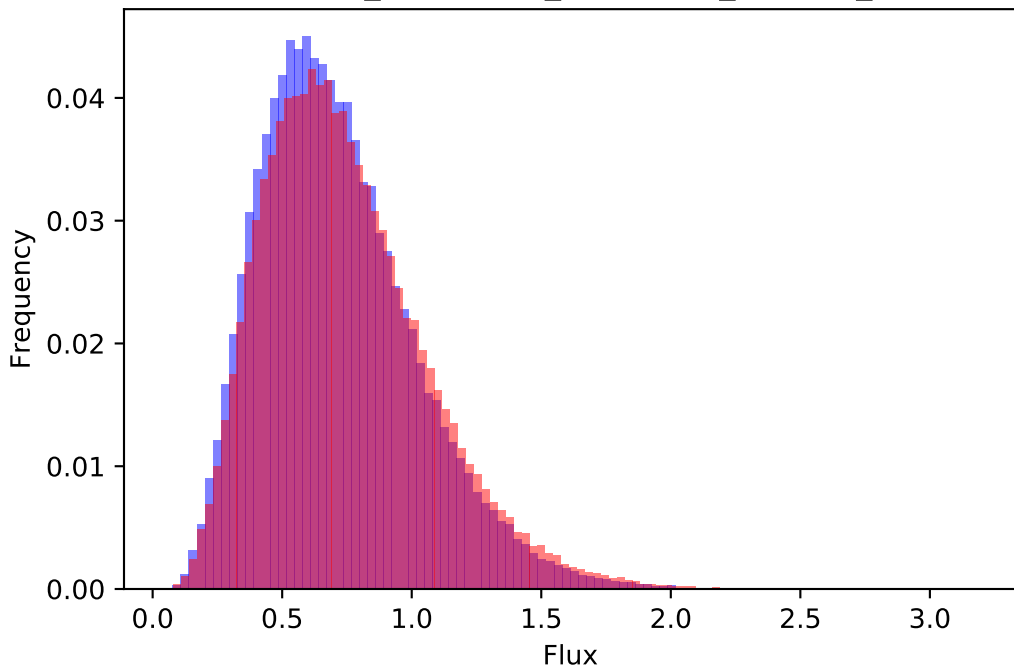




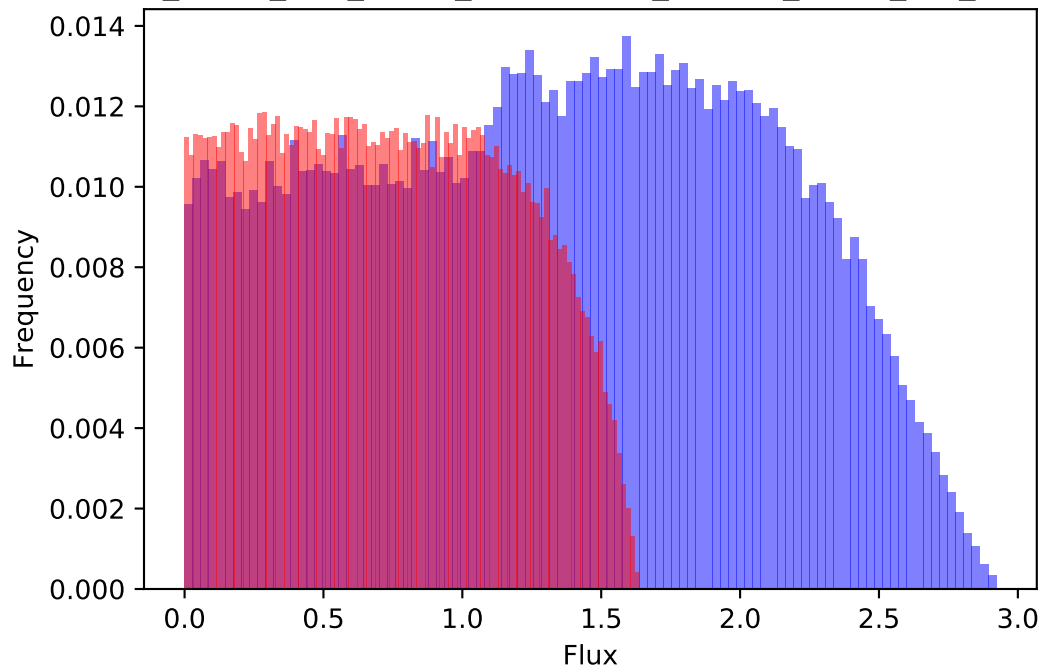
**\*\*232 : DAP\_h --> mDAP\_h\*\***



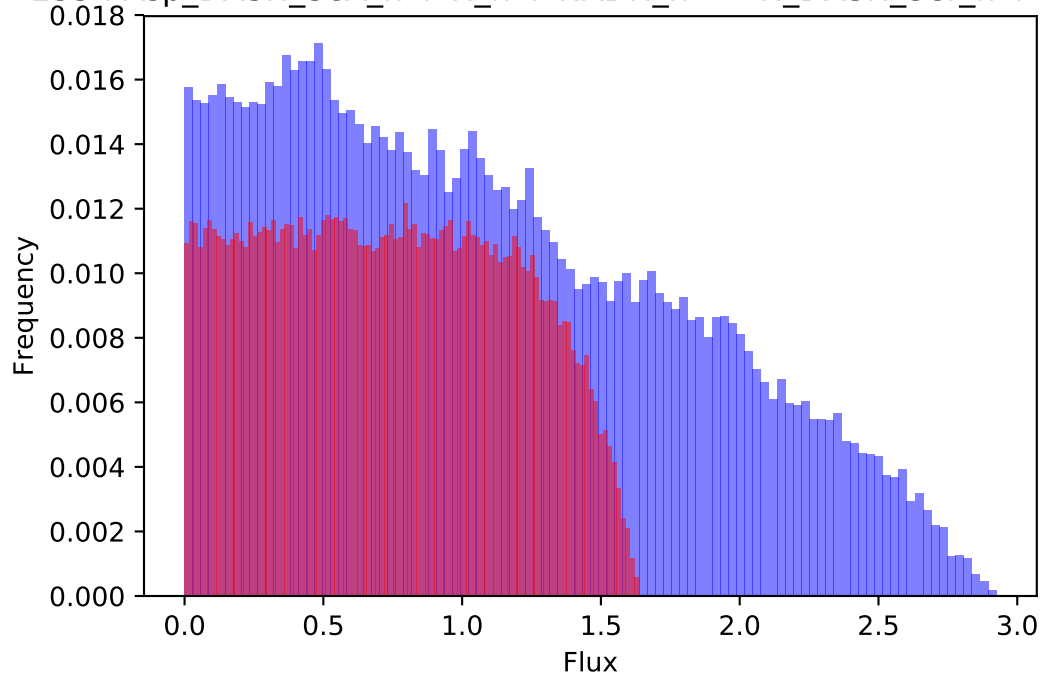
**\*\*233 : H\_h + mDAP\_h --> CO2\_h + Lys\_h\*\***



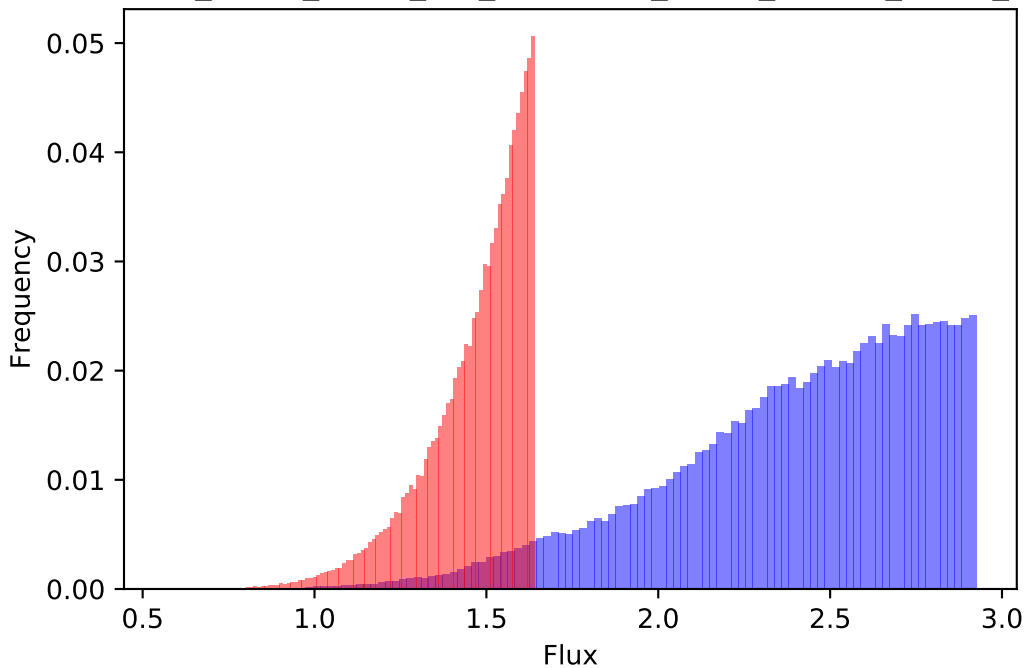
\*234 : Asp\_DASH\_SeA\_h + H\_h + NADPH\_h --> H\_DASH\_Ser\_h + NADP\_h



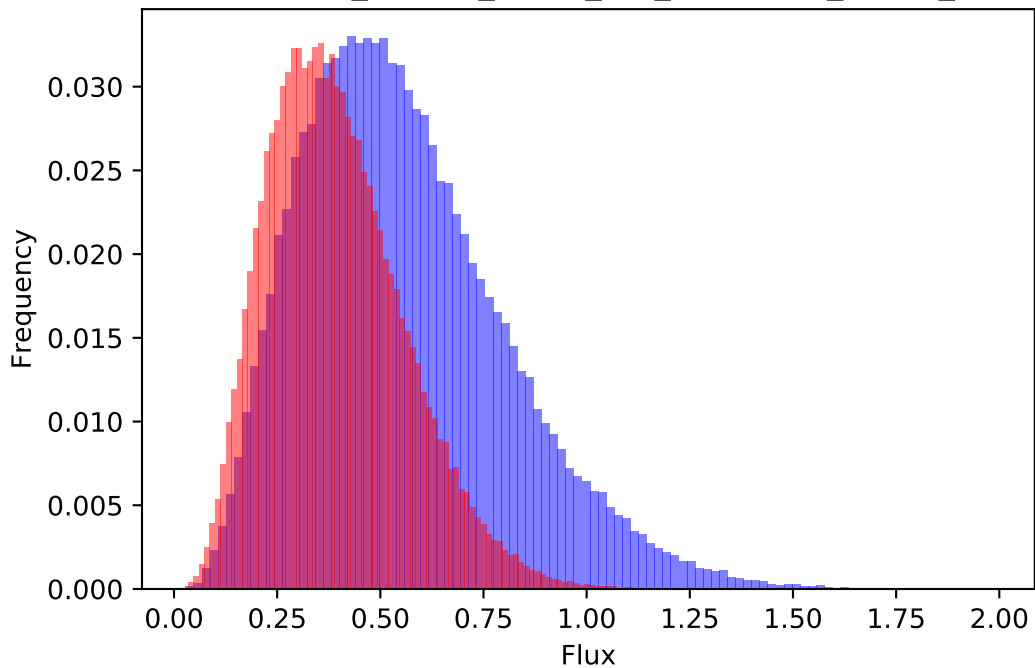
\*\*235 : Asp\_DASH\_SeA\_h + H\_h + NADH\_h --> H\_DASH\_Ser\_h + NAD\_h



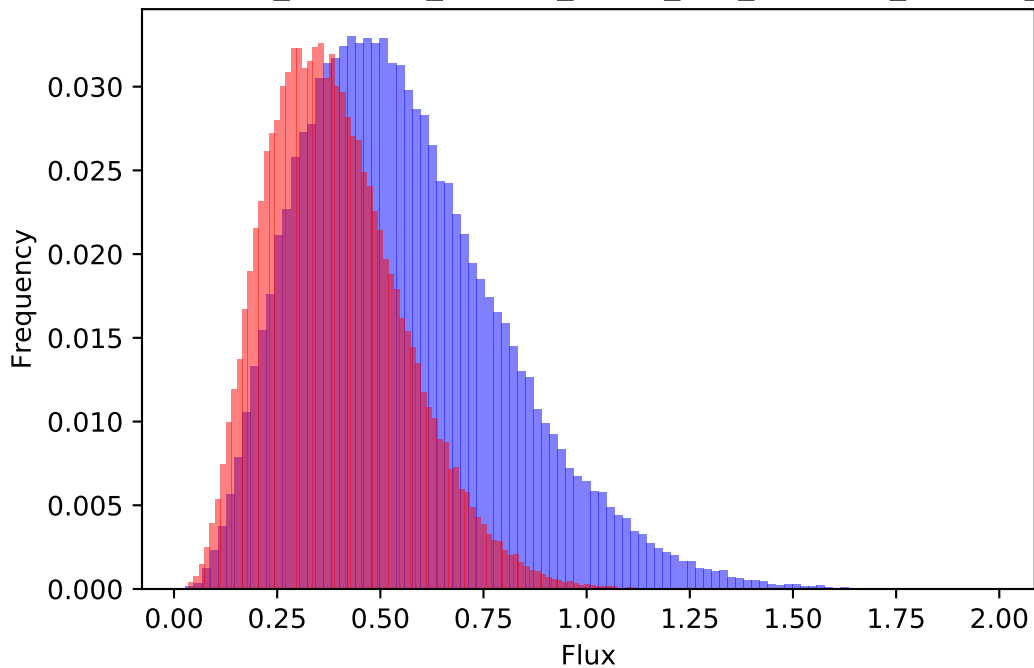
**\*\*236 : ATP\_h + H\_DASH\_Ser\_h --> ADP\_h + H\_h + PH\_DASH\_Ser\_h\*\***



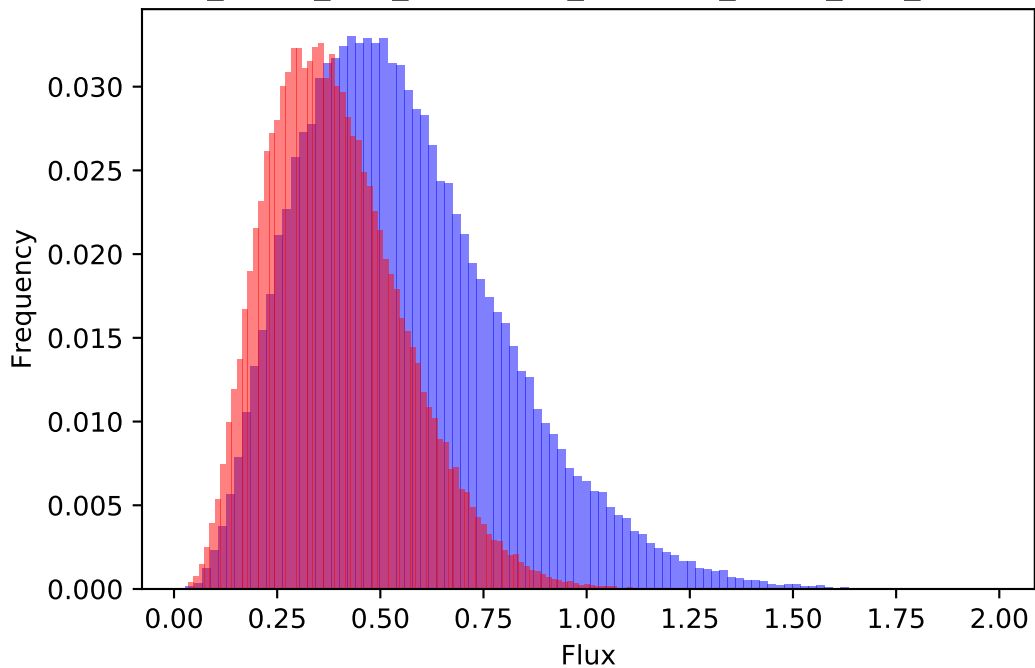
**\*\*237 : Cys\_h + PH\_DASH\_Ser\_h --> CTH\_h + Pi\_h\*\***



**\*\*238 : CTH\_h + H2O\_h --> H\_DASH\_Cys\_h + NH4\_h + Pyr\_h\*\***

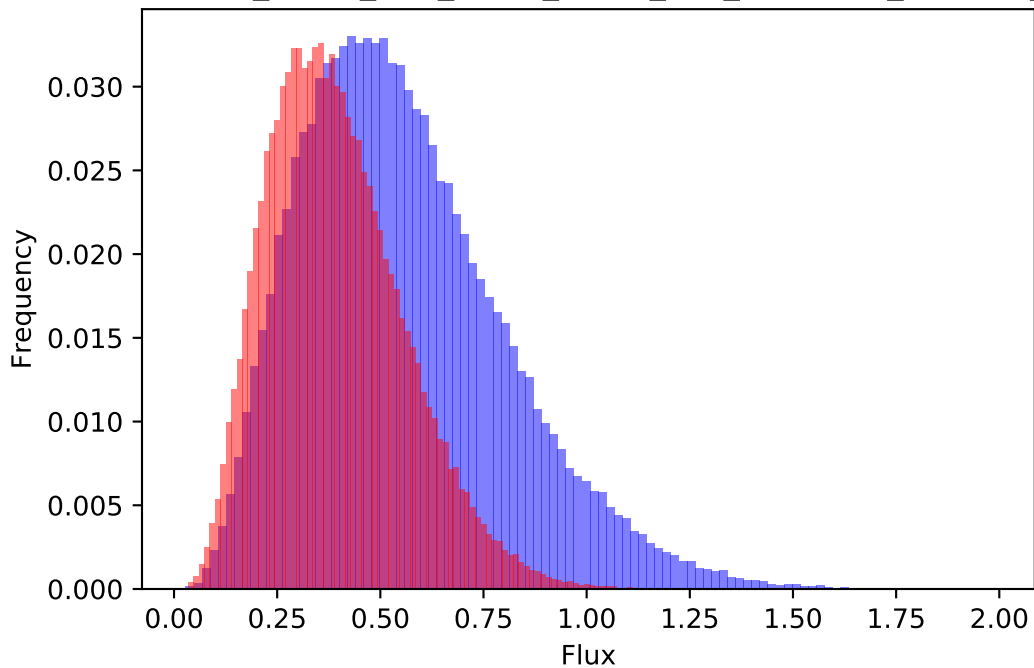


**\*\*239 : M\_DASH\_THF\_c + NADH\_c --> 5M\_DASH\_THF\_c + NAD\_c\*\***

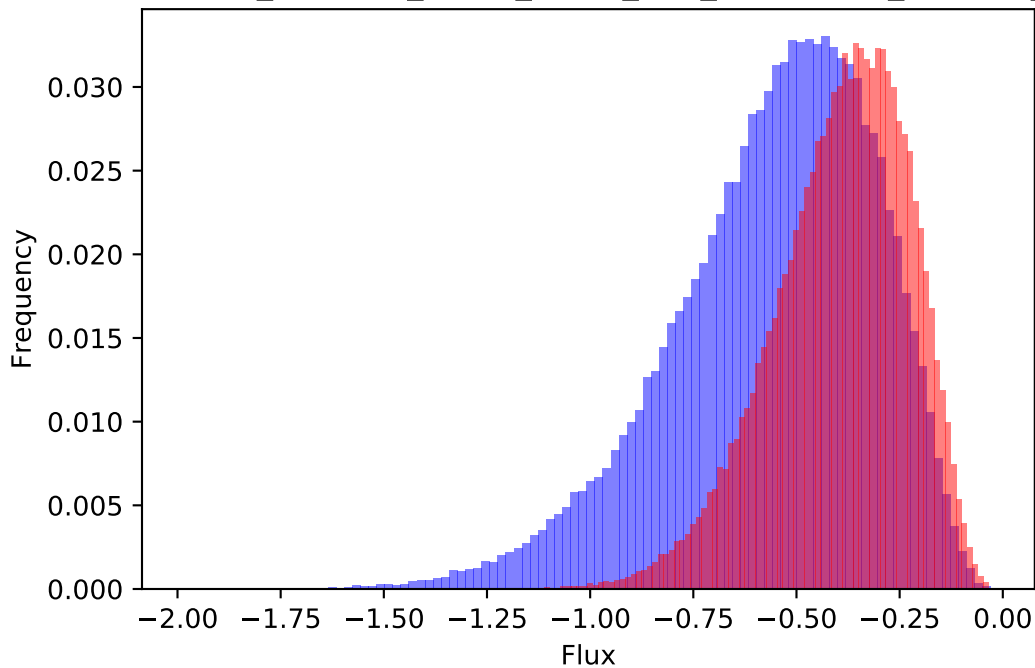




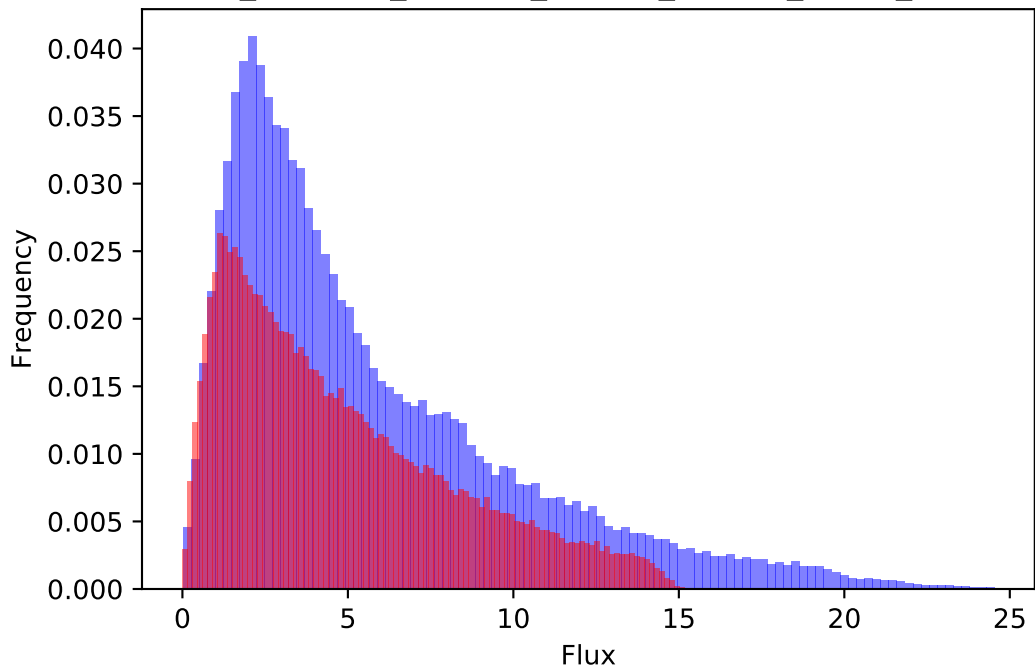
**\*\*240 : 5M\_DASH\_THF\_c + H\_DASH\_Cys\_c --> Met\_c + THF\_c\*\***



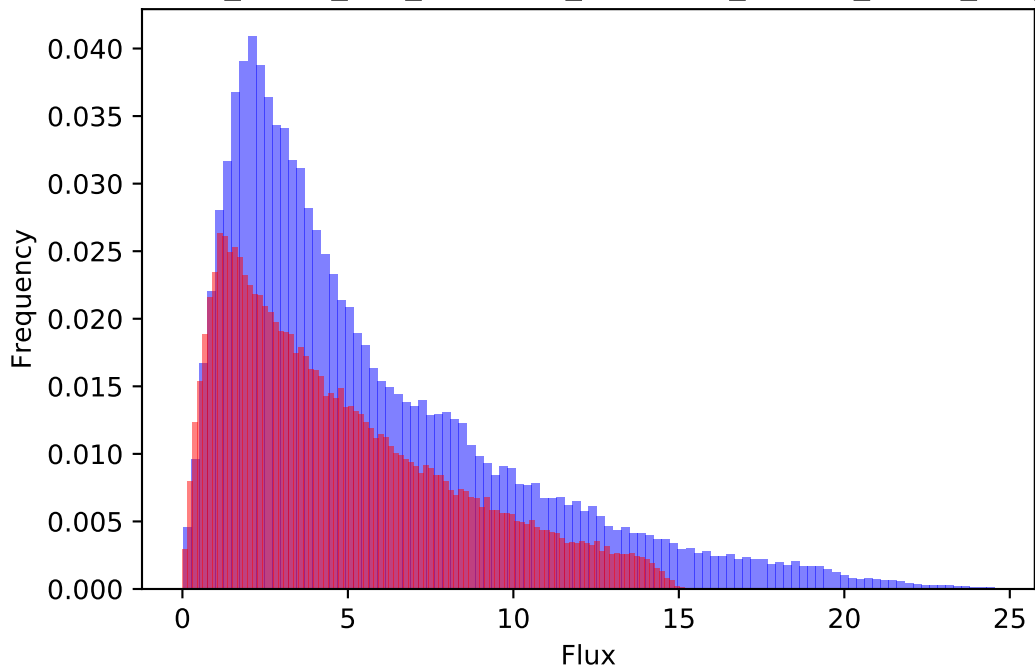
**\*\*241 : Gly\_c + H2O\_c + M\_DASH\_THF\_c <=> Ser\_c + THF\_c\*\***



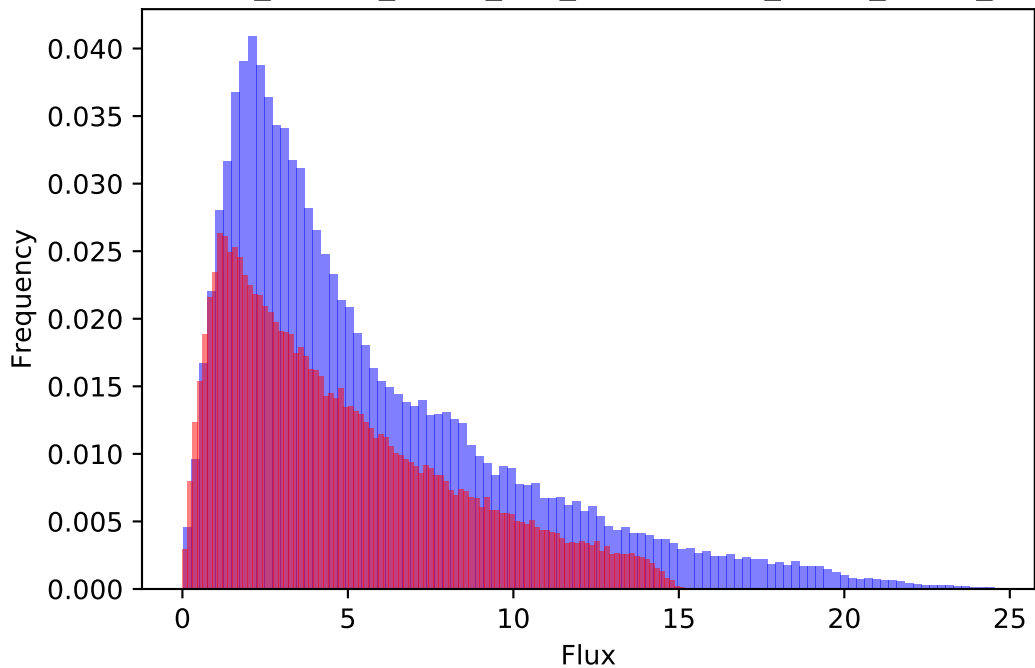
**\*\*242 : ATP\_c + H2O\_c + Met\_c --> H\_c + PPI\_c + Pi\_c + aMet\_c\*\***



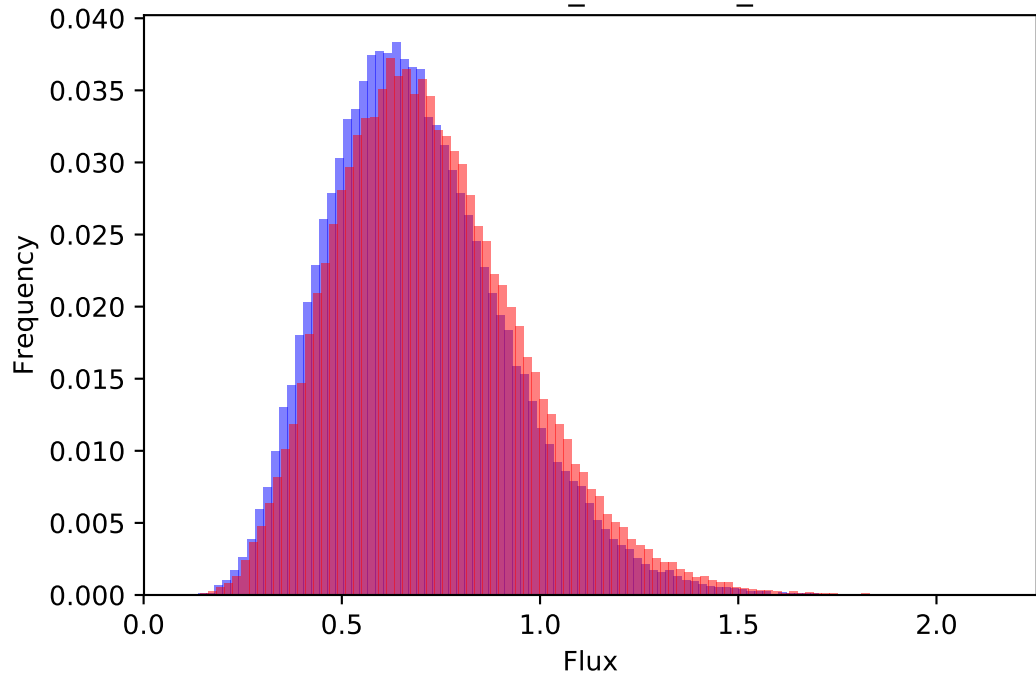
**\*\*243 : H\_DASH\_Cys\_c + aMet\_c --> Met\_c + aH\_DASH\_Cys\_c\*\***



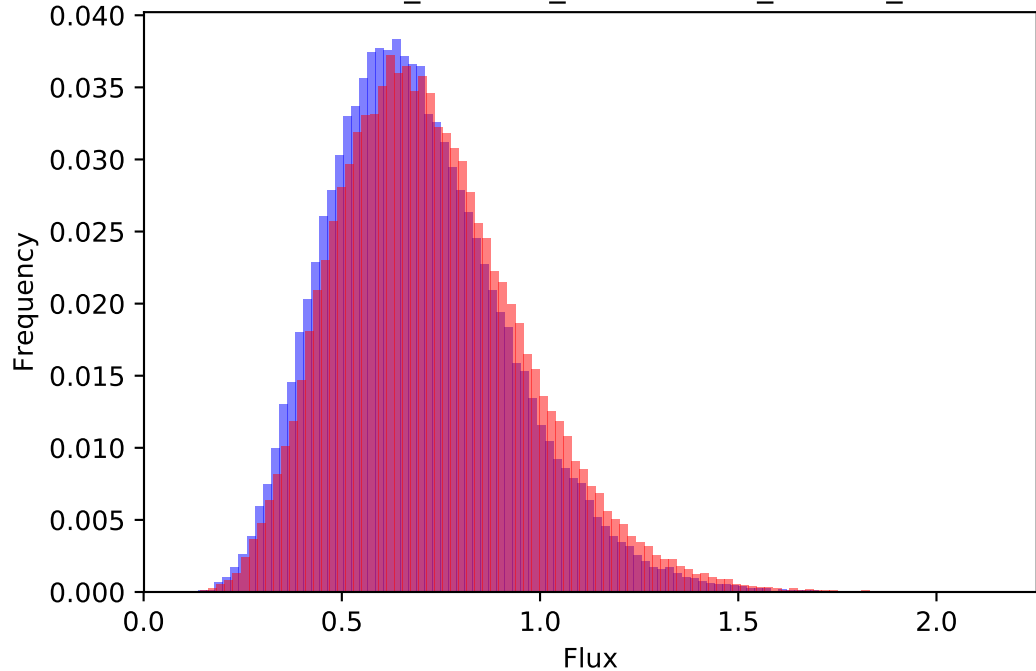
**\*\*244 : H2O\_c + aH\_DASH\_Cys\_c <=> ADN\_c + H\_DASH\_Cys\_c\*\***



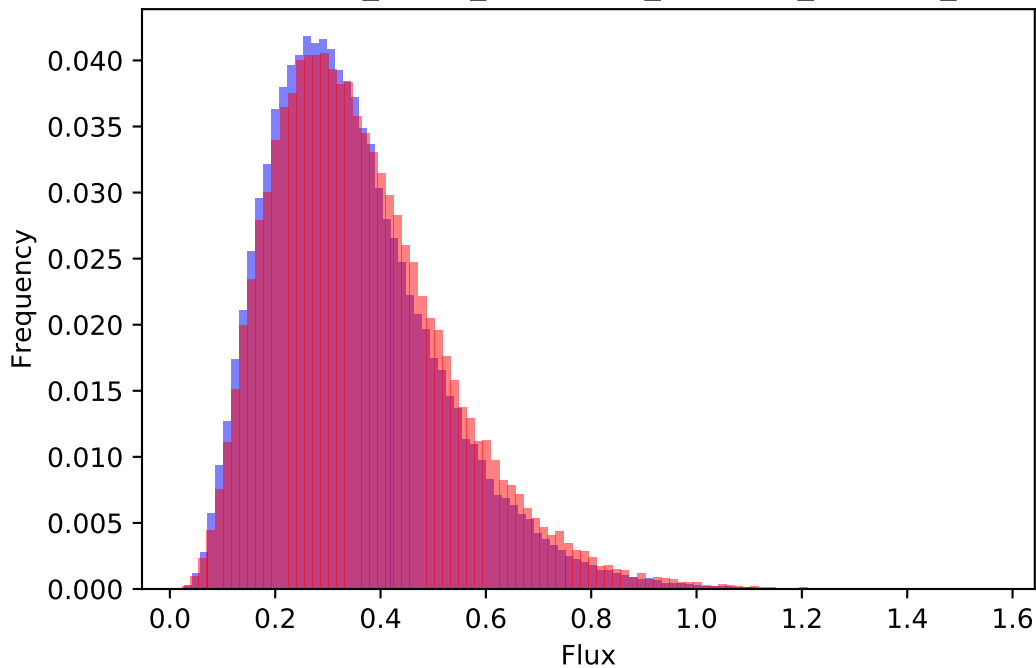
**\*\*245 : CHR\_h --> PRE\_h\*\***



**\*\*246 : Glu\_h + PRE\_h <=> AGN\_h + KG\_h\*\***

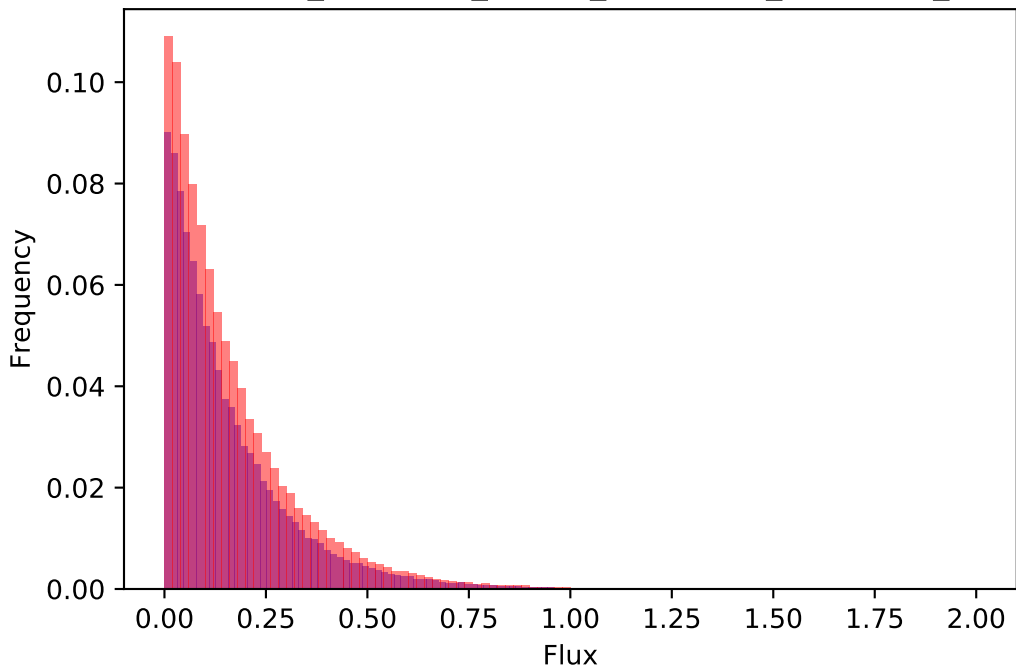


**\*\*247 : AGN\_h + H\_h --> CO2\_h + H2O\_h + Phe\_h\*\***

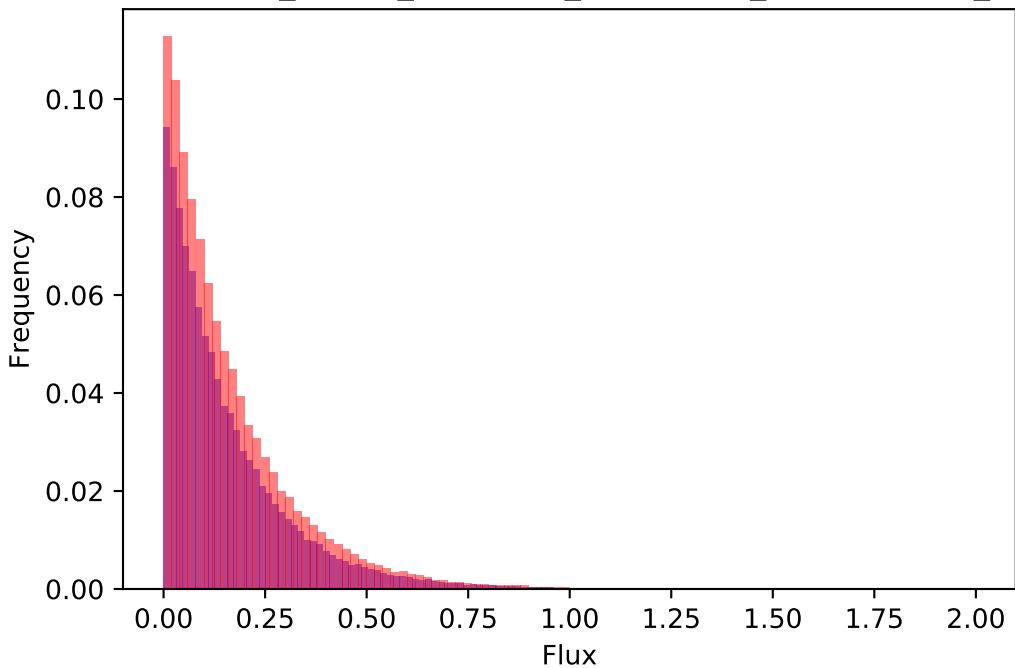




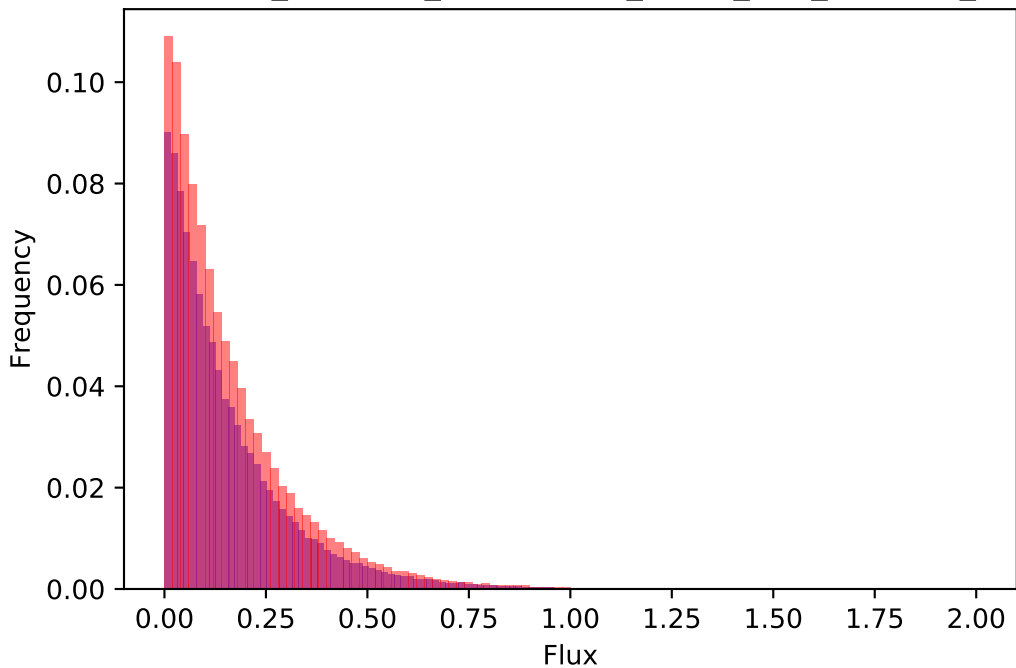
**\*\*248 : Arg\_m + H2O\_m + H\_m --> Orn\_m + urea\_m\*\***



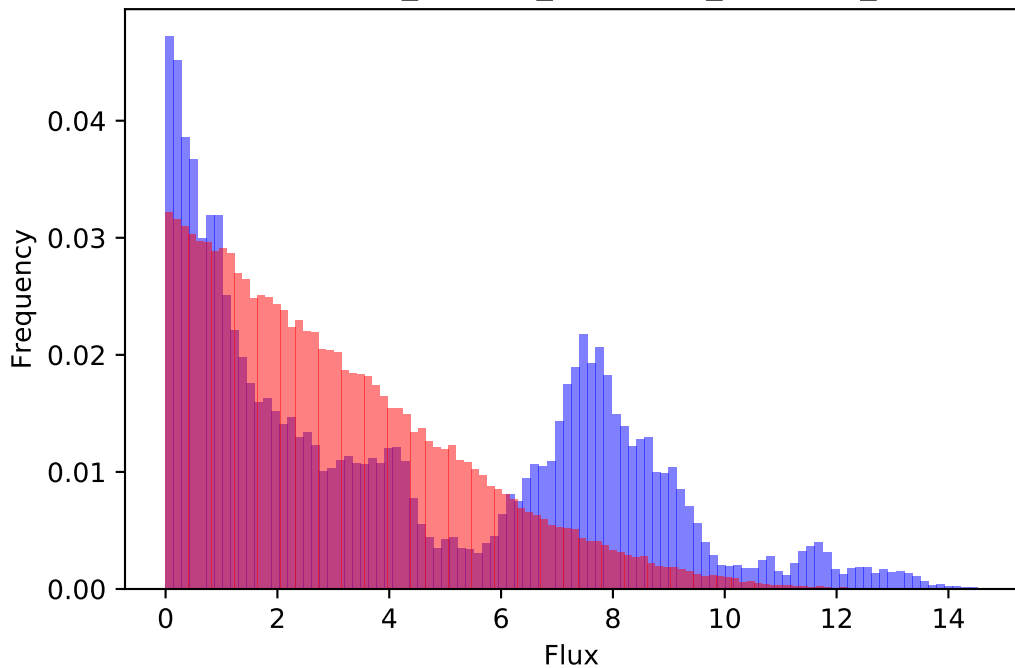
**\*\*249 : H2O\_m + H\_m + urea\_m --> CO2\_m + 2.0 NH4\_m\*\***



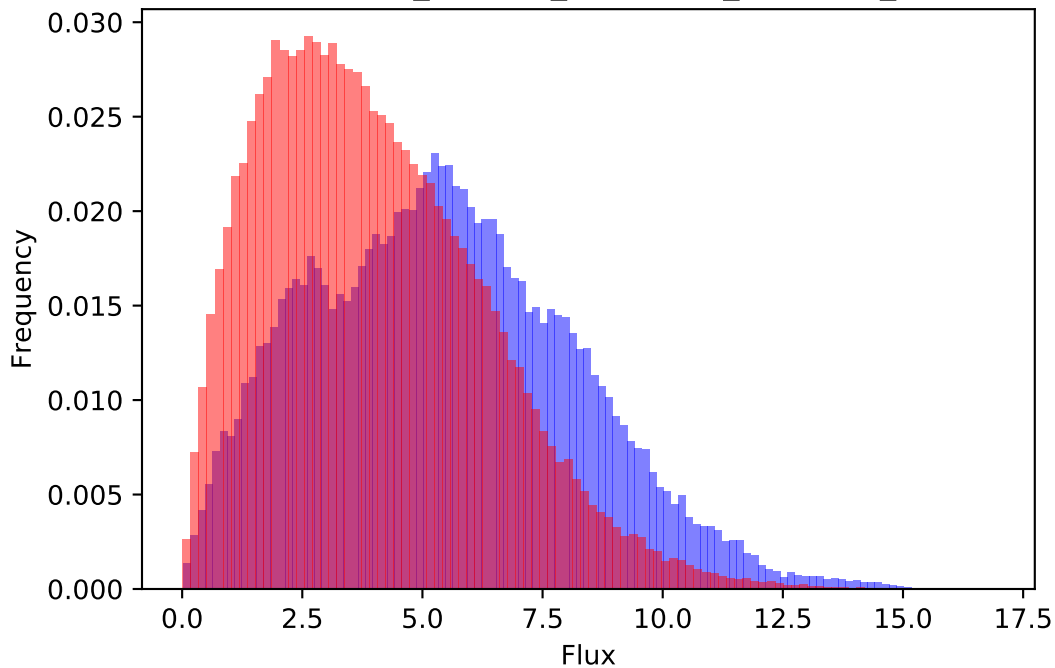
**\*\*250 : KG\_m + Orn\_m <=> Glu\_DASH\_SeA\_m + Glu\_m\*\***



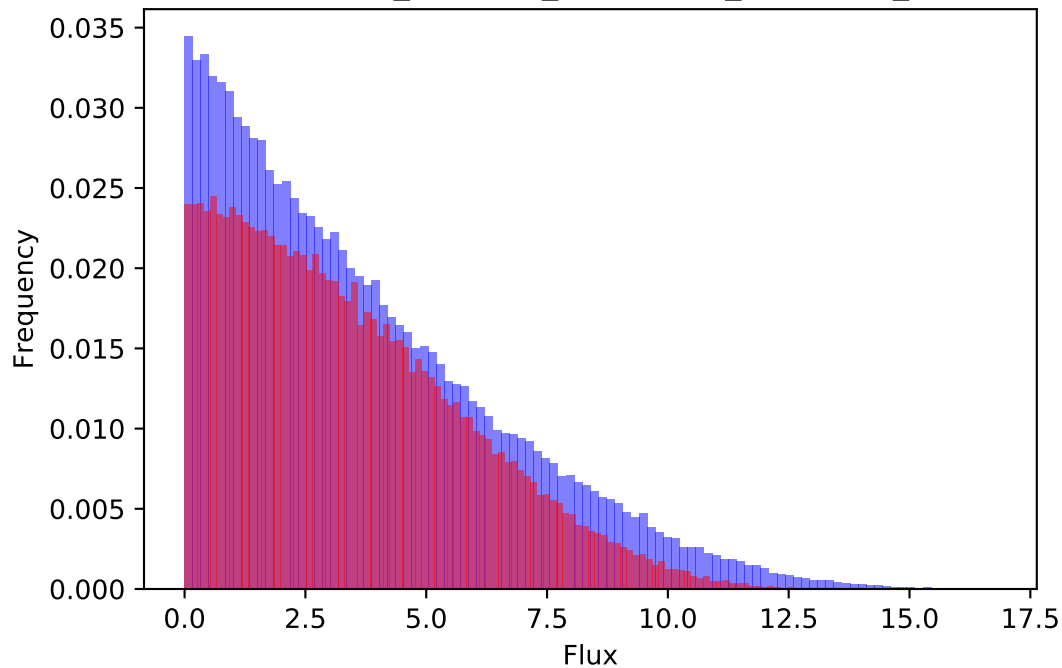
**\*\*251 : ATP\_c + Glu\_c --> ADP\_c + GluP\_c\*\***



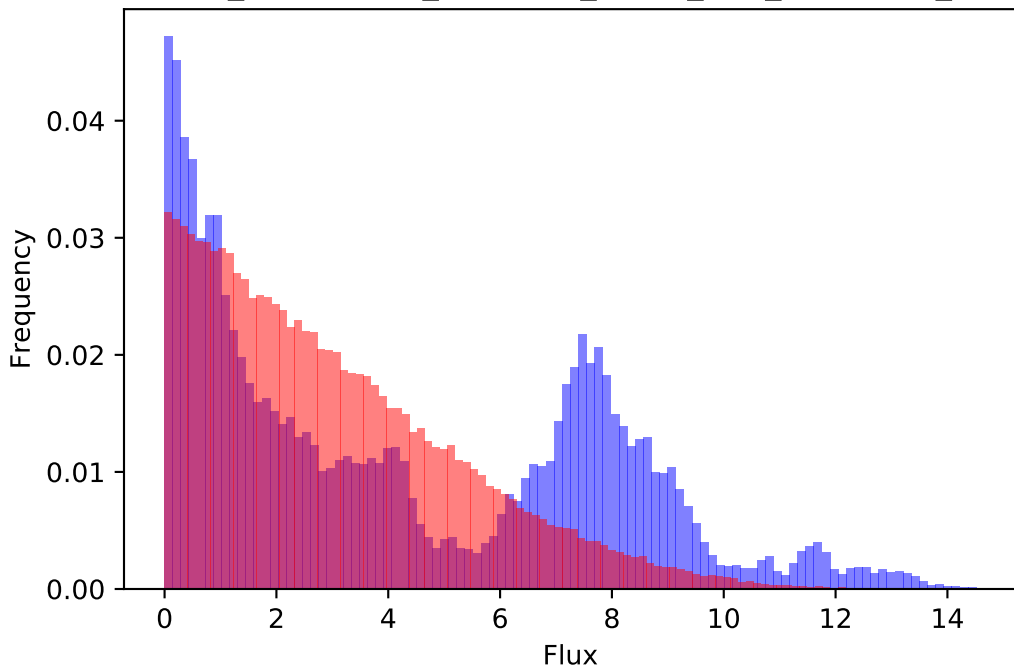
**\*\*252 : ATP\_h + Glu\_h --> ADP\_h + GluP\_h\*\***



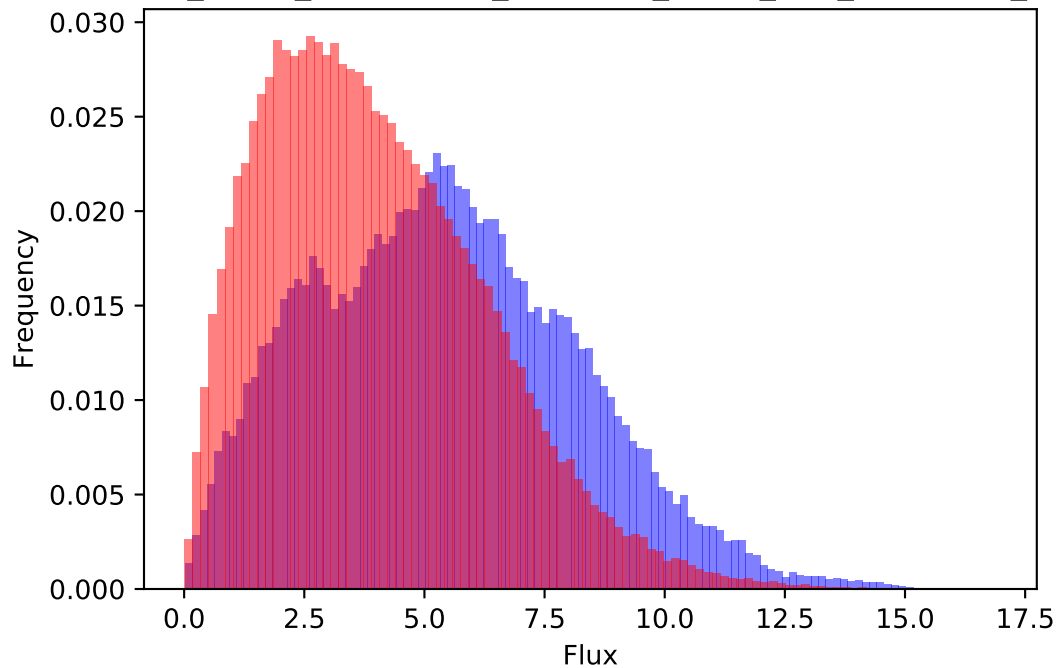
**\*\*253 : ATP\_m + Glu\_m --> ADP\_m + GluP\_m\*\***



**\*\*254 : GluP\_c + NADPH\_c --> Glu\_DASH\_SeA\_c + NADP\_c + Pi\_c\*\***

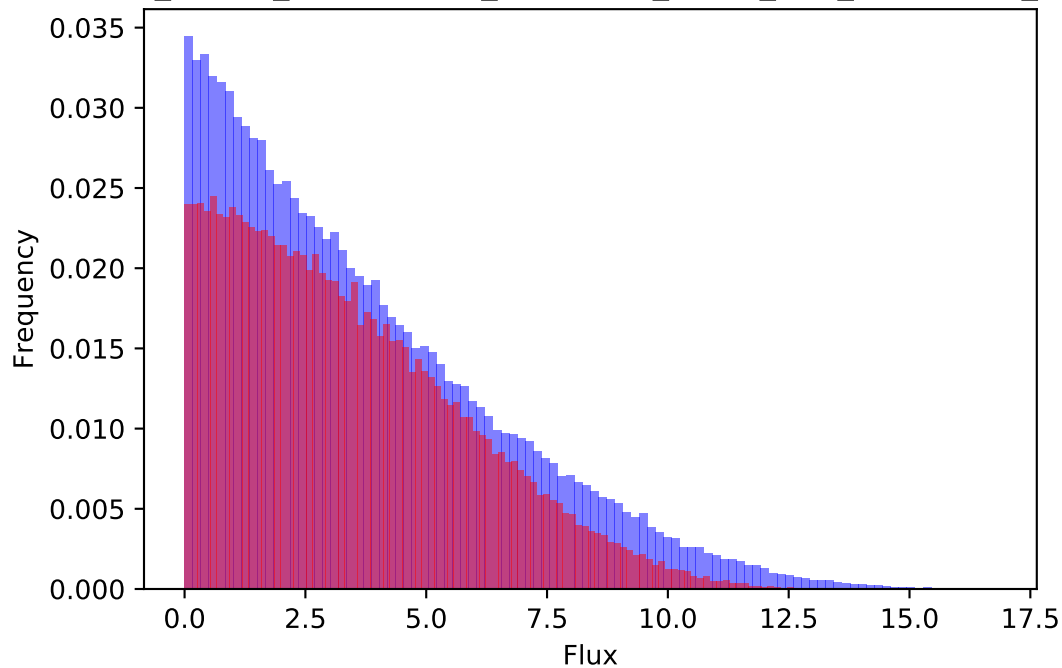


\*255 : GluP\_h + H\_h + NADPH\_h --> Glu\_DASH\_SeA\_h + NADP\_h + Pi\_h

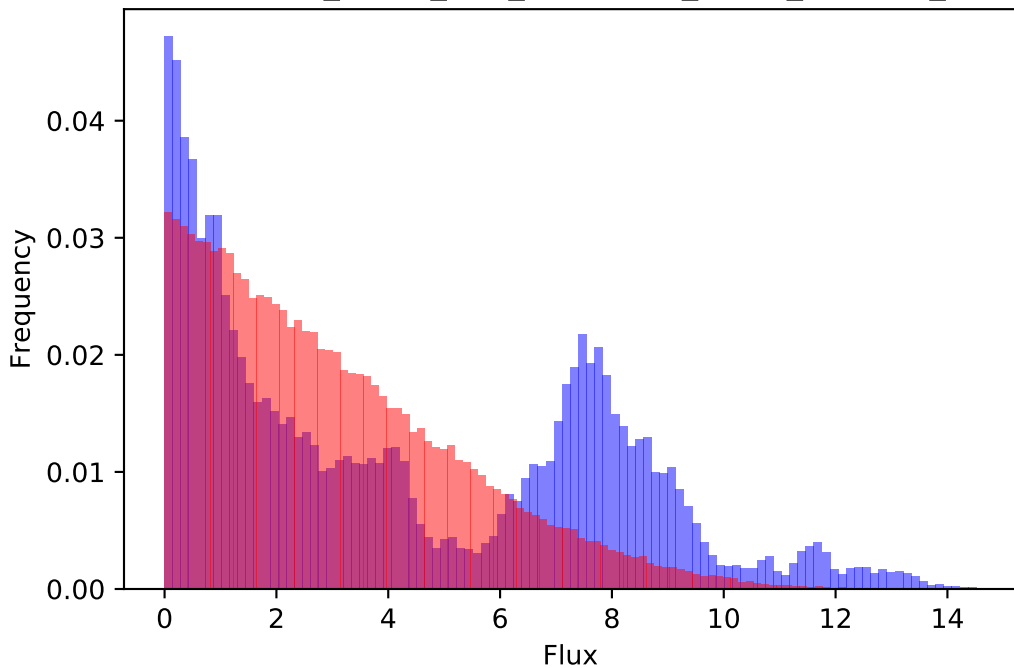




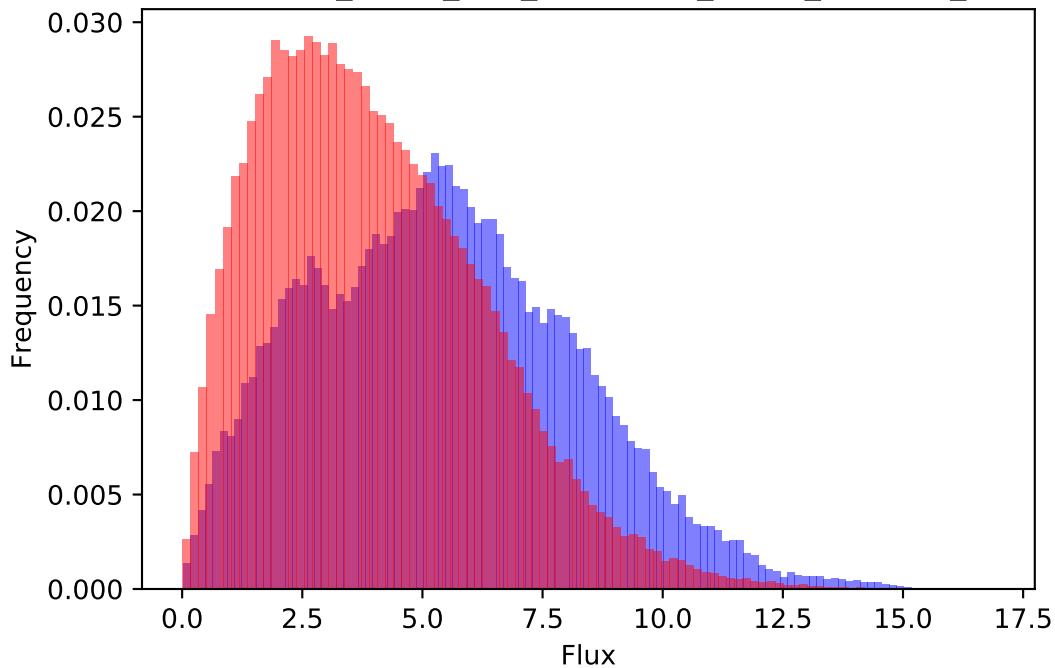
256 : GluP\_m + H\_m + NADPH\_m --> Glu\_DASH\_SeA\_m + NADP\_m + Pi\_m



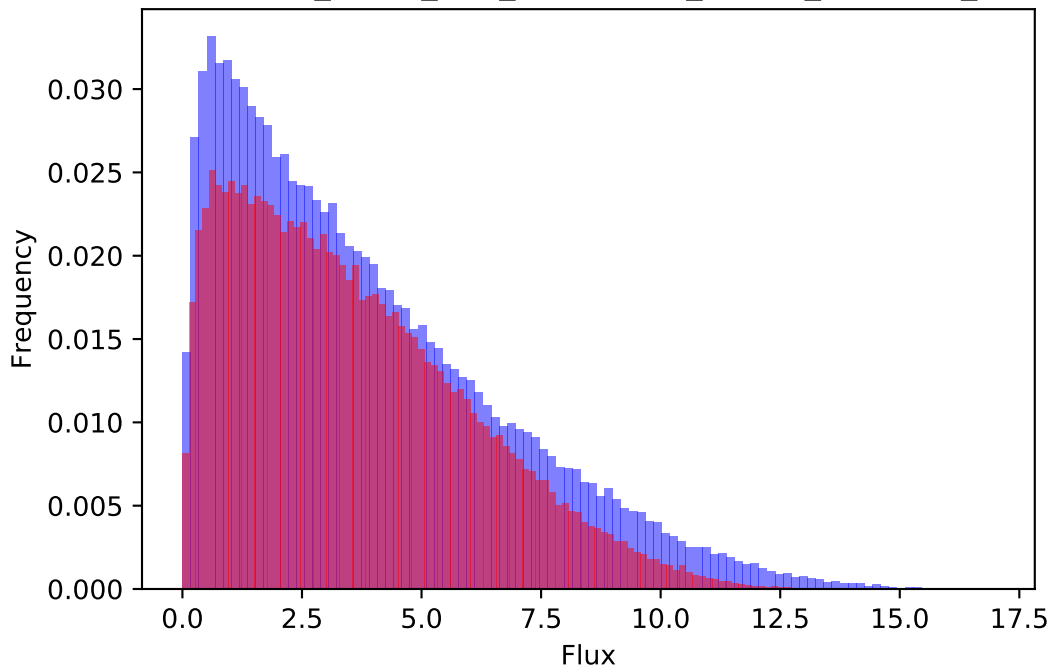
**\*\*257 : Glu\_DASH\_SeA\_c --> H2O\_c + H\_c + P5C\_c\*\***



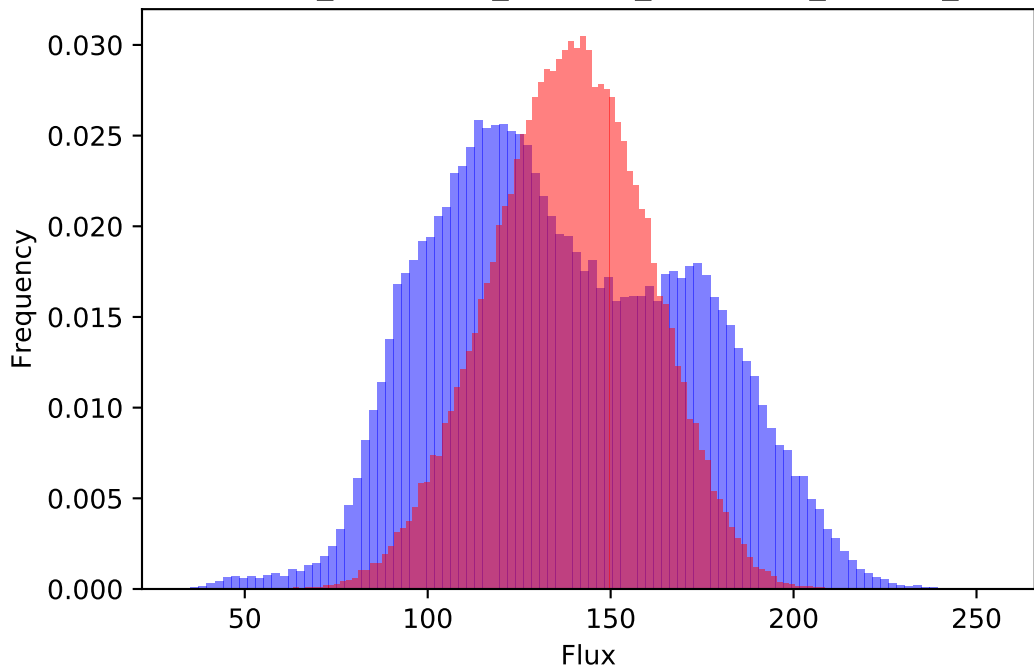
**\*\*258 : Glu\_DASH\_SeA\_h --> H2O\_h + H\_h + P5C\_h\*\***



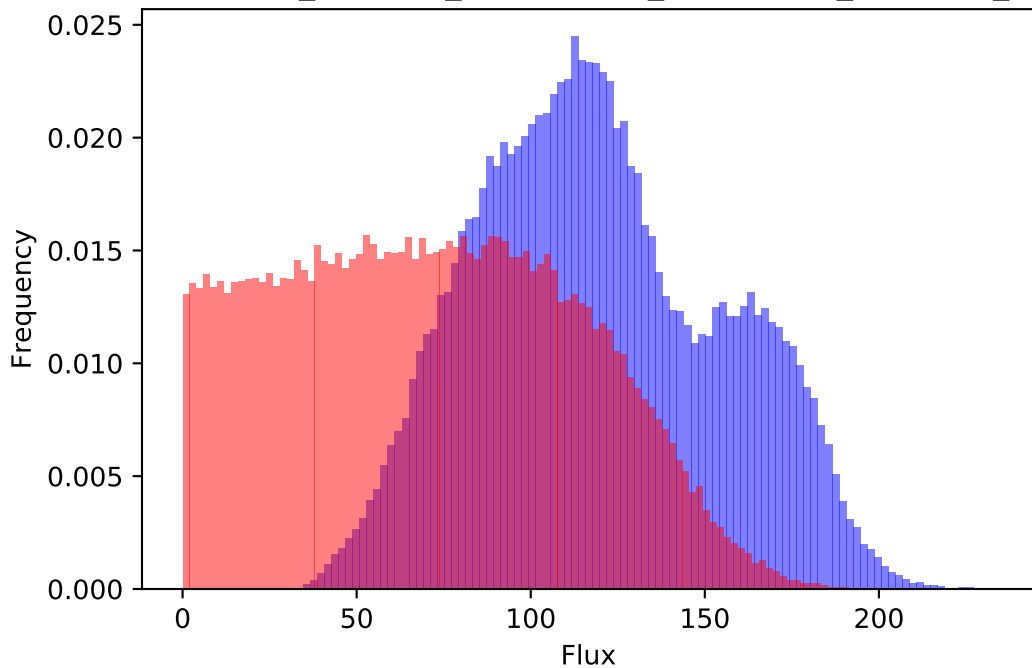
**\*\*259 : Glu\_DASH\_SeA\_m --> H2O\_m + H\_m + P5C\_m\*\***



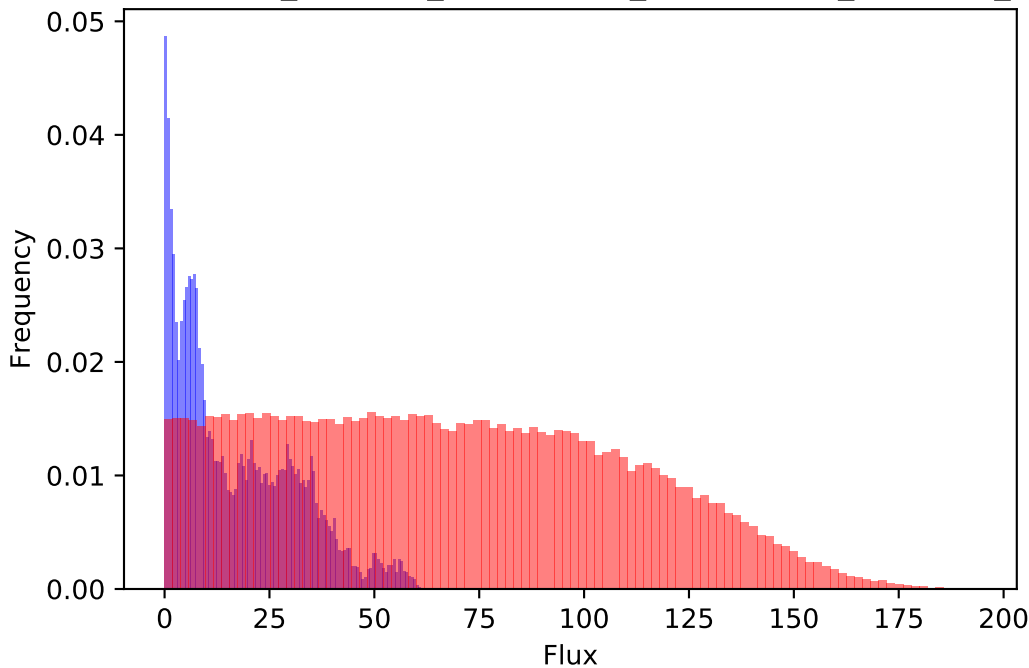
**\*\*260 : H\_c + NADH\_c + P5C\_c --> NAD\_c + Pro\_c\*\***



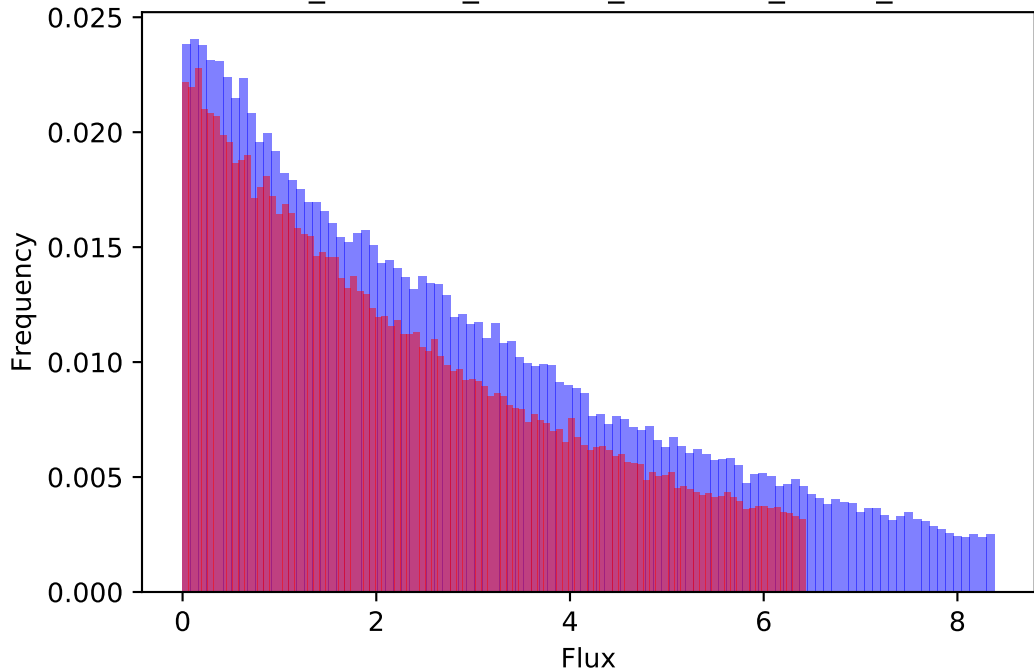
**\*\*261 : NAD\_m + Pro\_m --> 2.0 H\_m + NADH\_m + P5C\_m\*\***



**\*\*262 : NADP\_m + Pro\_m --> 2.0 H\_m + NADPH\_m + P5C\_m\*\***

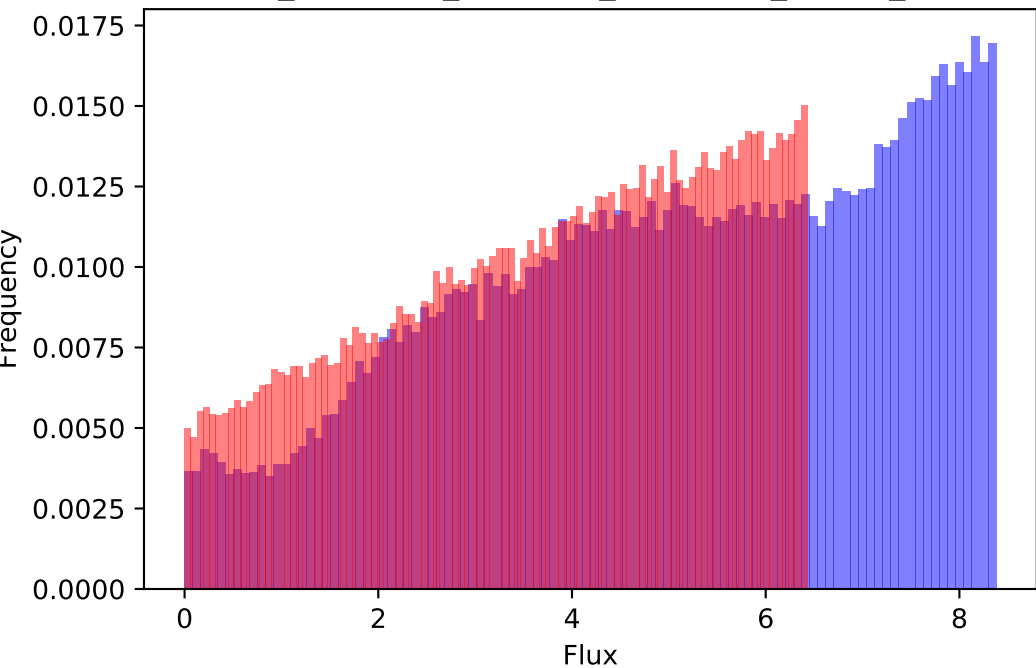


**\*\*263 : 2.0 H2O\_h + NAD\_h + P5C\_h --> Glu\_h + H\_h + NADH\_h\*\***

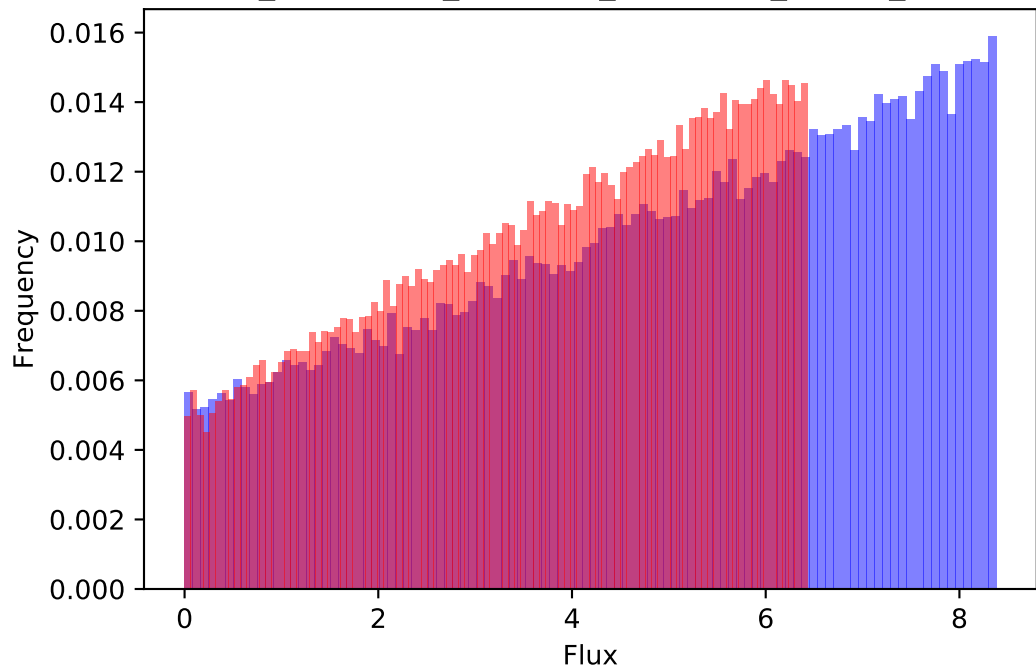




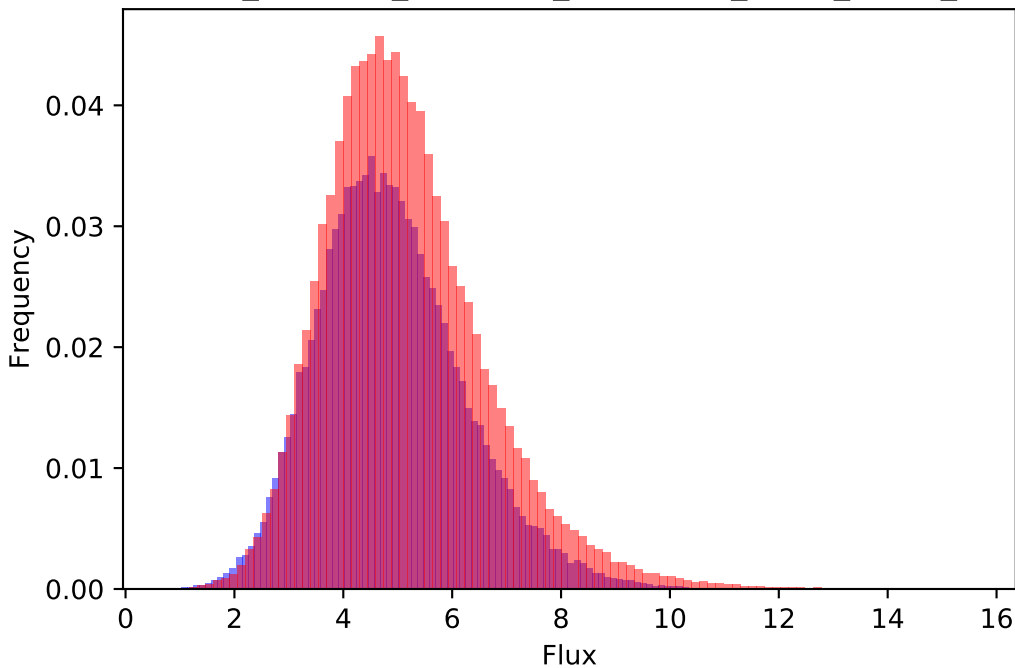
**\*\*264 : 2.0 H2O\_m + NAD\_m + P5C\_m --> Glu\_m + H\_m + NADH\_m\*\***



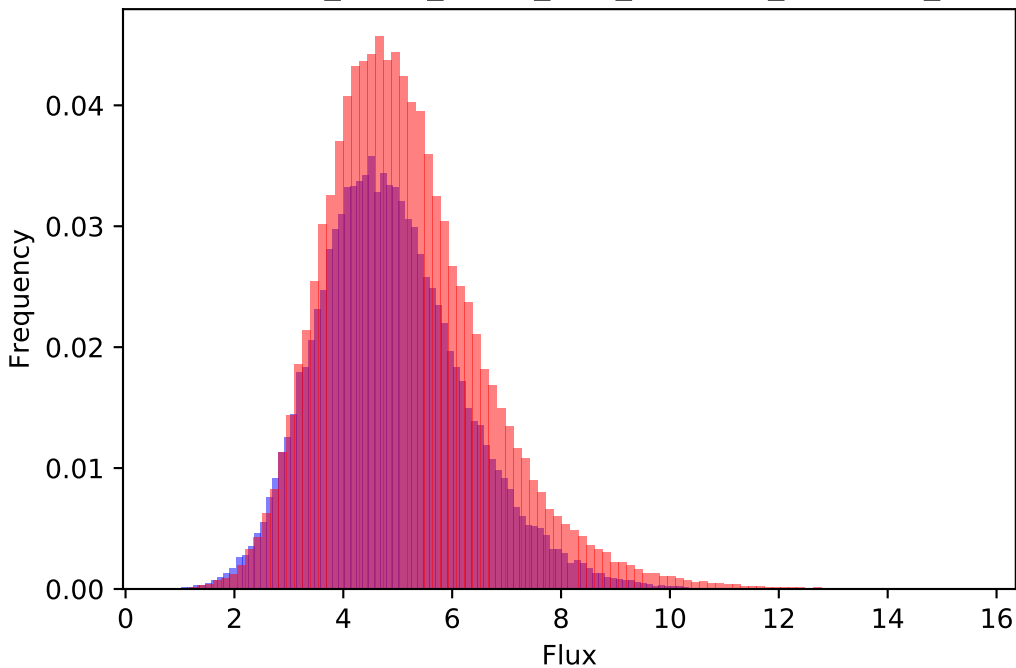
**\*\*265 : 2.0 H2O\_m + NADP\_m + P5C\_m --> Glu\_m + H\_m + NADPH\_m\***



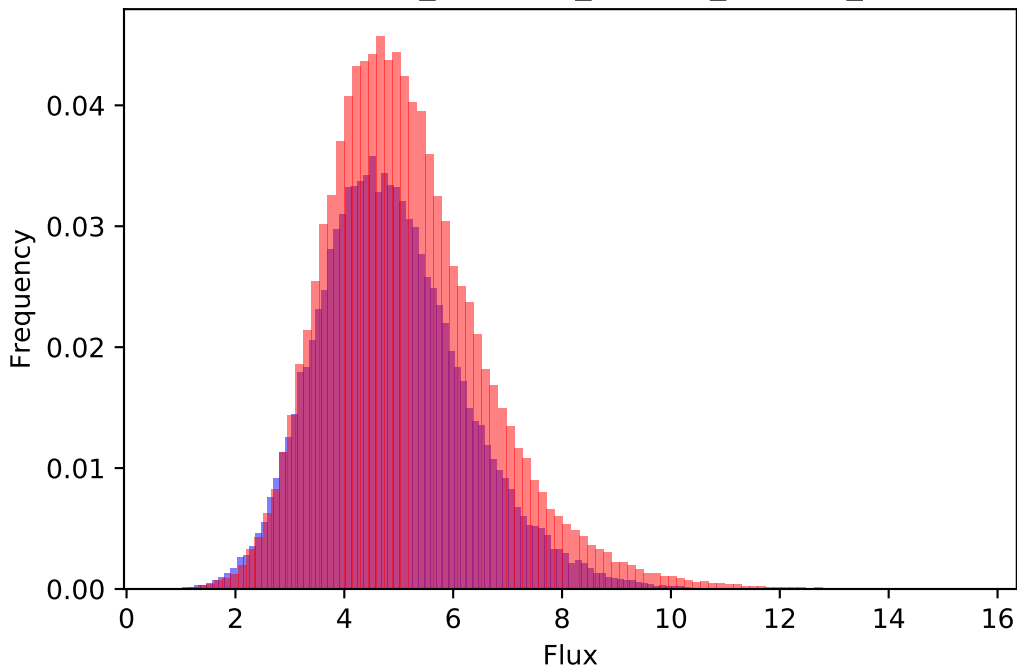
**\*\*266 :  $\text{NAD}_h + \text{PGA}_h \rightleftharpoons \text{H}_h + \text{NADH}_h + \text{P\_DASH\_HPR}_h$  \*\***



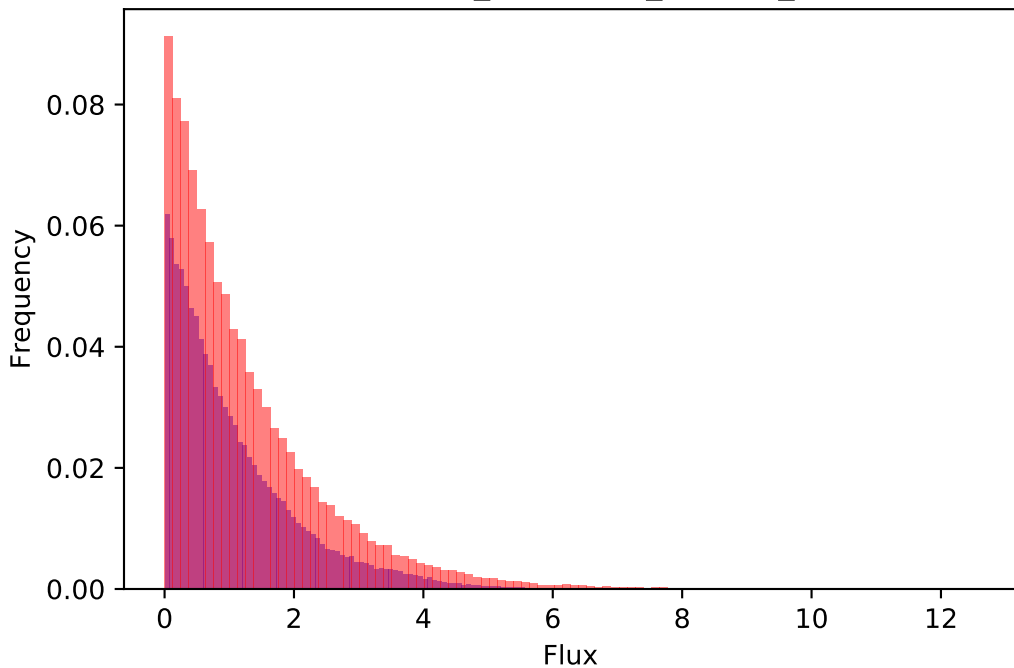
**\*\*267 : Glu\_h + P\_DASH\_HPR\_h --> KG\_h + PSer\_h\*\***



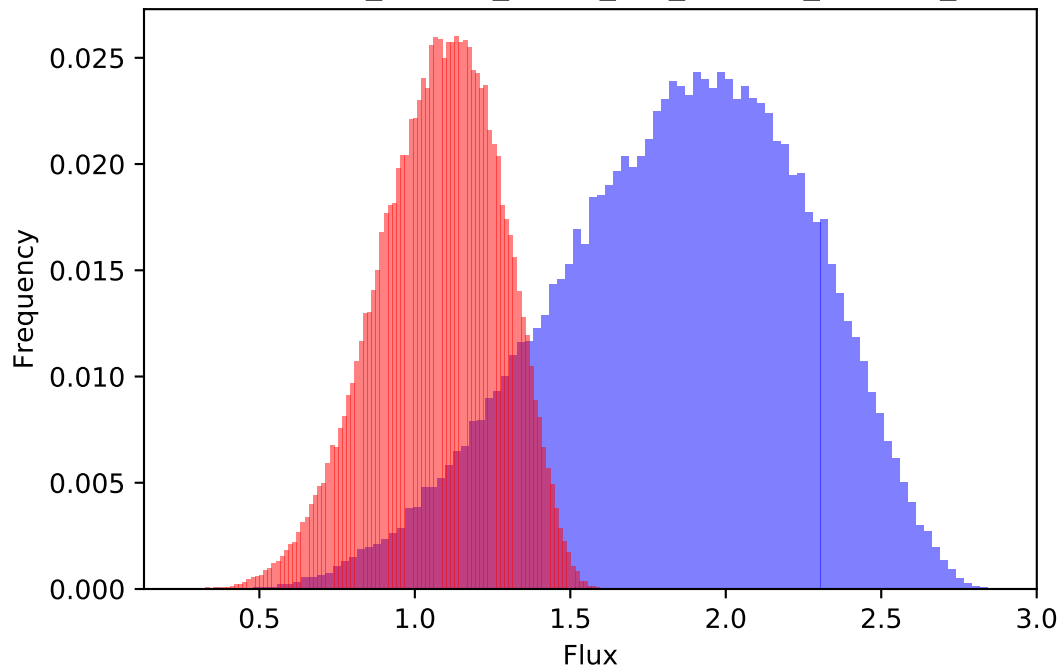
**\*\*268 : H2O\_h + PSer\_h --> Pi\_h + Ser\_h\*\***



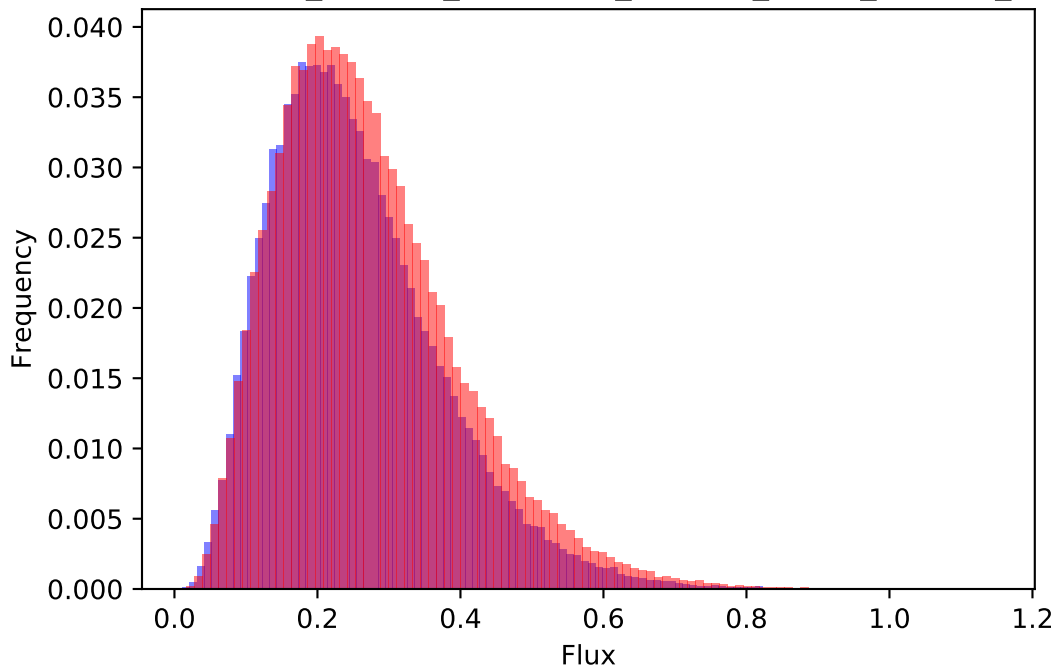
**\*\*269 : Ser\_c --> NH4\_c + Pyr\_c\*\***



**\*\*270 : H2O\_h + PH\_DASH\_Ser\_h --> Pi\_h + Thr\_h\*\***

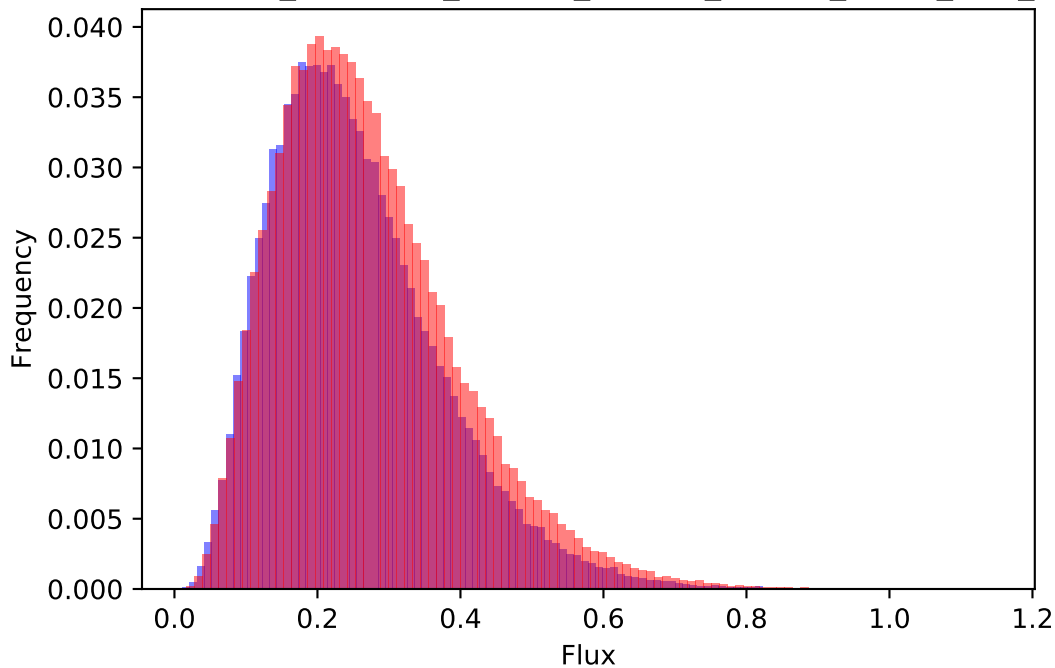


**\*\*271 : CHR\_h + Gln\_h --> ANT\_h + Glu\_h + H\_h + Pyr\_h\*\***

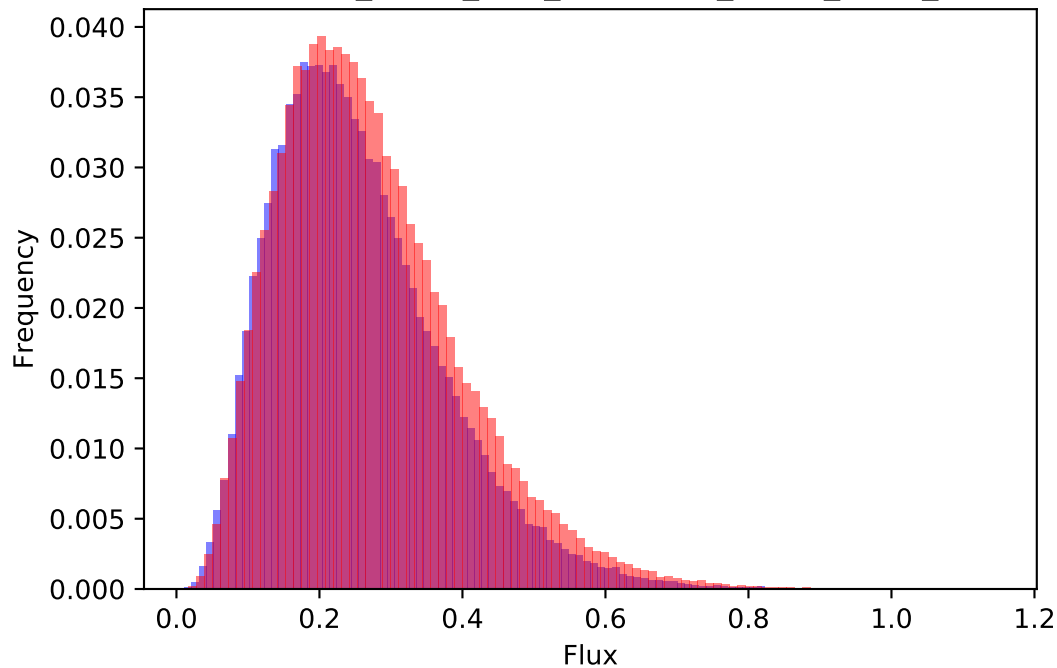




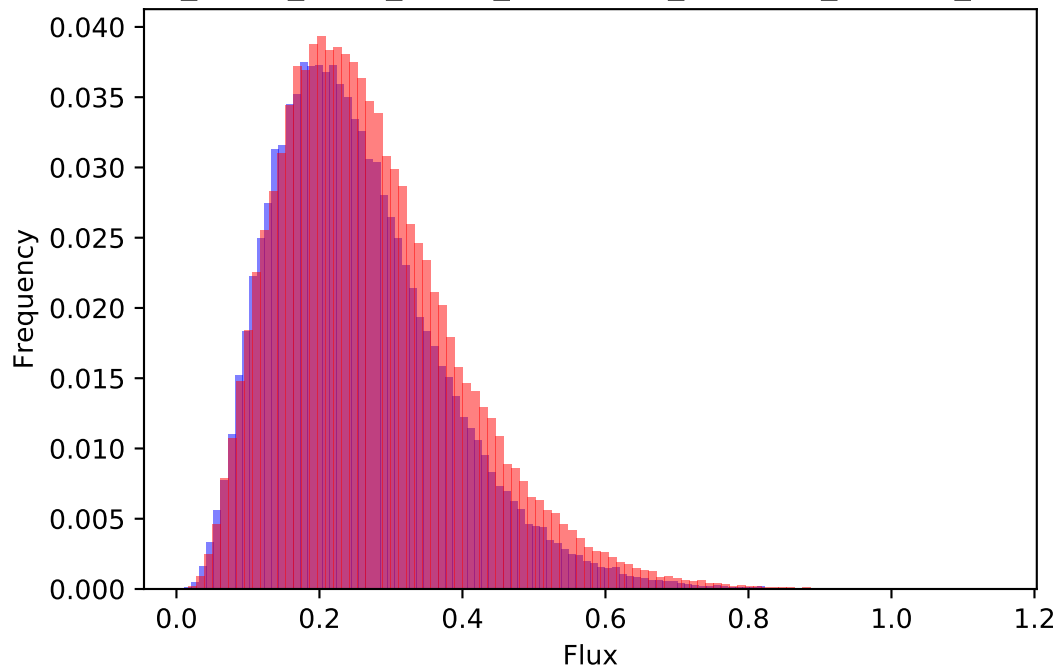
**\*\*272 : ANT\_h + PRPP\_h --> H\_h + PPI\_h + PR\_DASH\_ANT\_h\*\***



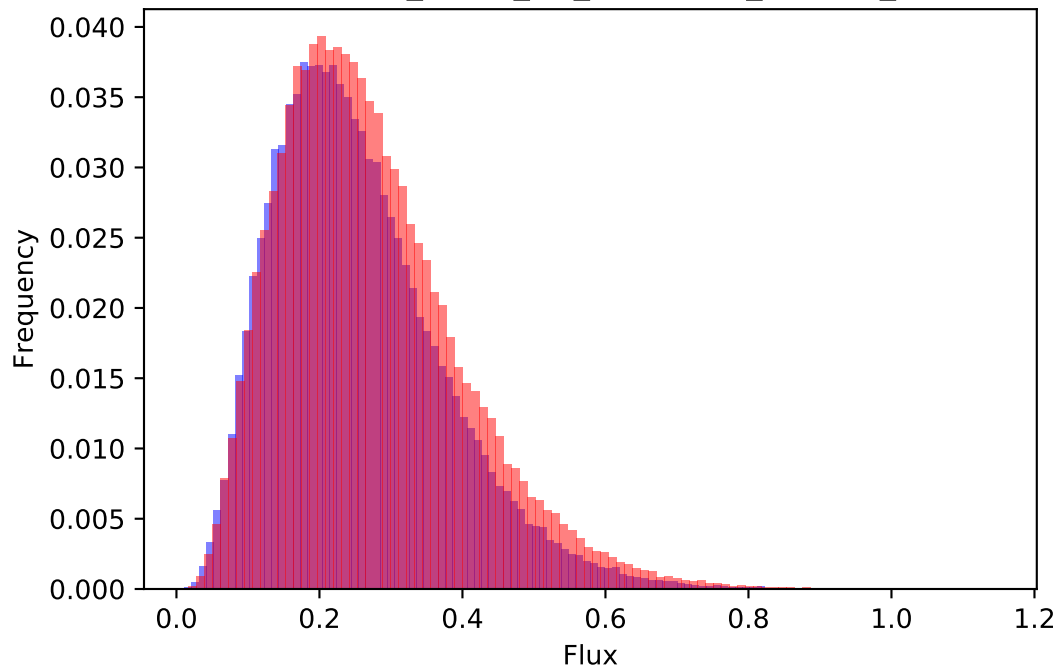
**\*\*273 : PR\_DASH\_ANT\_h --> CPD\_DASH\_Ru5P\_h\*\***



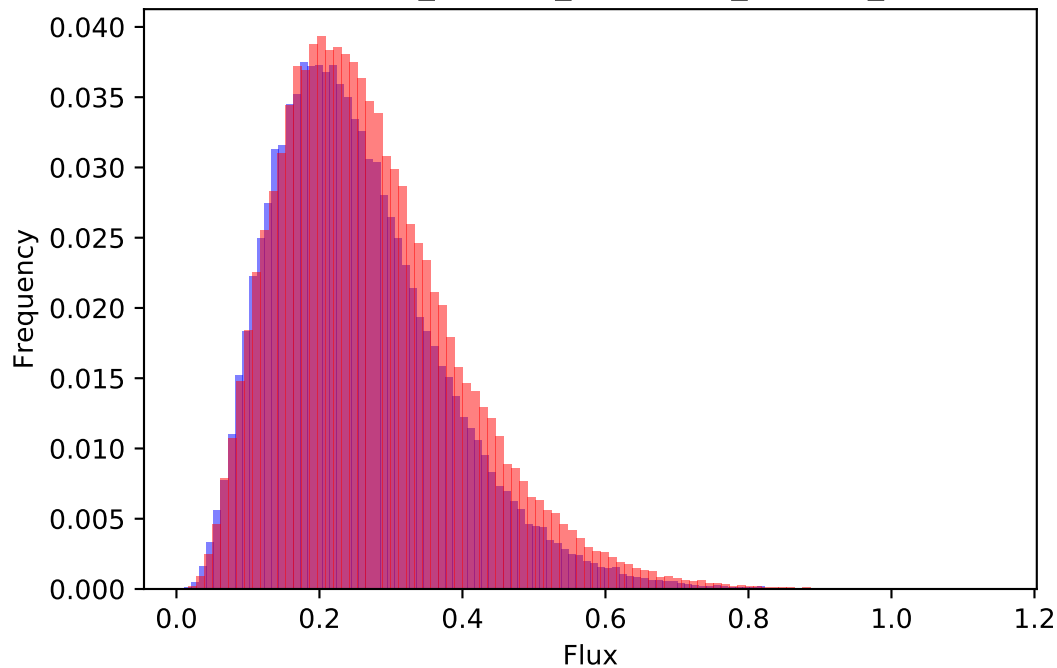
\*274 : CPD\_DASH\_Ru5P\_h + H\_h --> CO2\_h + H2O\_h + Ind\_DASH\_GP\_h



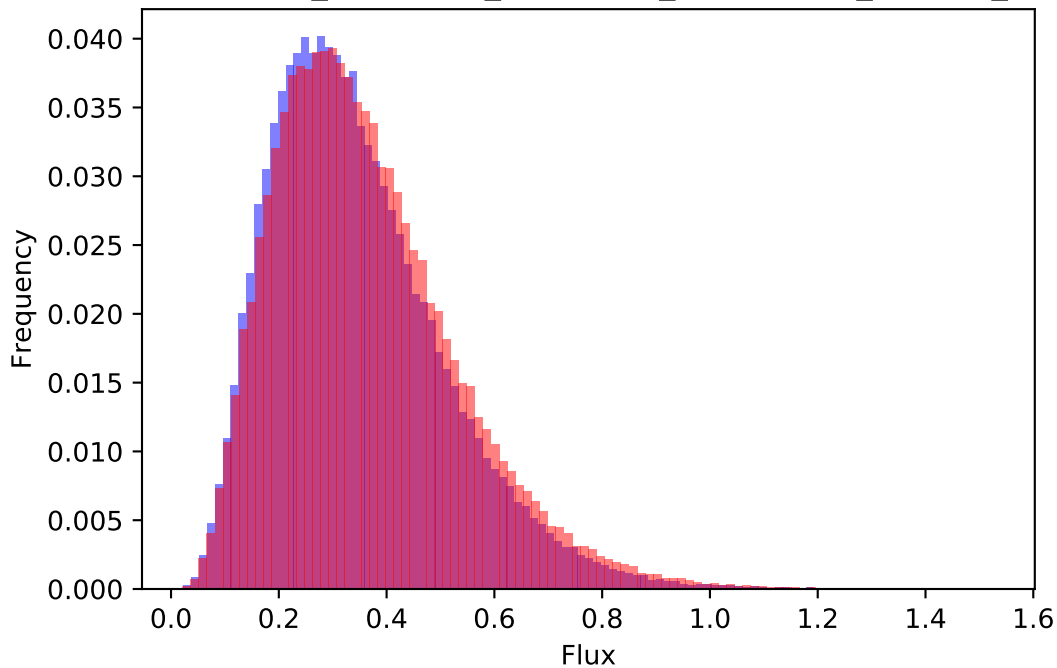
**\*\*275 : Ind\_DASH\_GP\_h --> GAP\_h + Ind\_h\*\***



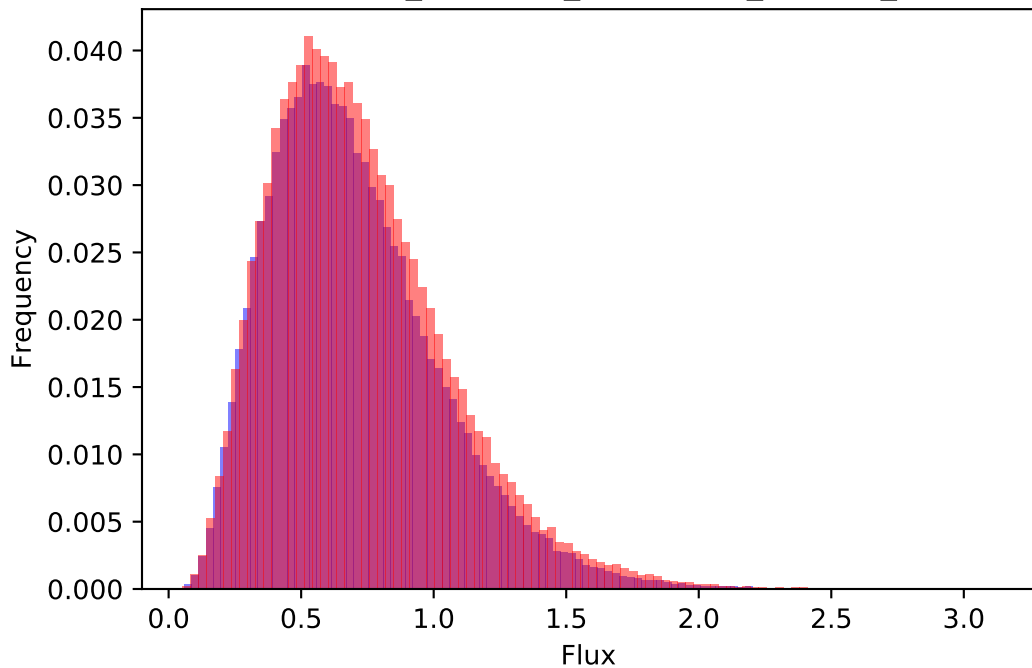
**\*\*276 : Ind\_h + Ser\_h --> H2O\_h + Trp\_h\*\***



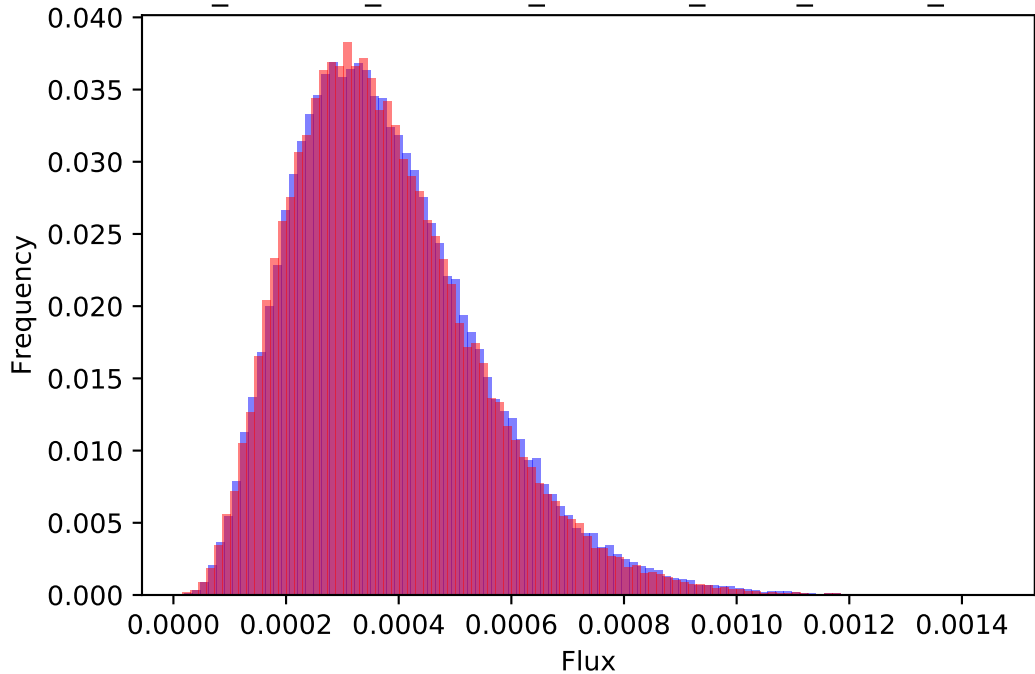
**\*\*277 : AGN\_h + NADP\_h --> CO2\_h + NADPH\_h + Tyr\_h\*\***



**\*\*278 : Glu\_h + MOB\_h <=> KG\_h + Val\_h\*\***

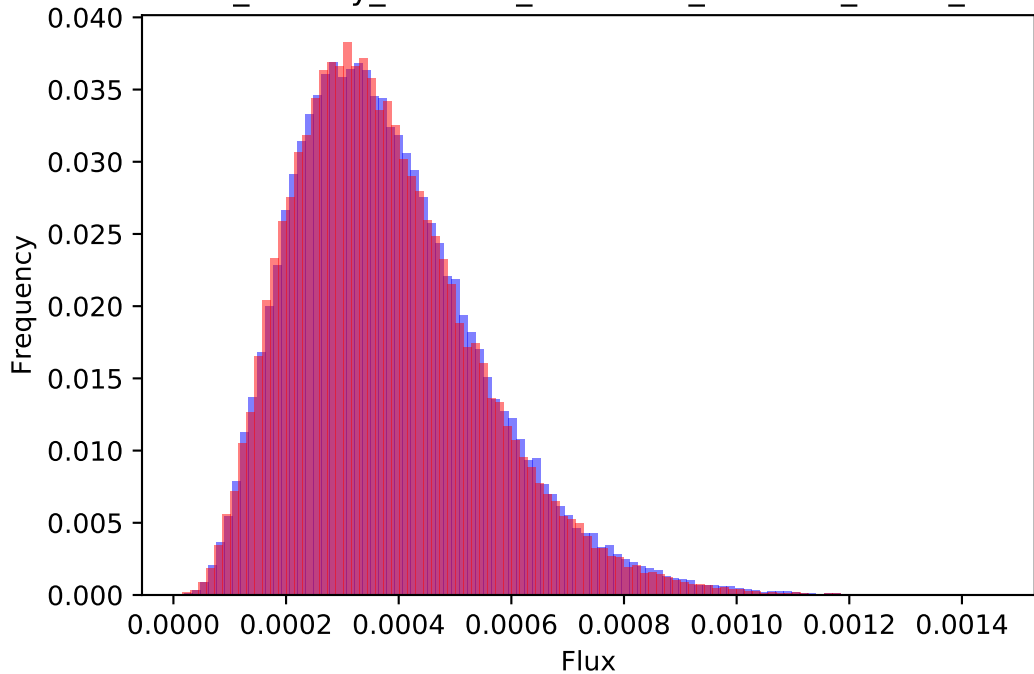


**\*\*279 : Gln\_h + H2O\_h + PRPP\_h --> Glu\_h + H\_h + PPI\_h + PRA\_h\*\***

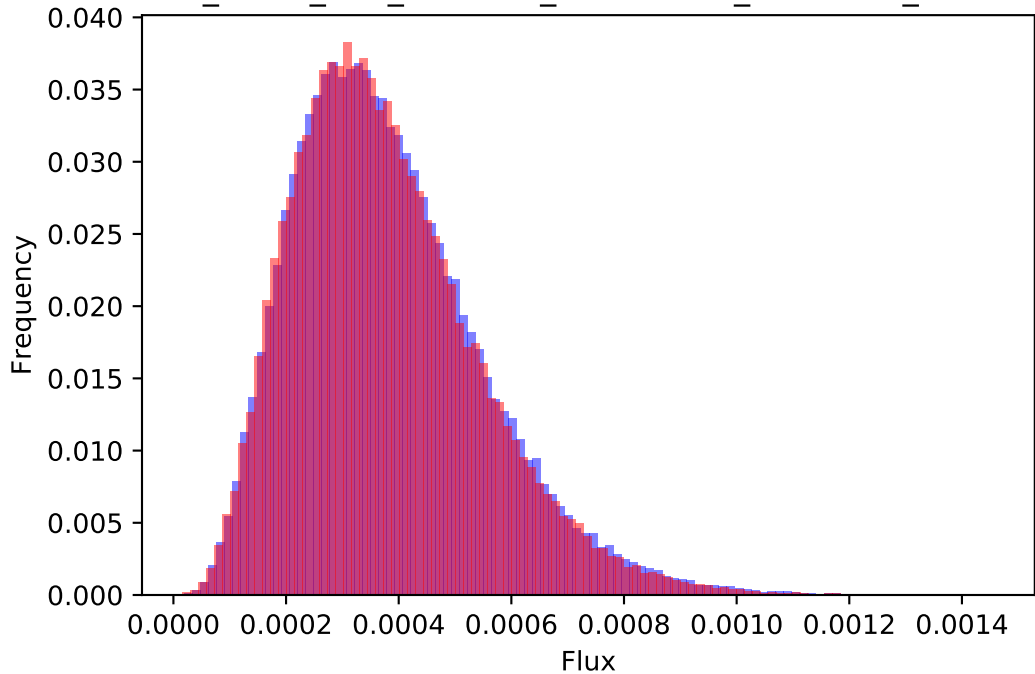




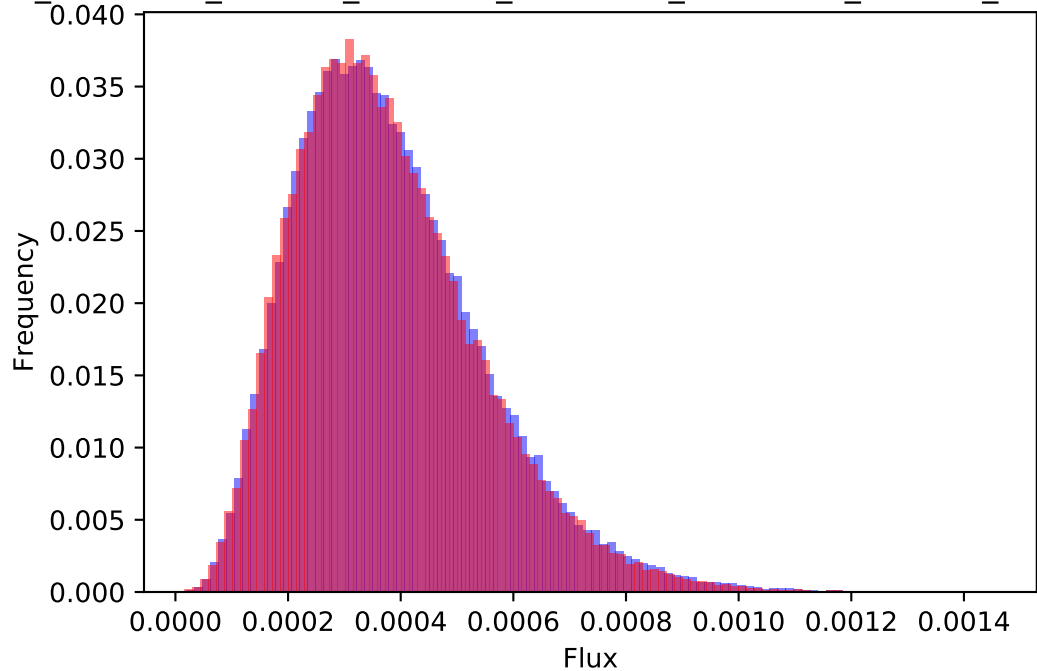
**\*\*280 : ATP\_h + Gly\_h + PRA\_h --> ADP\_h + GAR\_h + H\_h + Pi\_h\*\***



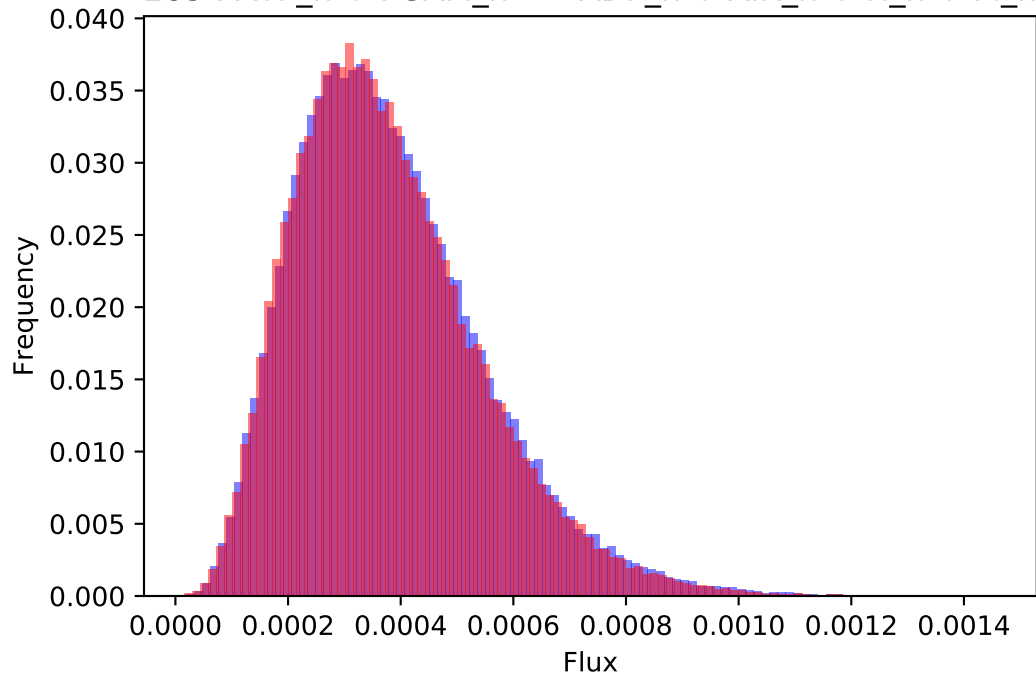
**\*\*281 : F\_DASH\_THF\_h + GAR\_h --> FGAR\_h + 2.0 H\_h + THF\_h\*\***



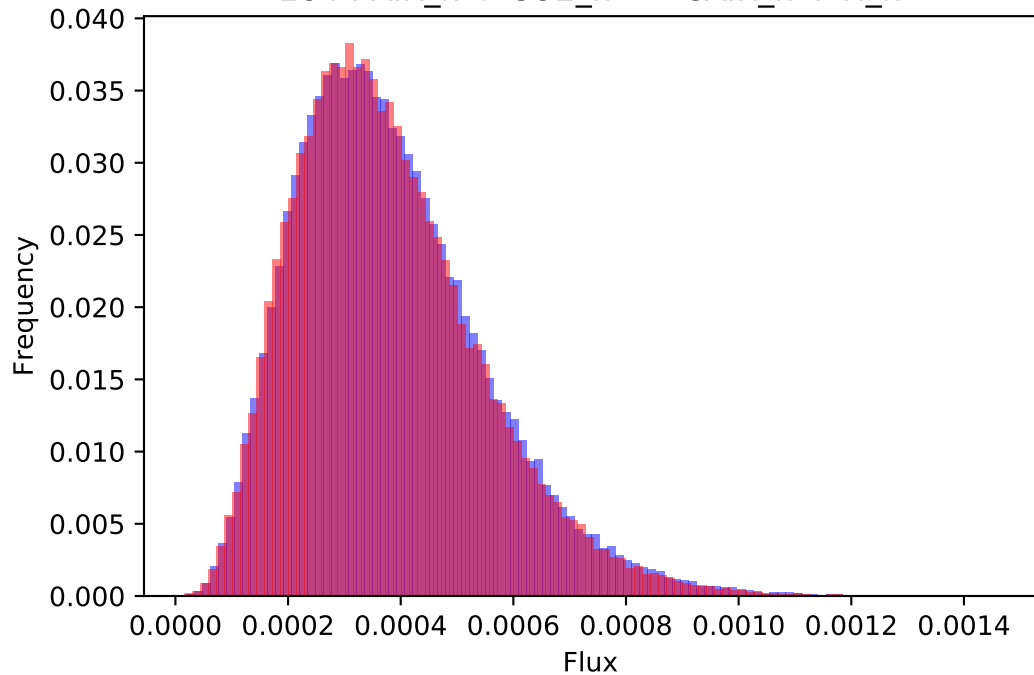
TP\_h + FGAR\_h + Gln\_h + H2O\_h --> ADP\_h + FGAM\_h + Glu\_h + 2.0 H<sub>2</sub>



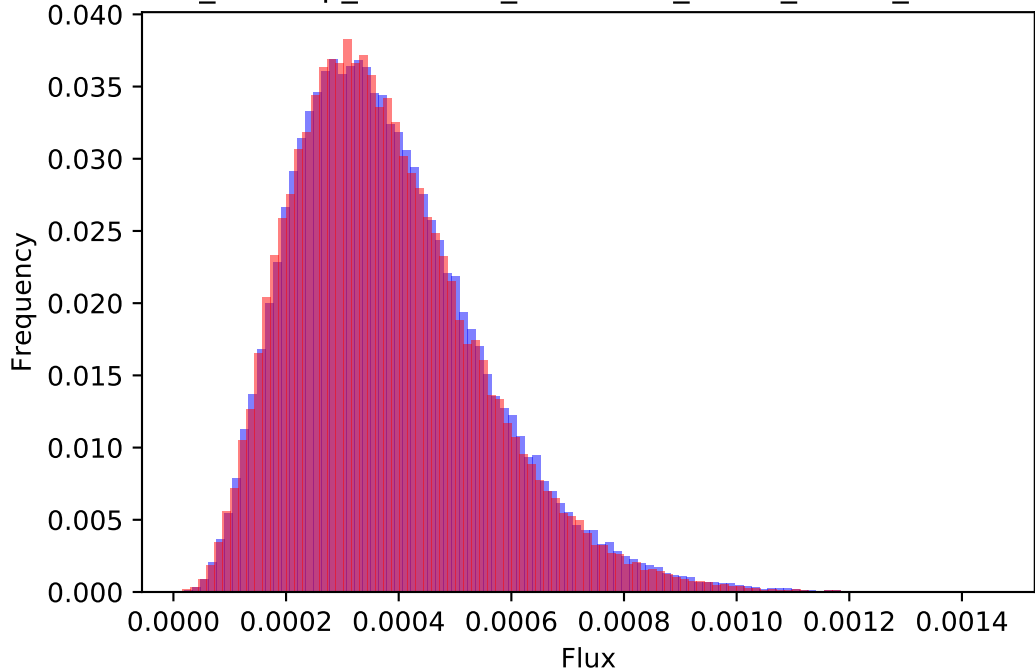
**\*\*283 : ATP\_h + FGAM\_h --> ADP\_h + AIR\_h + H\_h + Pi\_h\*\***



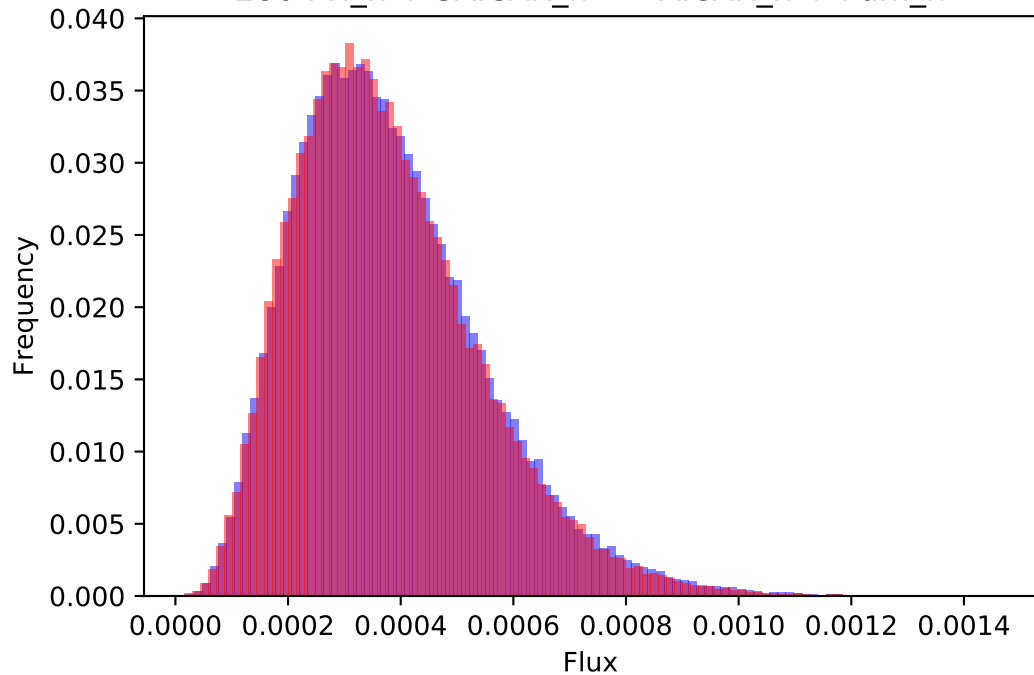
**\*\*284 : AIR\_h + CO2\_h --> CAIR\_h + H\_h\*\***



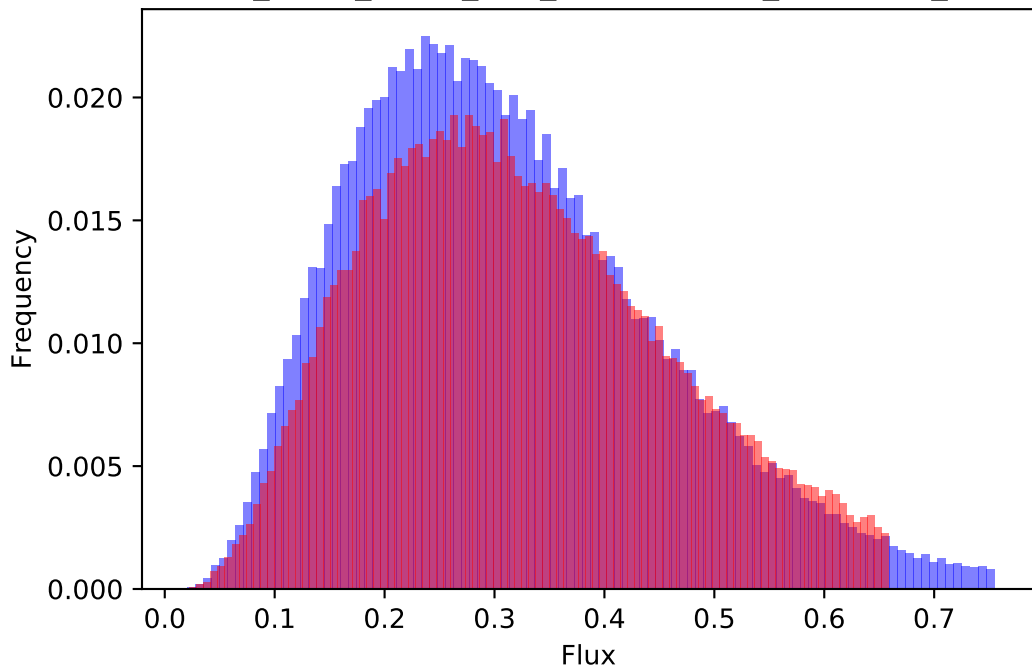
**\*\*285 : ATP\_h + Asp\_h + CAIR\_h --> ADP\_h + H\_h + Pi\_h + SAICAR\_h\*\***



**\*\*286 : H\_h + SAICAR\_h --> AICAR\_h + Fum\_h\*\***

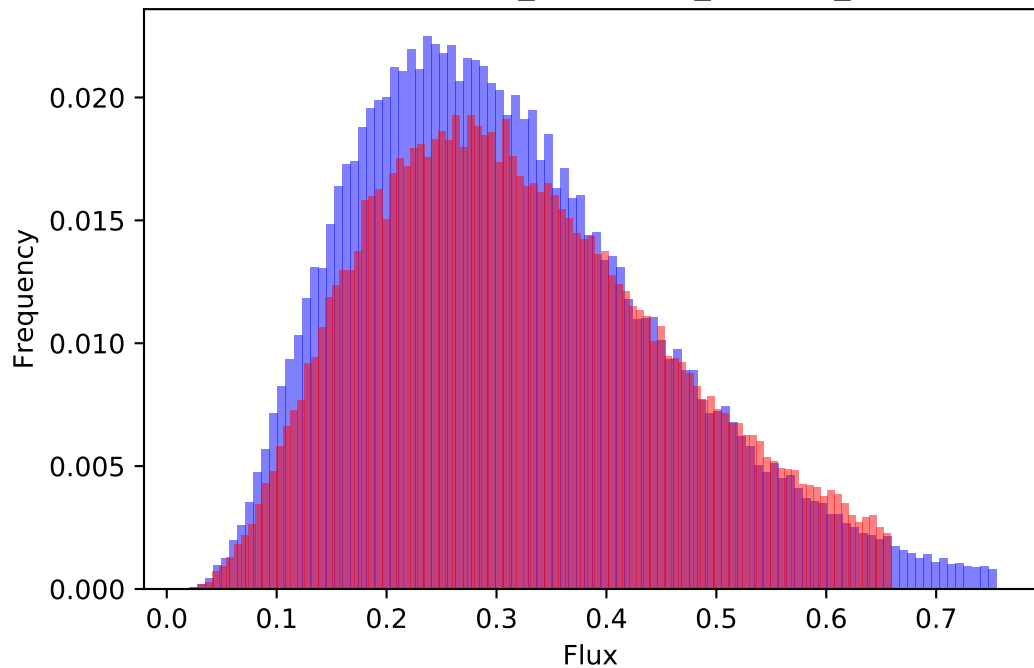


**\*\*287 : AICAR\_h + F\_DASH\_THF\_h --> FAICAR\_h + 2.0 H\_h + THF\_h\*\***

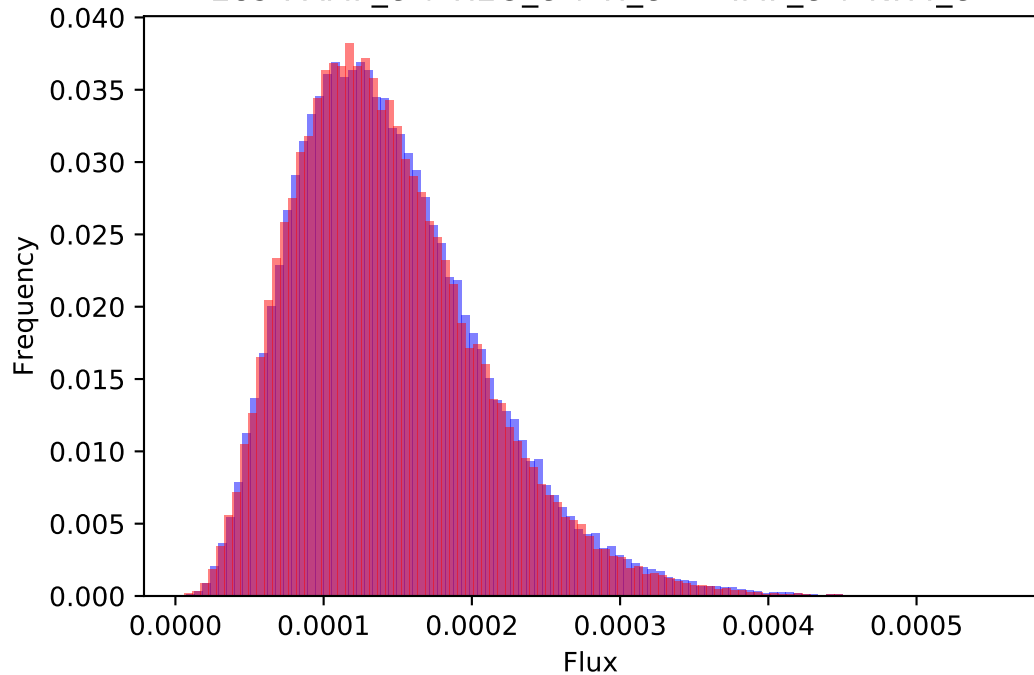




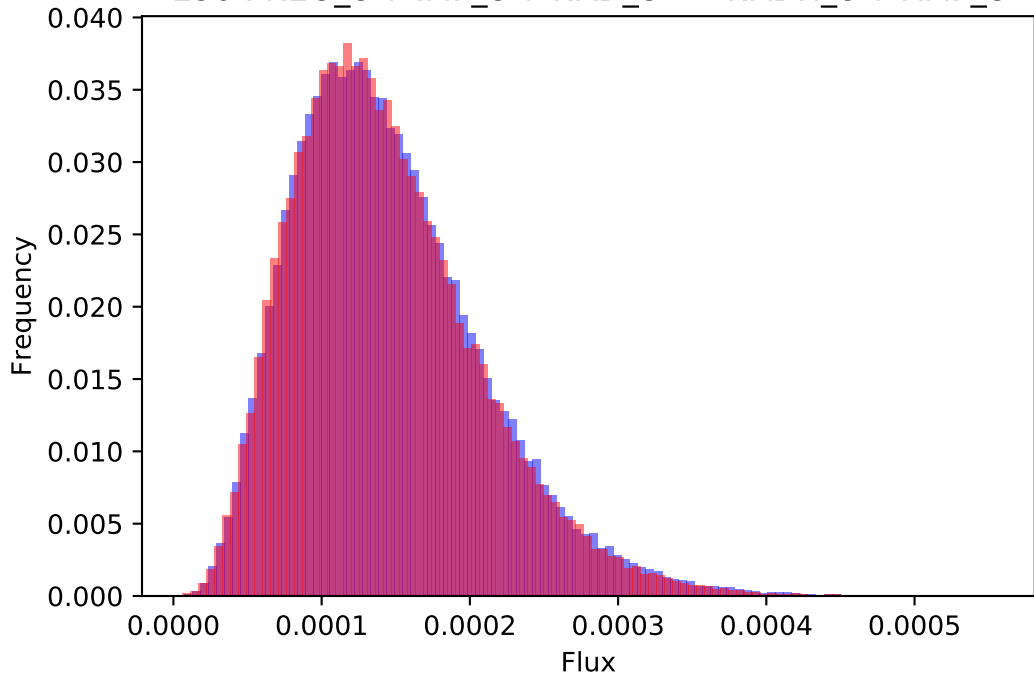
**\*\*288 : FAICAR\_h --> H2O\_h + IMP\_h\*\***



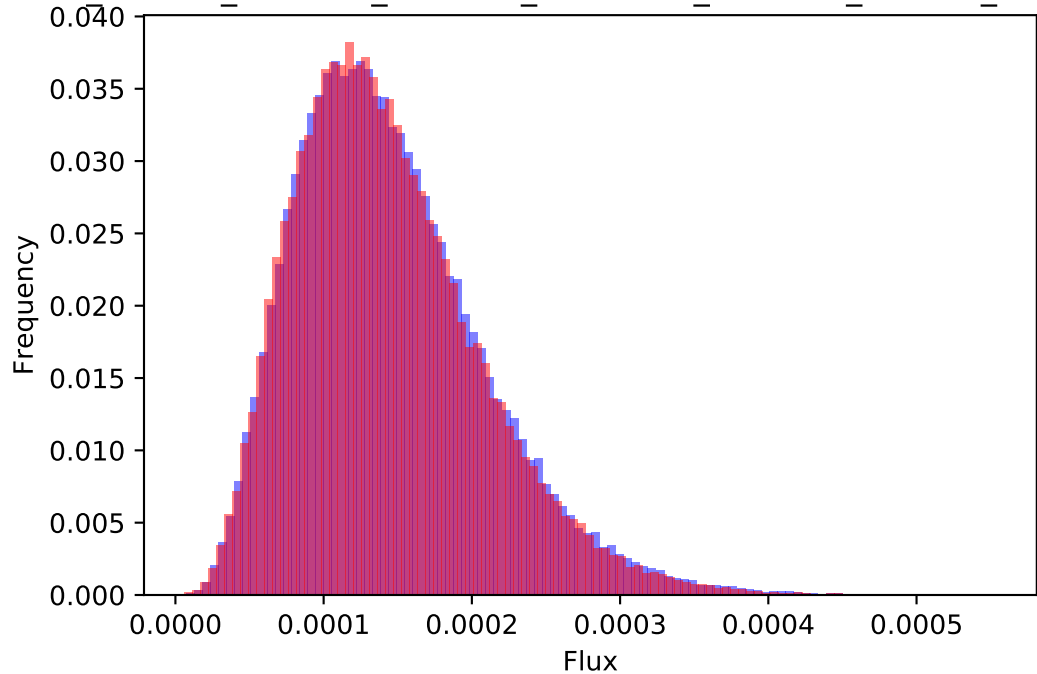
**\*\*289 : AMP\_c + H2O\_c + H\_c --> IMP\_c + NH4\_c\*\***



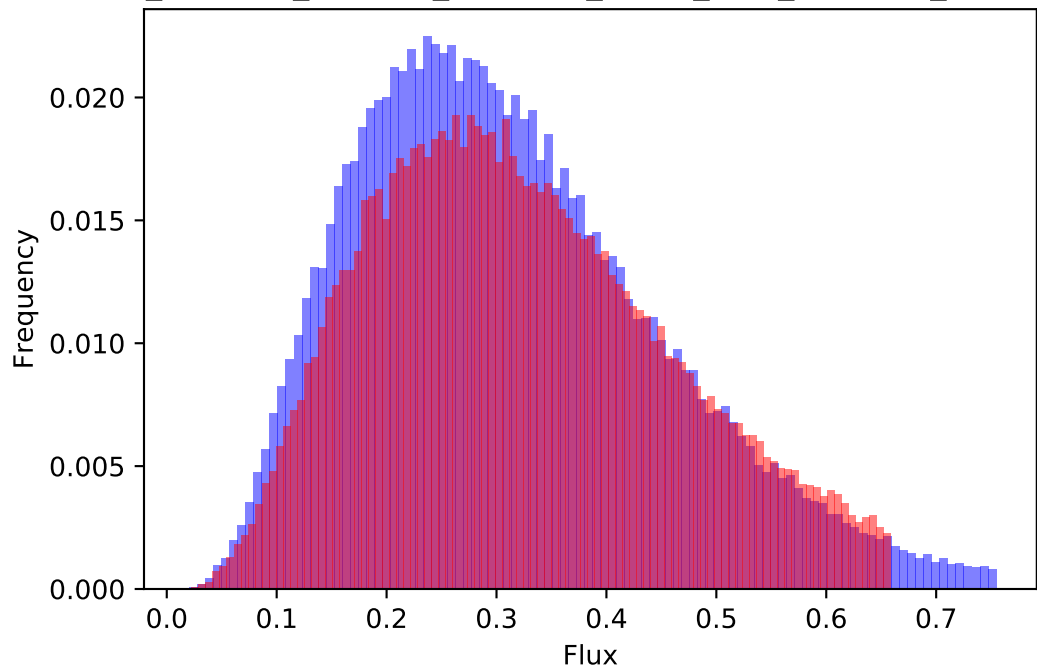
**\*\*290 : H2O\_c + IMP\_c + NAD\_c --> NADH\_c + XMP\_c\*\***



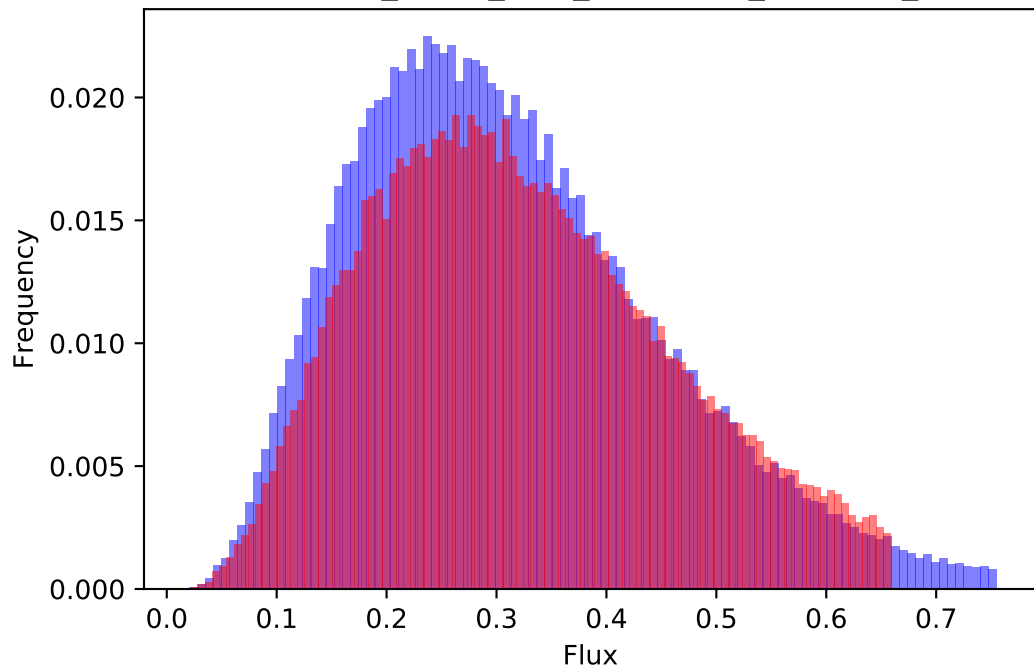
: ATP\_c + Gln\_c + H2O\_c + XMP\_c --> AMP\_c + GMP\_c + Glu\_c + H\_c +



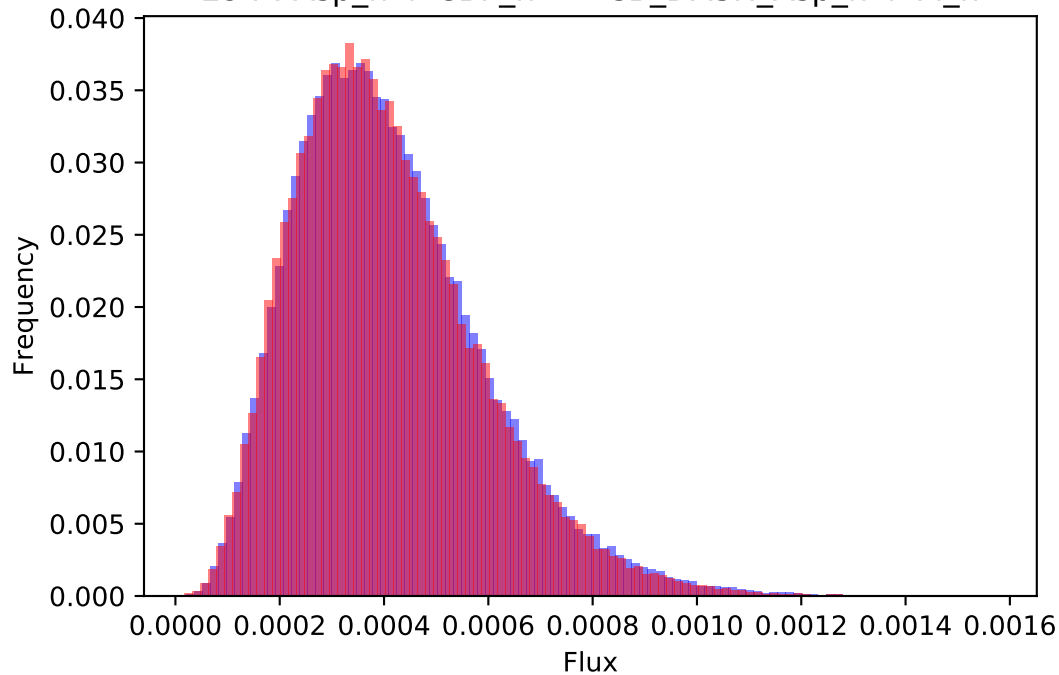
292 : Asp\_h + GTP\_h + IMP\_h --> DC\_DASH\_AMP\_h + GDP\_h + H\_h + Pi



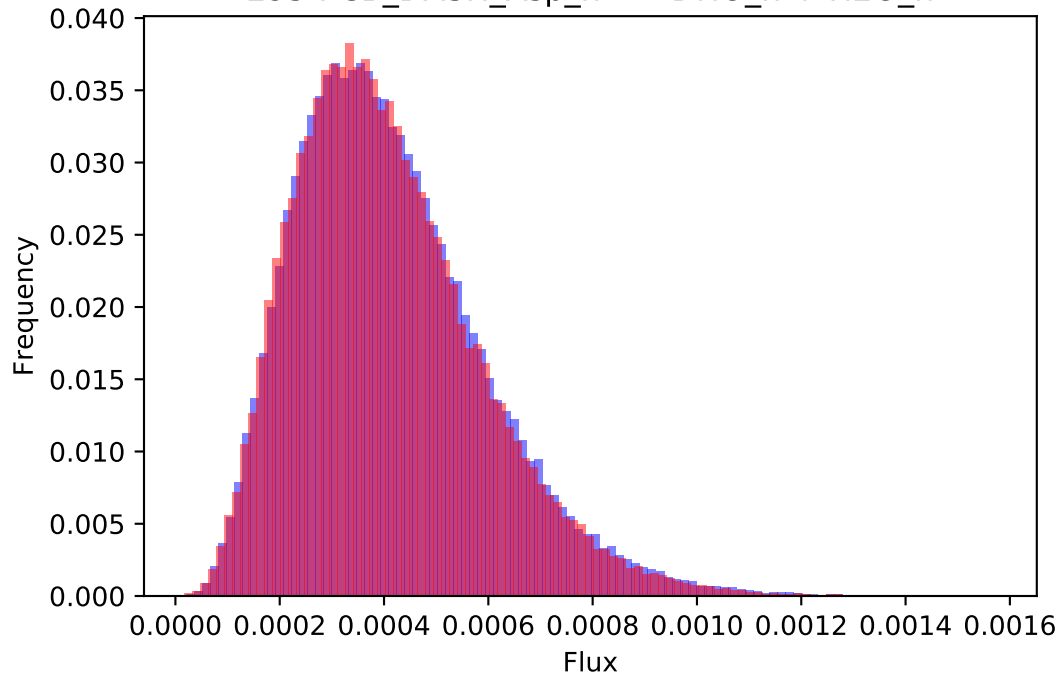
**\*\*293 : DC\_DASH\_AMP\_h --> AMP\_h + Fum\_h\*\***



**\*\*294 : Asp\_h + CBP\_h --> CB\_DASH\_Asp\_h + Pi\_h\*\***

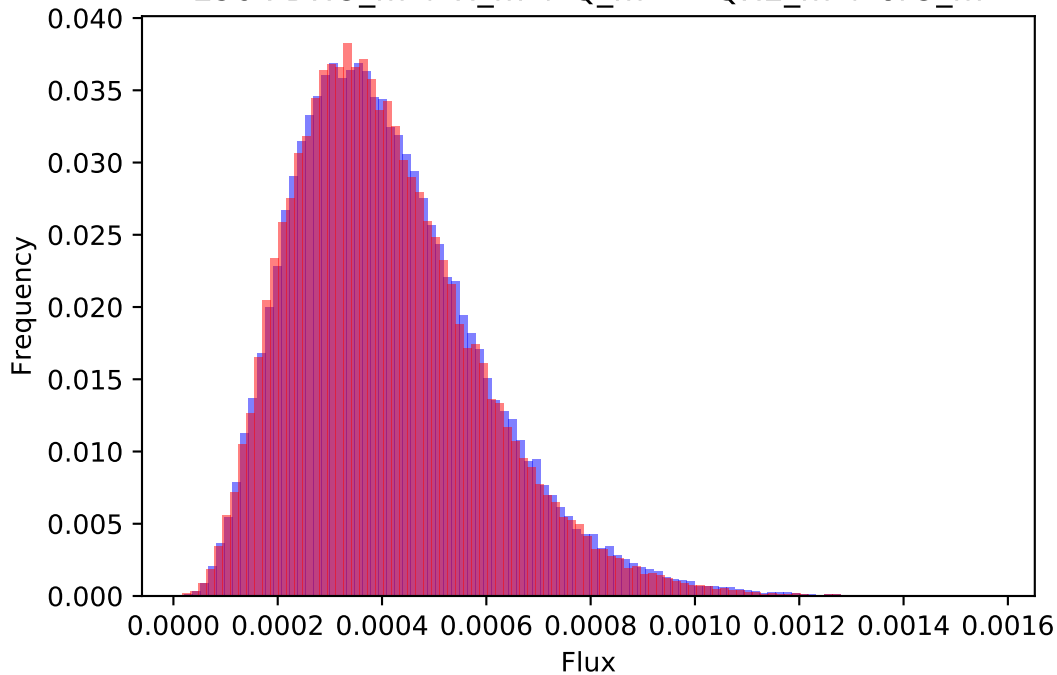


**\*\*295 : CB\_DASH\_Asp\_h --> DHO\_h + H2O\_h\*\***

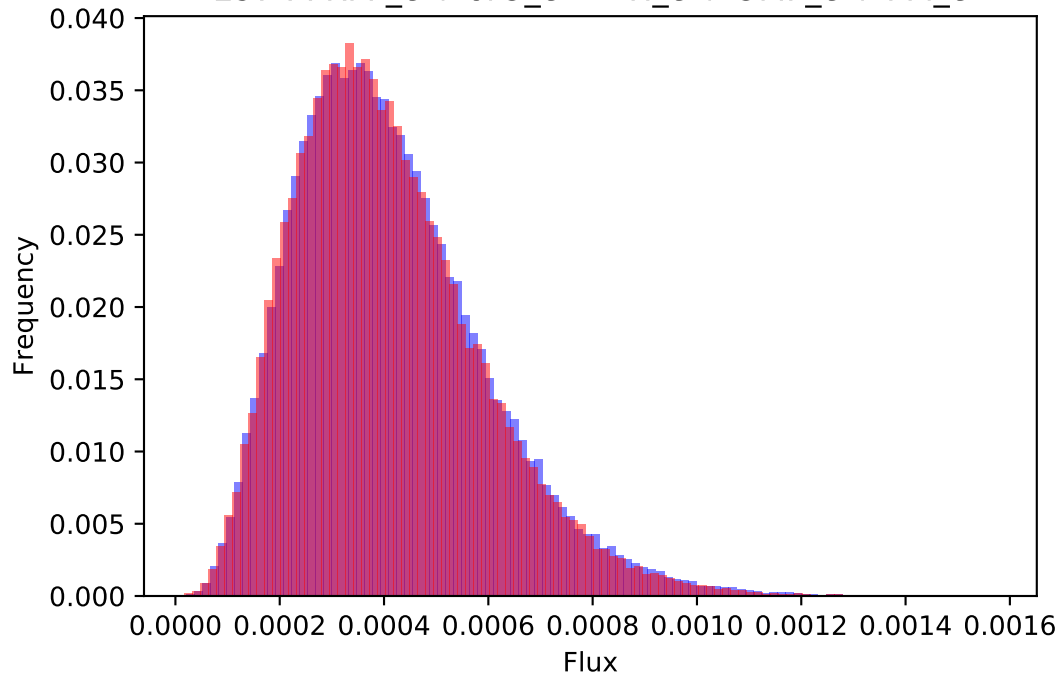




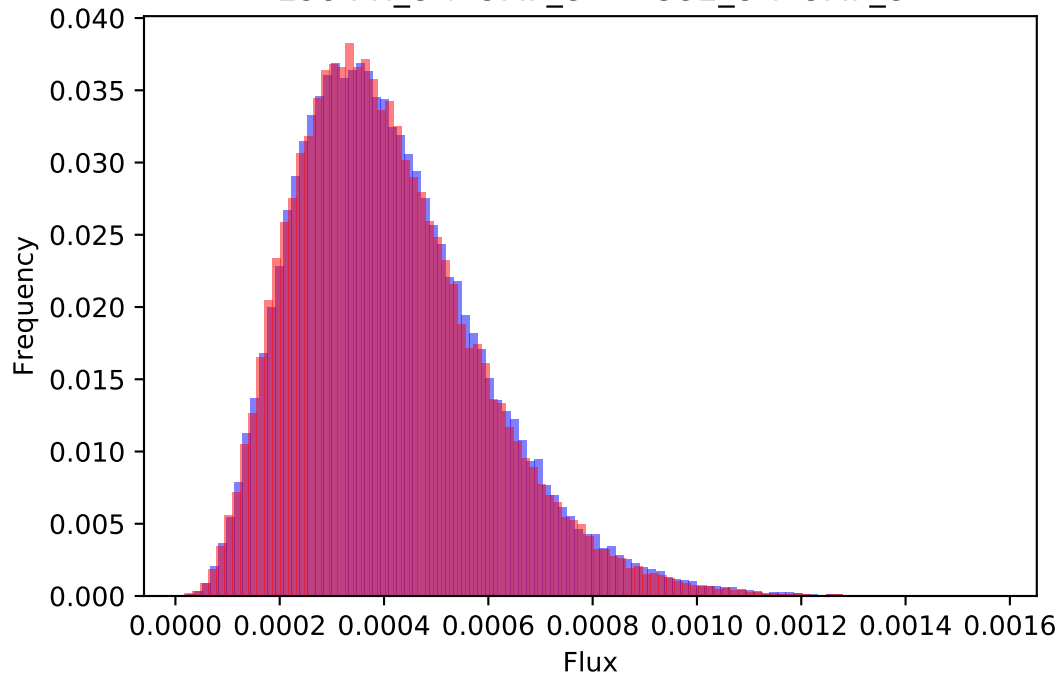
**\*\*296 : DHO\_m + H\_m + Q\_m --> QH2\_m + orO\_m\*\***



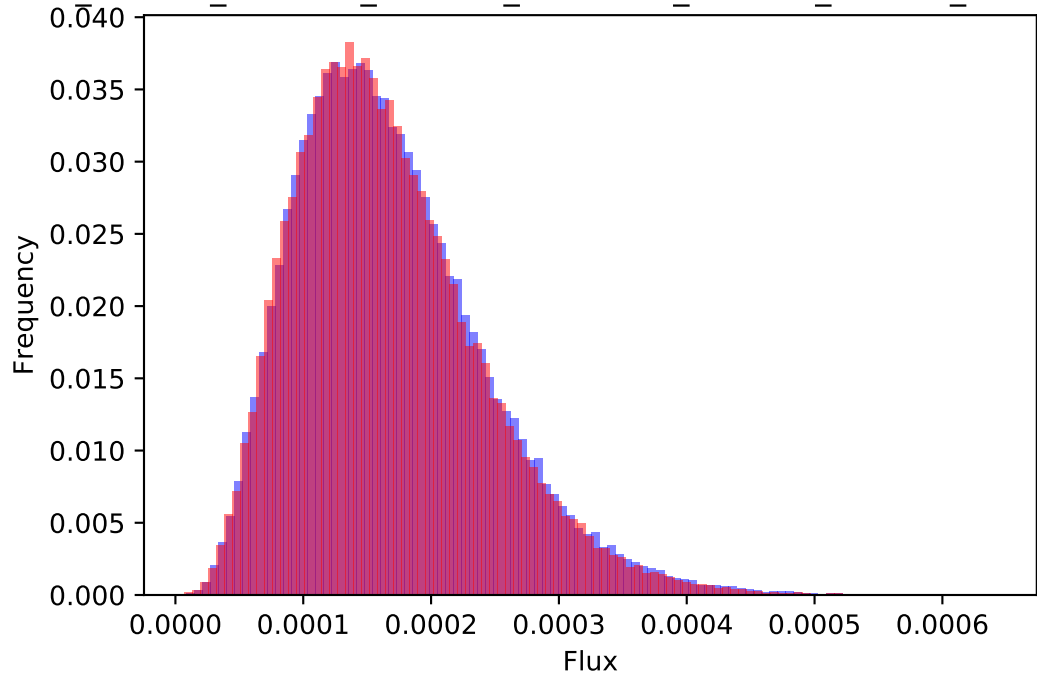
**\*\*297 : PRPP\_c + orO\_c --> H\_c + OMP\_c + PPI\_c\*\***



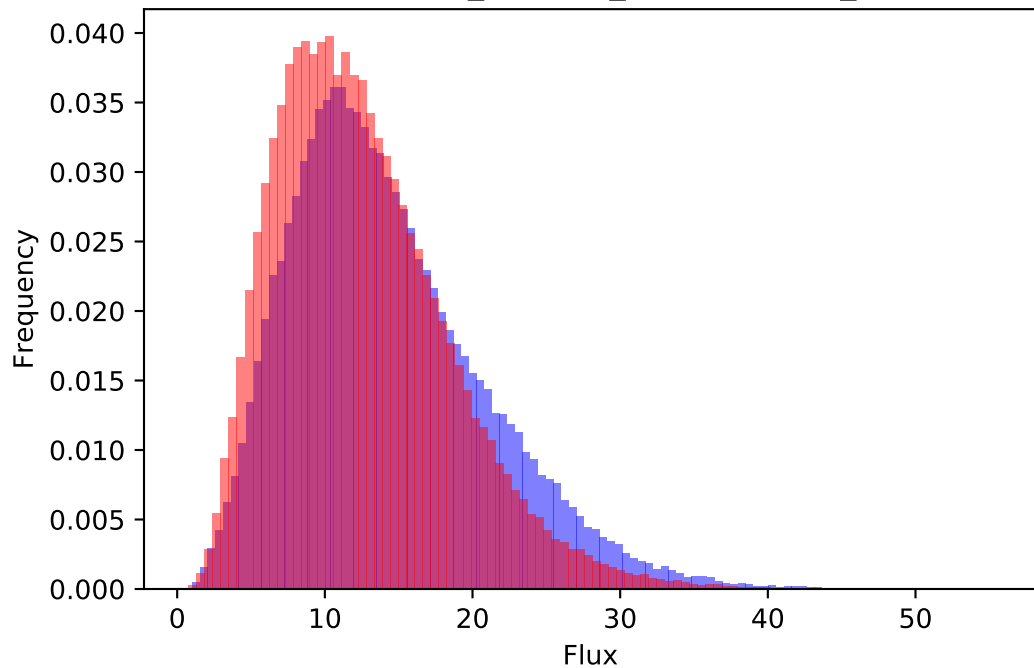
**\*\*298 : H\_c + OMP\_c --> CO2\_c + UMP\_c\*\***



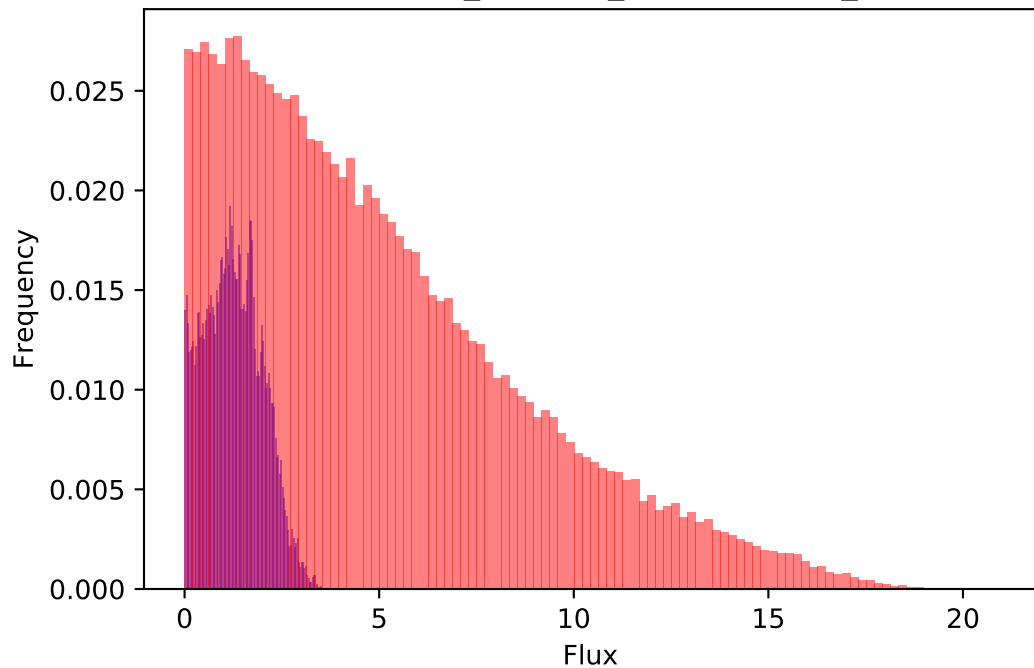
ATP\_c + Gln\_c + H2O\_c + UTP\_c --> ADP\_c + CTP\_c + Glu\_c + 2.0 H\_c



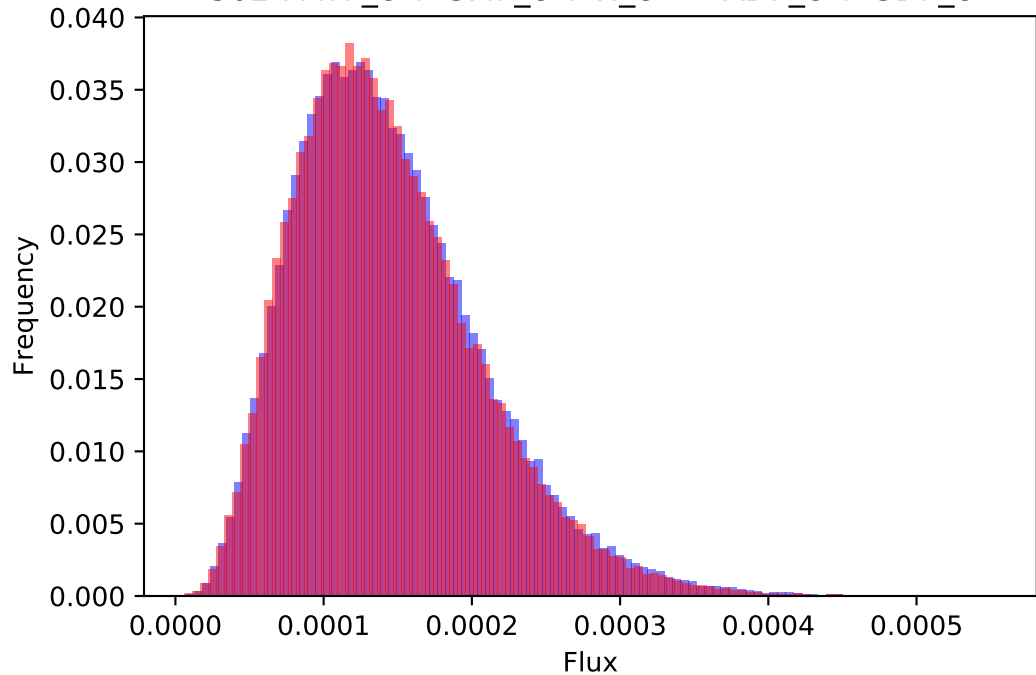
**\*\*300 : AMP\_c + ATP\_c --> 2.0 ADP\_c\*\***



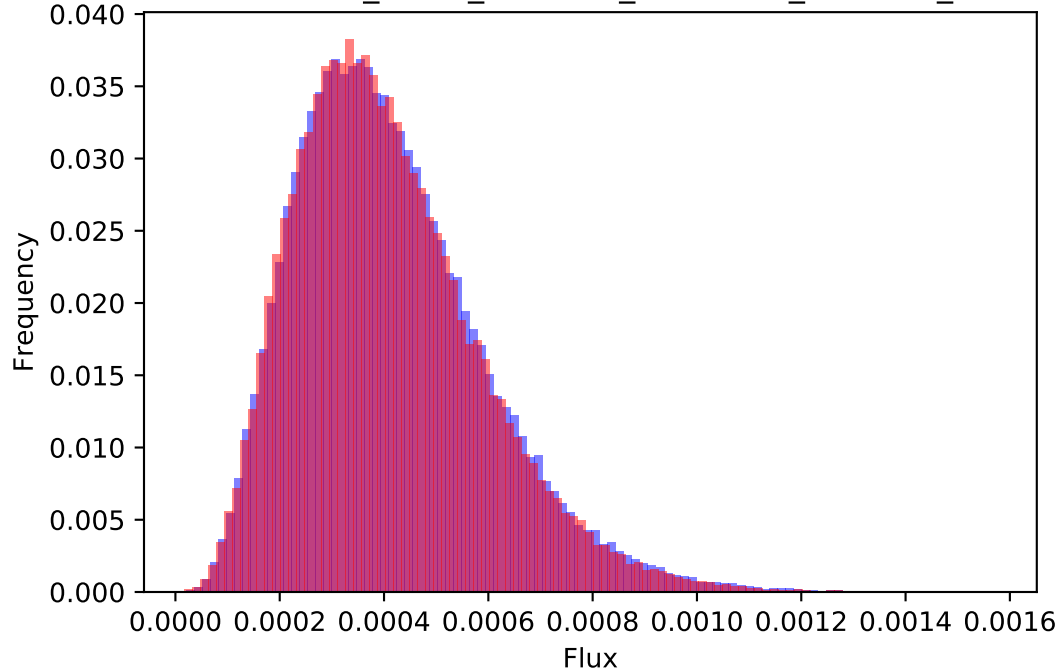
**\*\*301 : AMP\_h + ATP\_h --> 2.0 ADP\_h\*\***



**\*\*302 : ATP\_c + GMP\_c + H\_c --> ADP\_c + GDP\_c\*\***

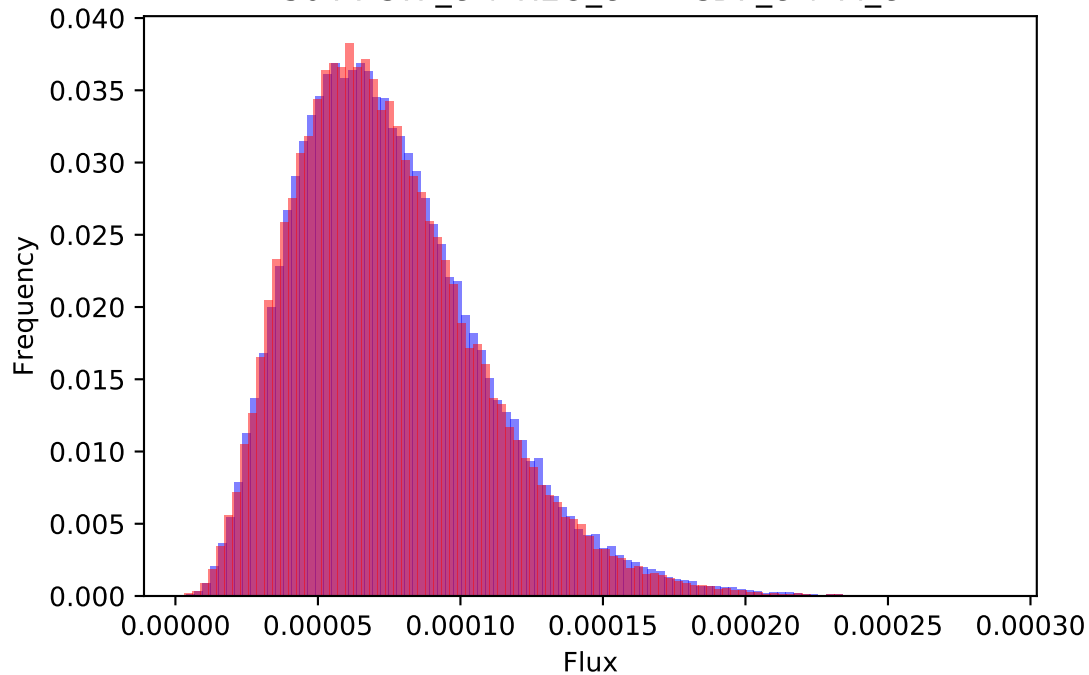


**\*\*303 : ATP\_c + H\_c + UMP\_c --> ADP\_c + UDP\_c\*\***

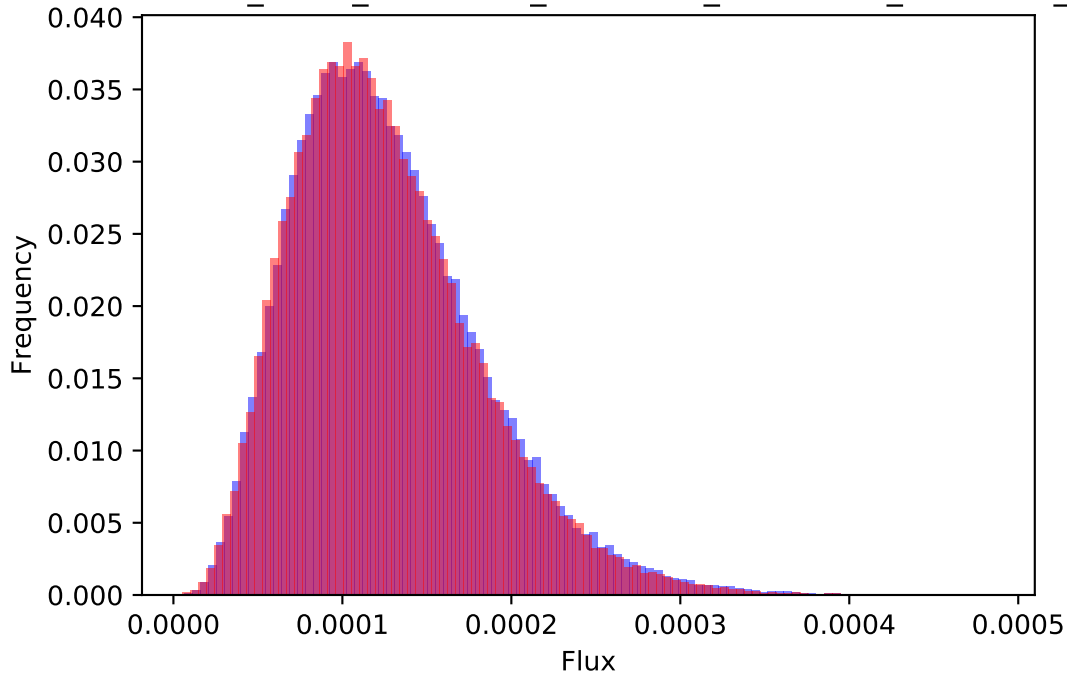




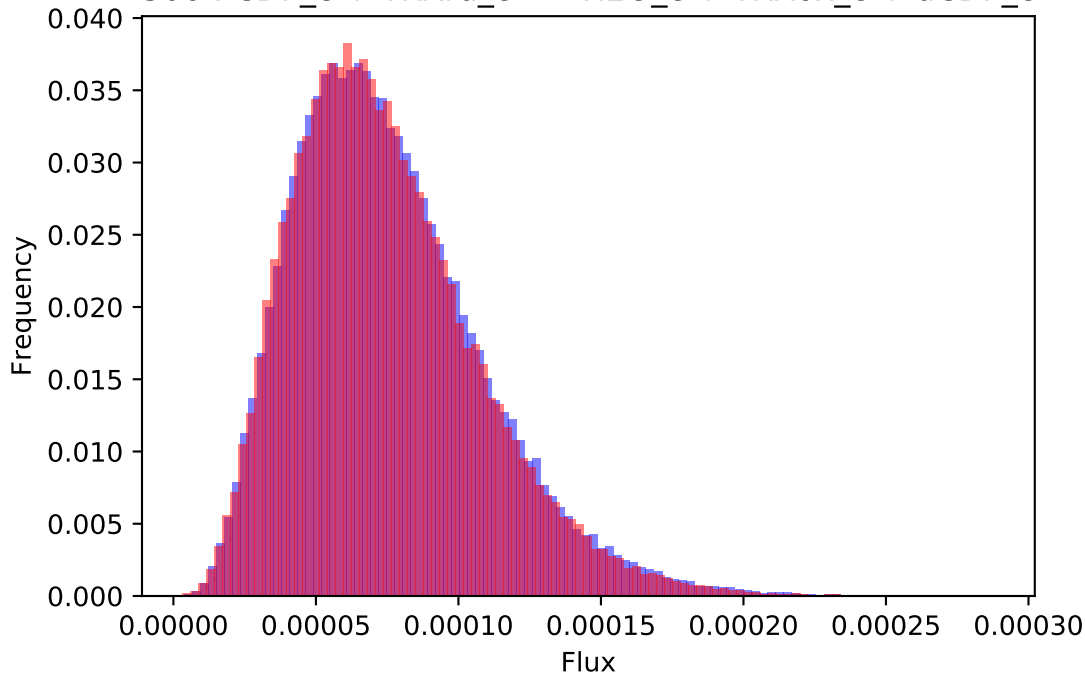
**\*\*304 : CTP\_c + H2O\_c --> CDP\_c + Pi\_c\*\***



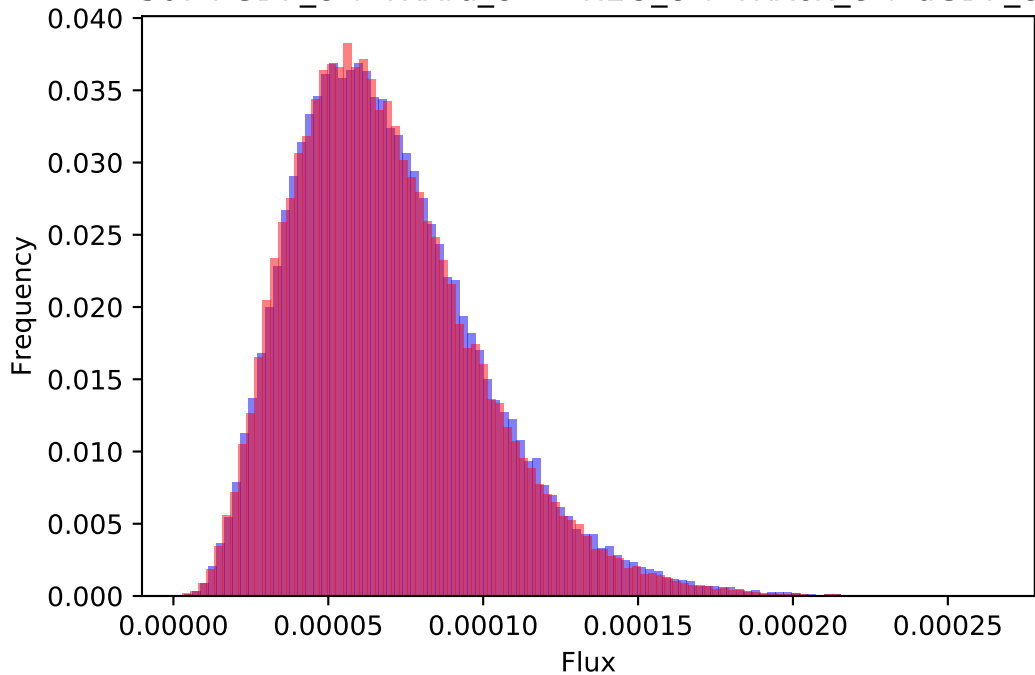
**\*\*305 : ADP\_c + H\_c + TRXrd\_c --> H2O\_c + TRXox\_c + dADP\_c\*\***



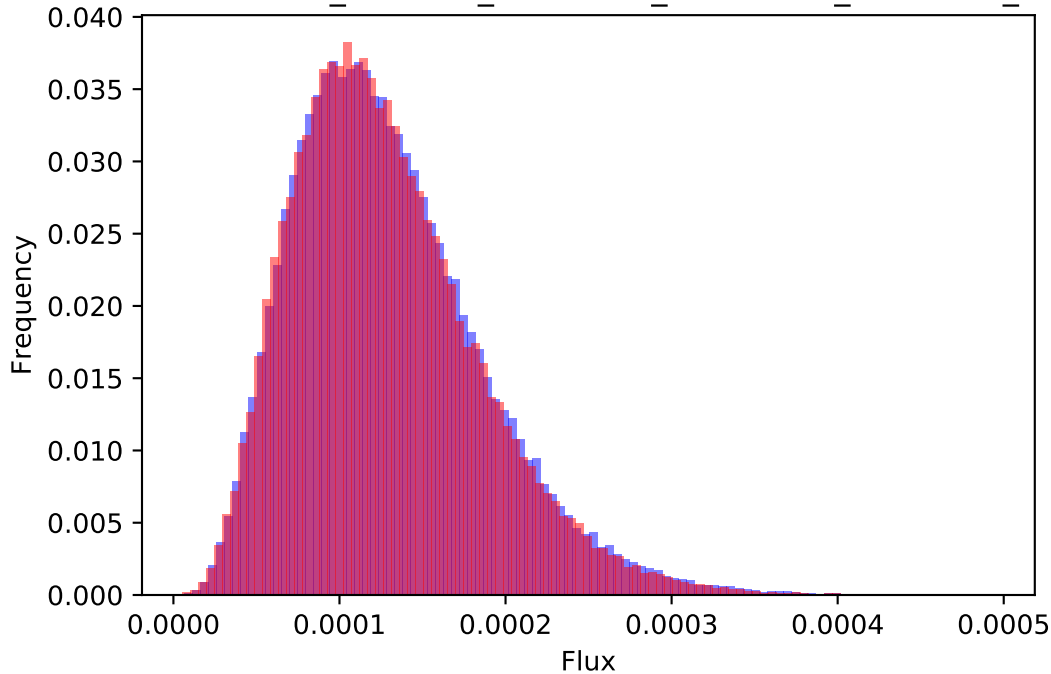
**\*\*306 : CDP\_c + TRXrd\_c --> H2O\_c + TRXox\_c + dCDP\_c\*\***



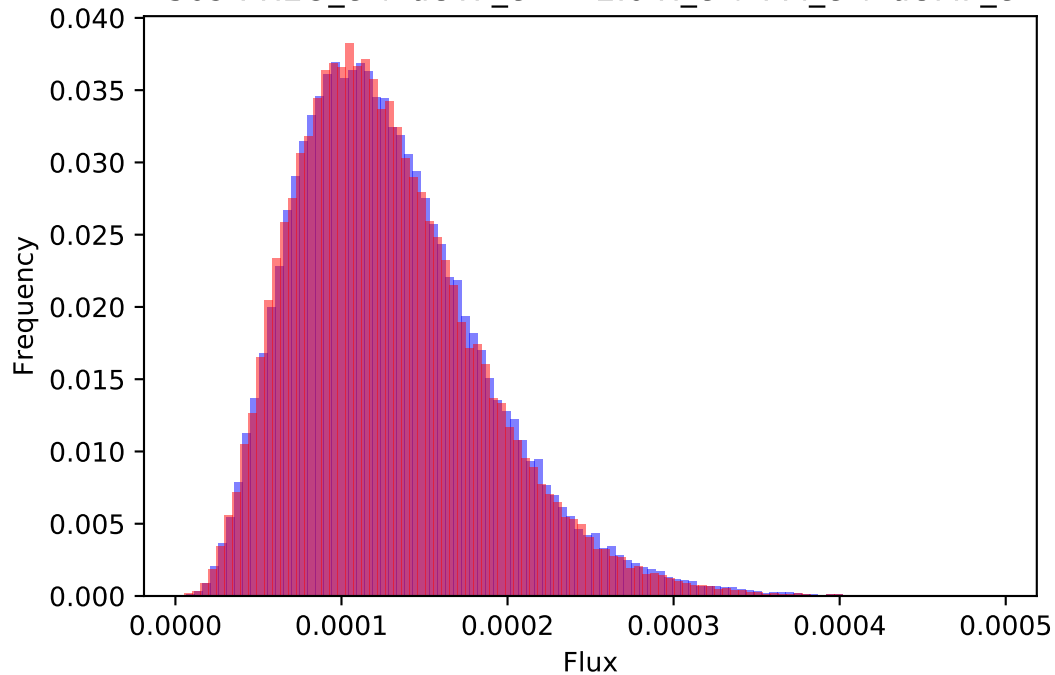
**\*\*307 : GDP\_c + TRXrd\_c --> H2O\_c + TRXox\_c + dGDP\_c\*\***



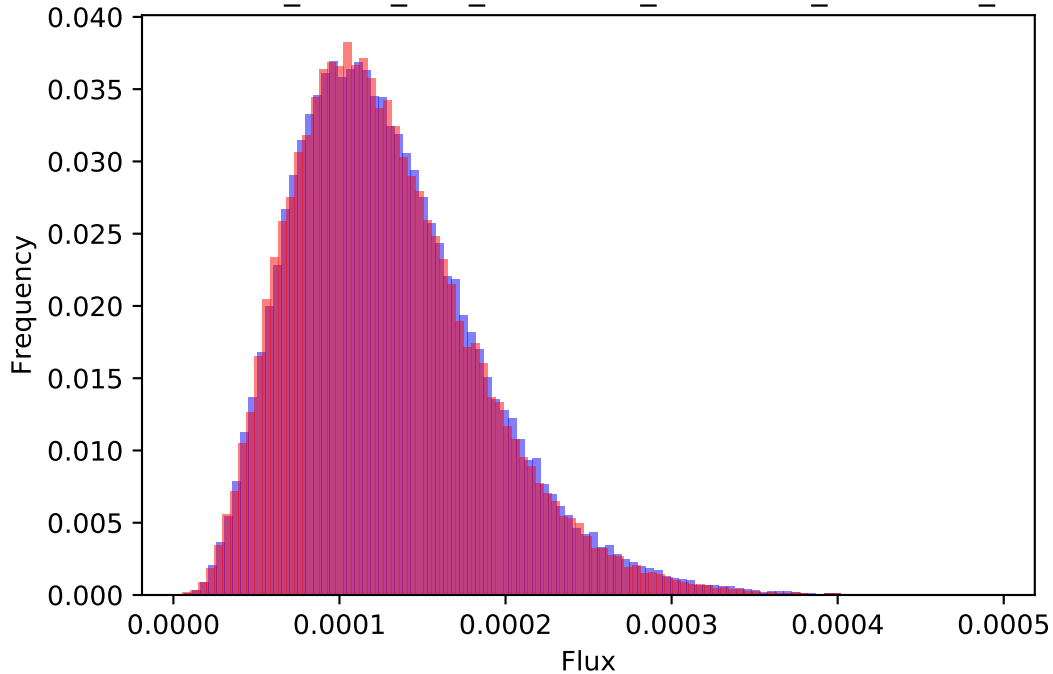
**\*\*308 : TRXrd\_c + UDP\_c --> H2O\_c + TRXox\_c + dUDP\_c\*\***



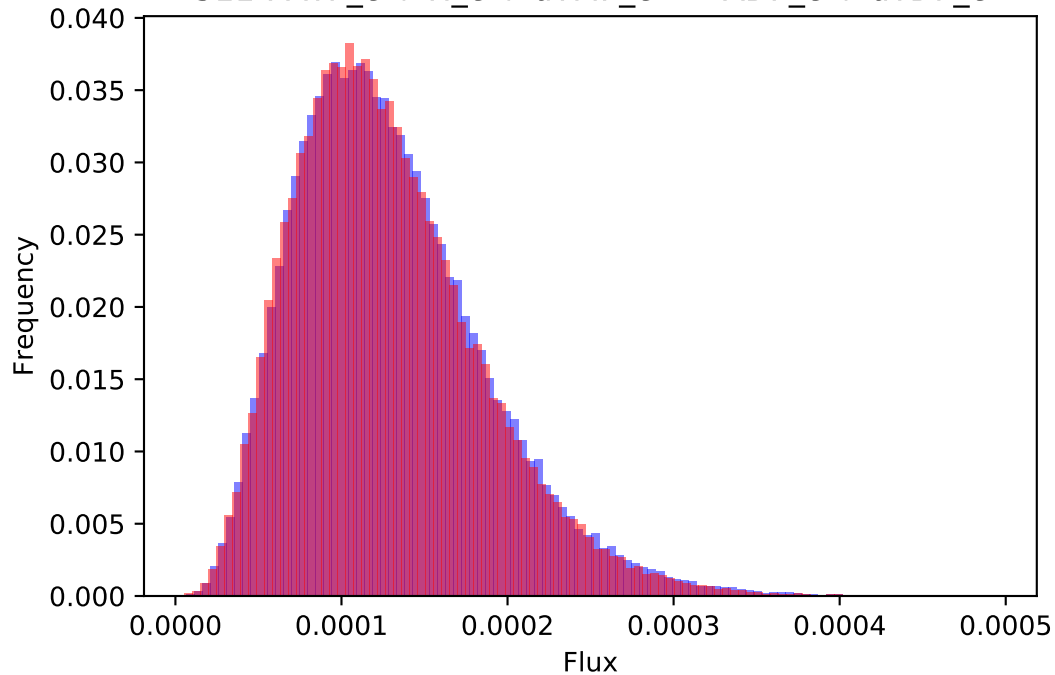
**\*\*309 : H2O\_c + dUTP\_c --> 2.0 H\_c + PPI\_c + dUMP\_c\*\***



**\*\*310 : M\_DASH\_THF\_c + dUMP\_c --> DHF\_c + dTMP\_c\*\***

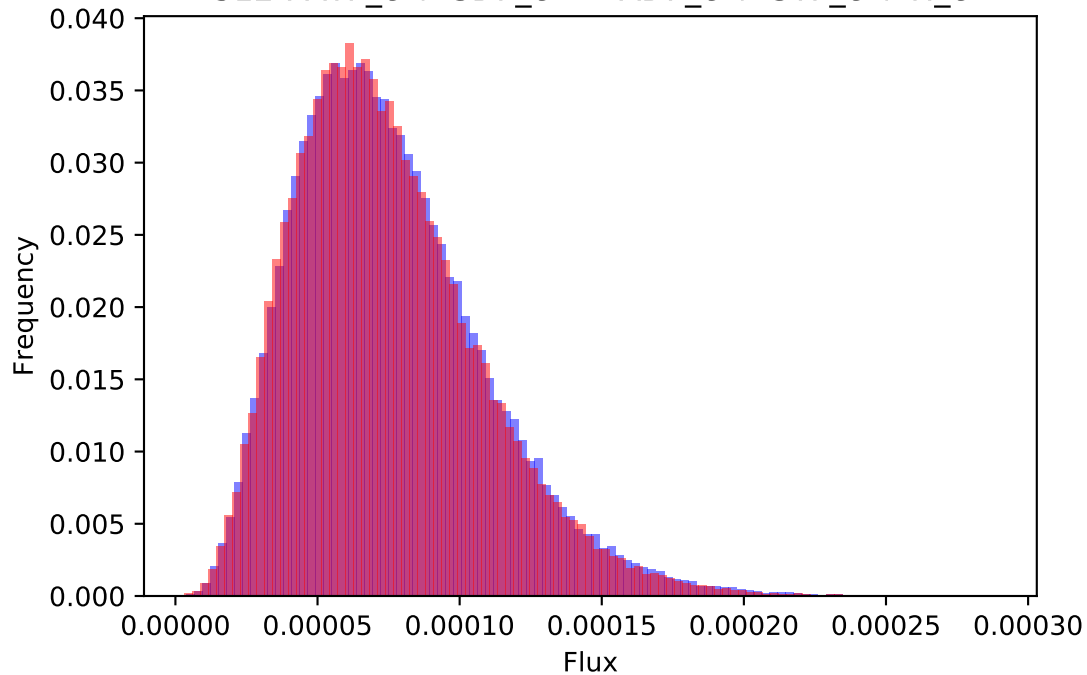


**\*\*311 : ATP\_c + H\_c + dTMP\_c --> ADP\_c + dTDP\_c\*\***

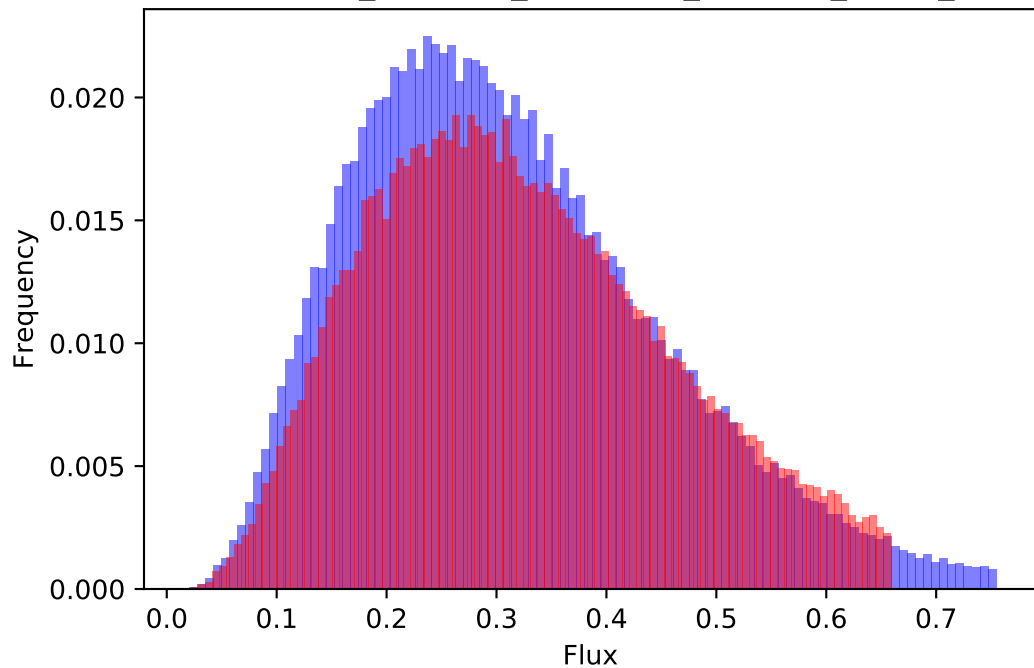




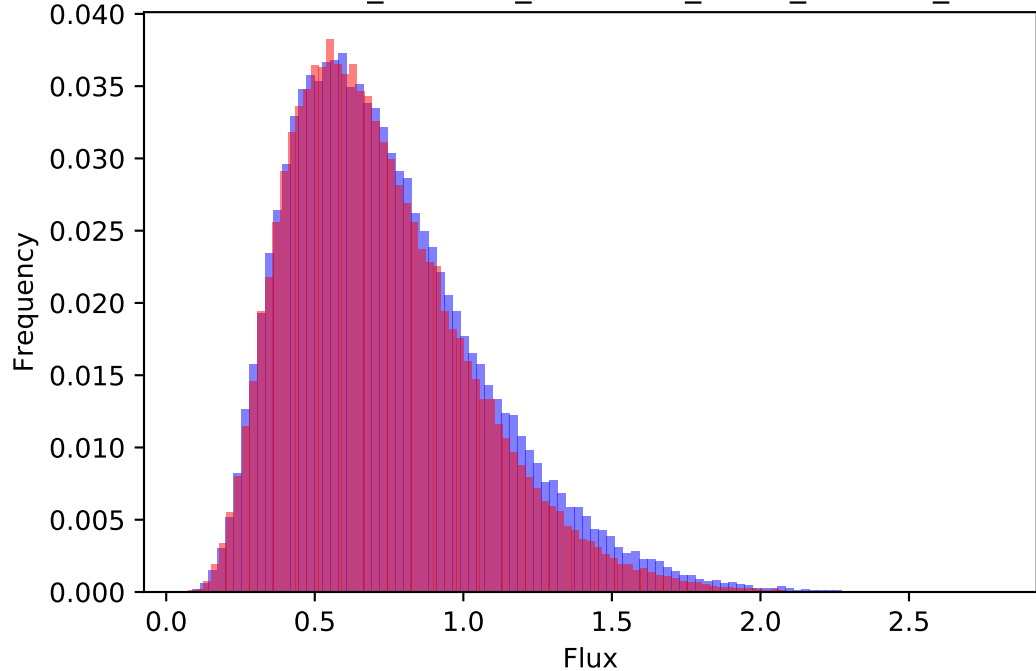
**\*\*312 : ATP\_c + GDP\_c --> ADP\_c + GTP\_c + H\_c\*\***



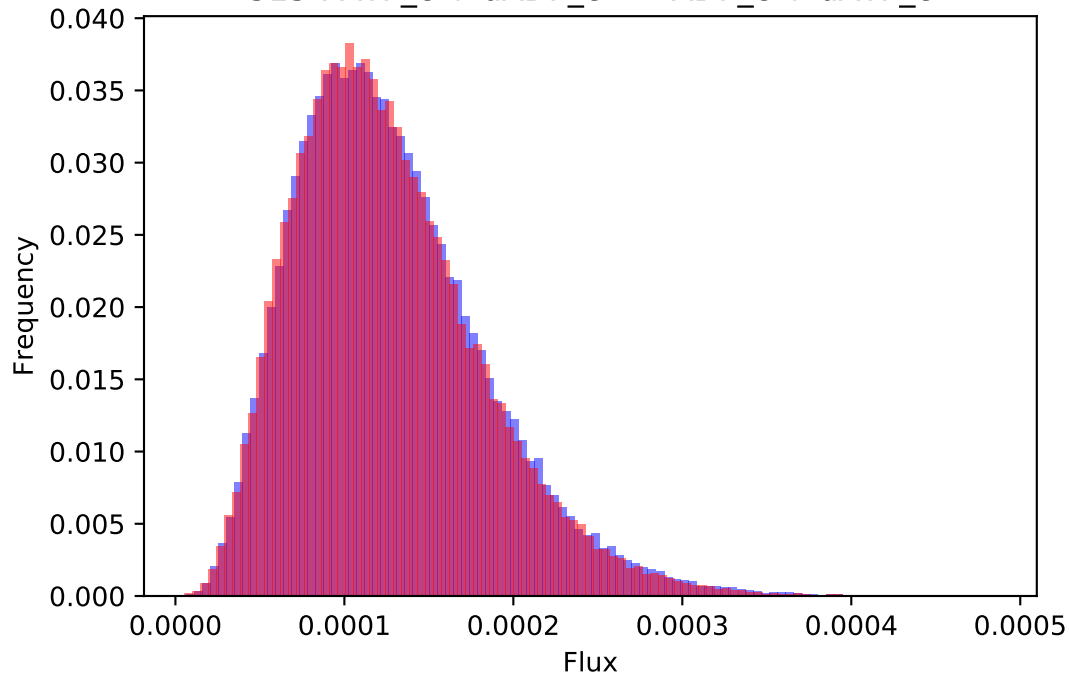
**\*\*313 : ATP\_h + GDP\_h --> ADP\_h + GTP\_h + H\_h\*\***



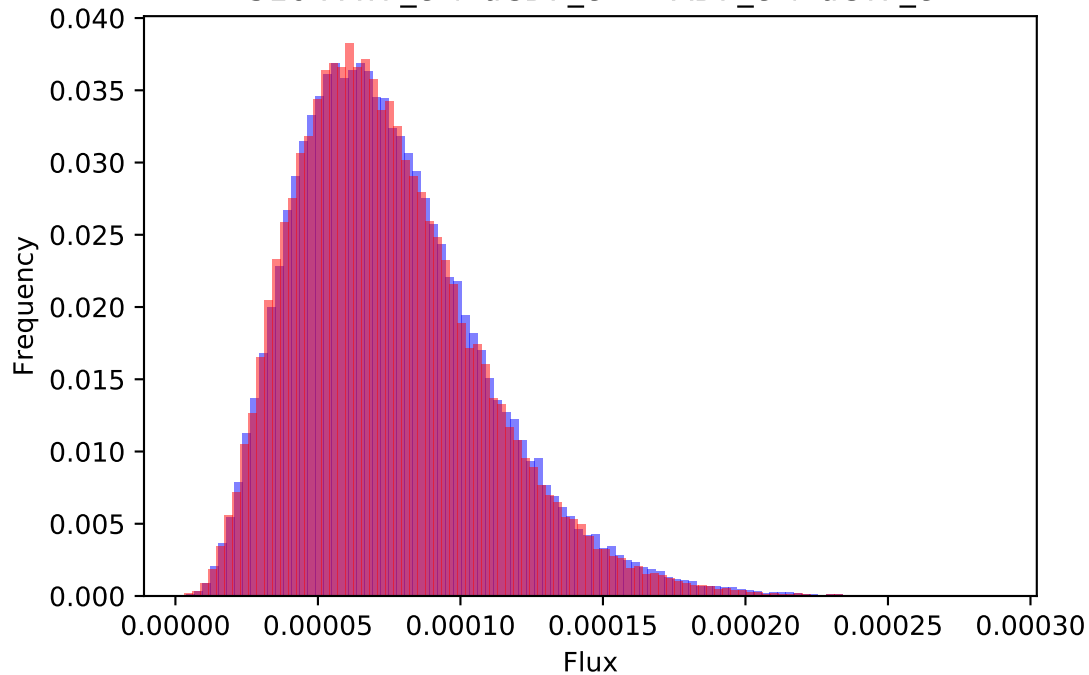
**\*\*314 : ATP\_c + UDP\_c --> ADP\_c + H\_c + UTP\_c\*\***



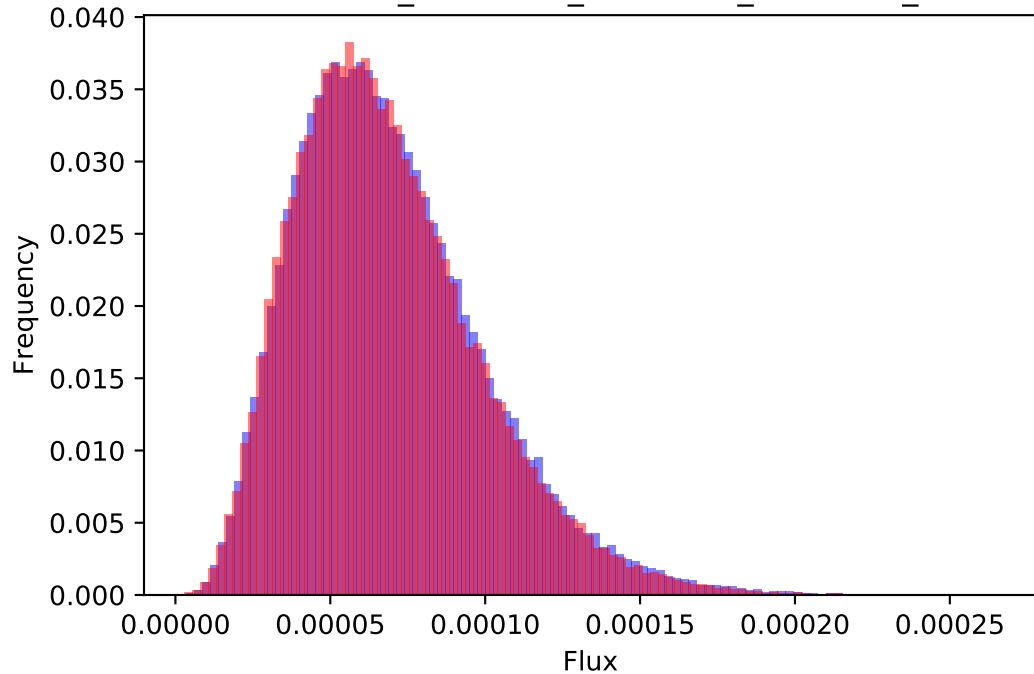
**\*\*315 : ATP\_c + dADP\_c --> ADP\_c + dATP\_c\*\***



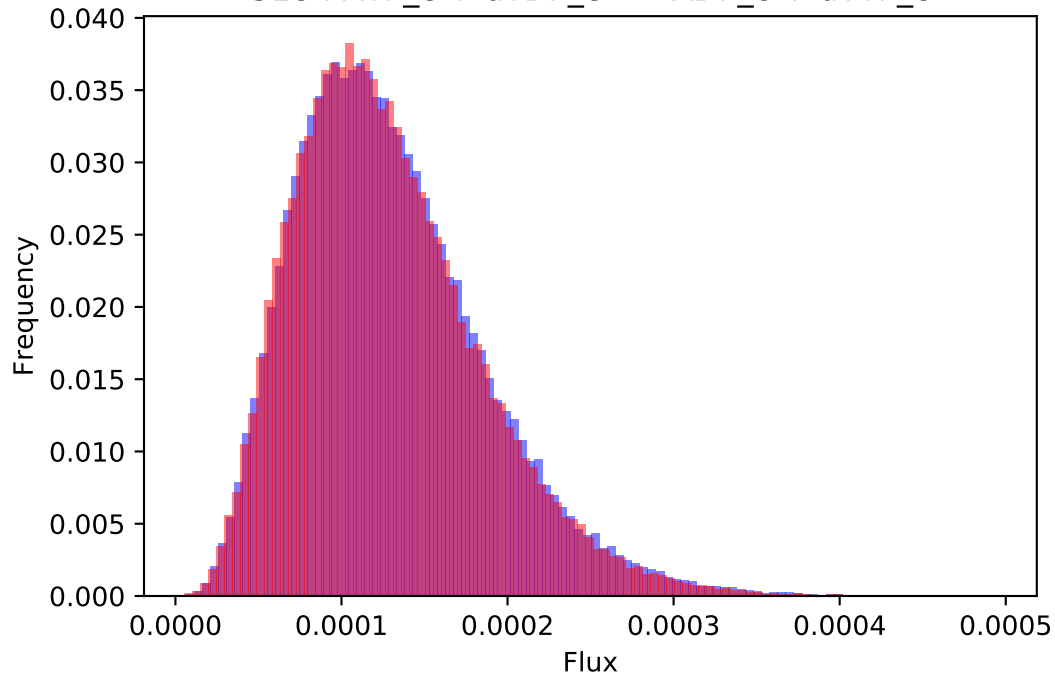
**\*\*316 : ATP\_c + dCDP\_c --> ADP\_c + dCTP\_c\*\***



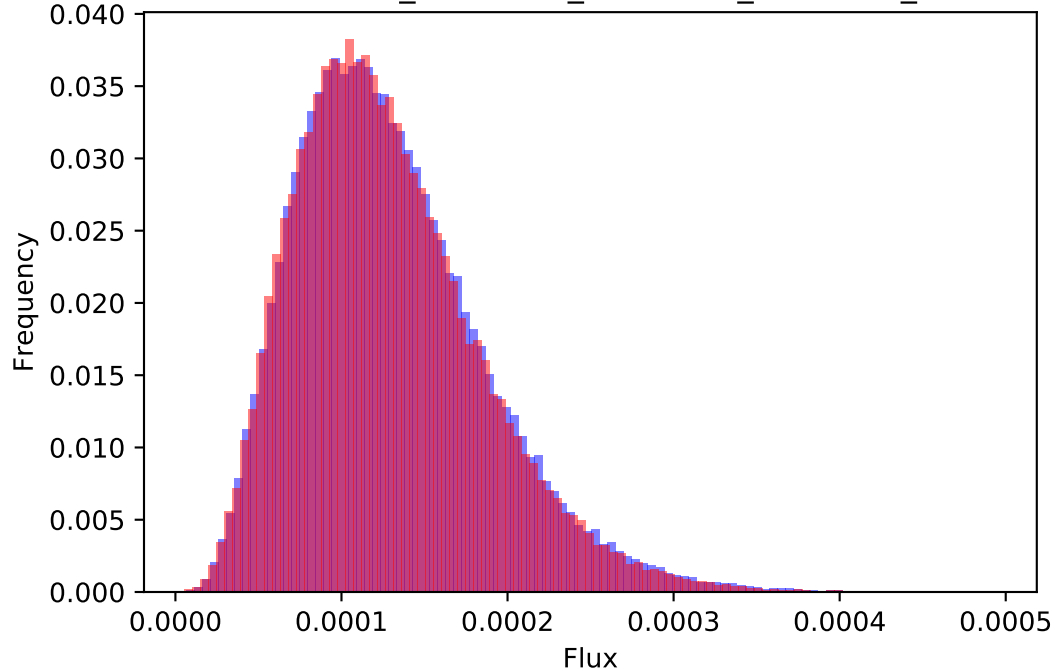
**\*\*317 : ATP\_c + dGDP\_c --> ADP\_c + dGTP\_c\*\***



**\*\*318 : ATP\_c + dTDP\_c --> ADP\_c + dTTP\_c\*\***

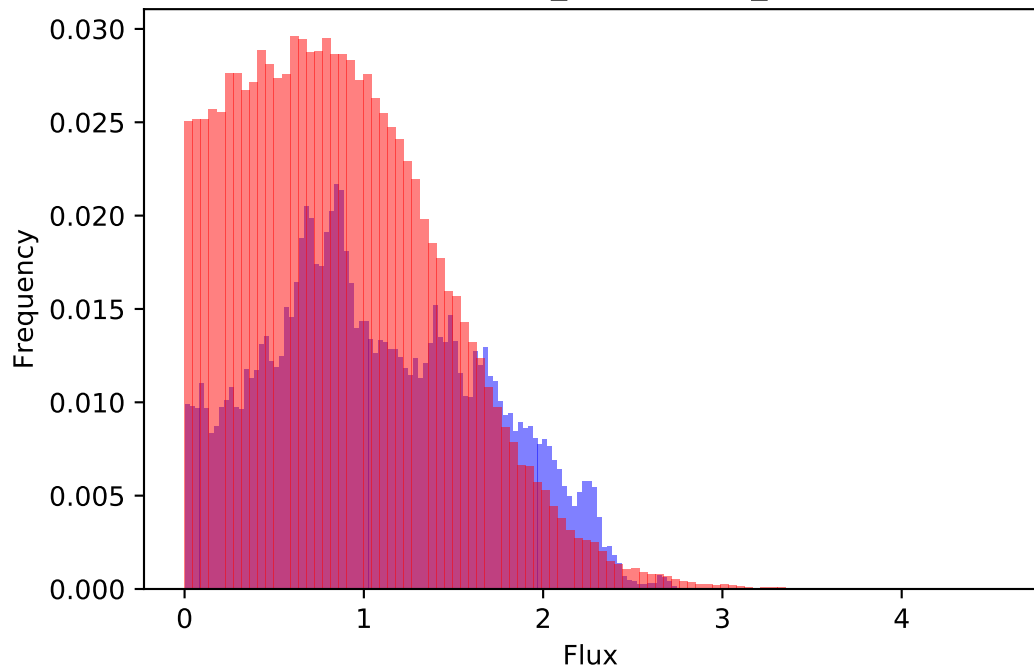


**\*\*319 : ATP\_c + dUDP\_c --> ADP\_c + dUTP\_c\*\***

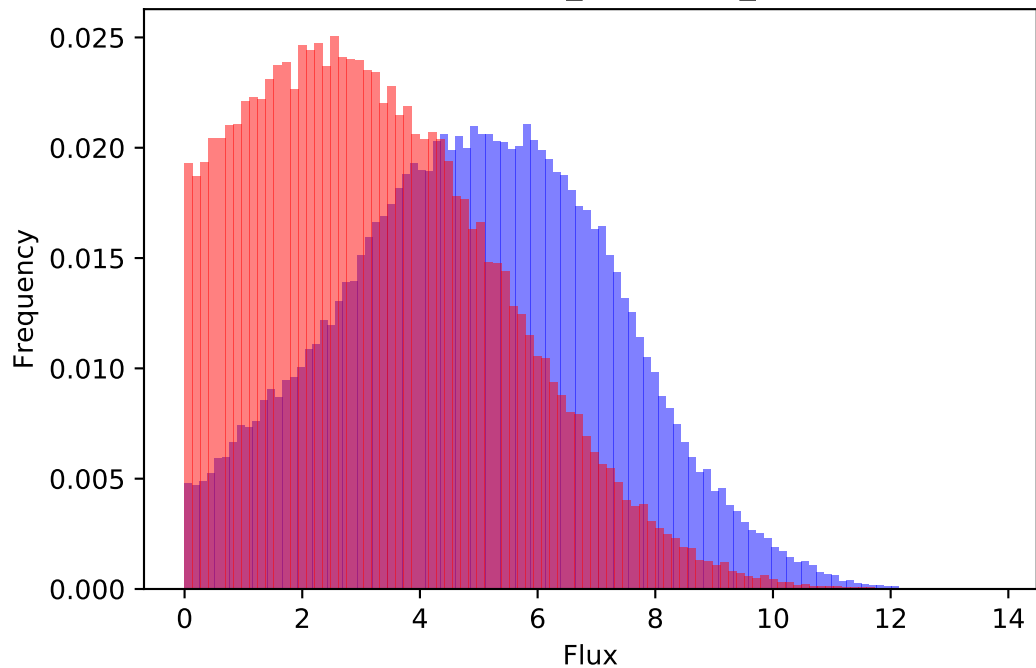




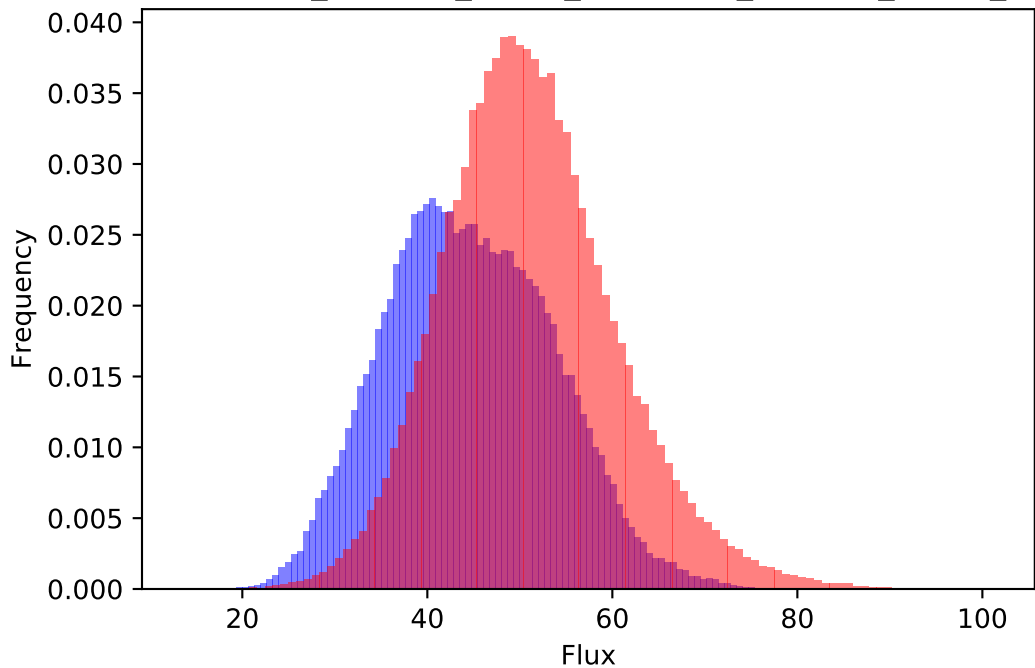
**\*\*320 : SO4\_c <=> SO4\_h\*\***



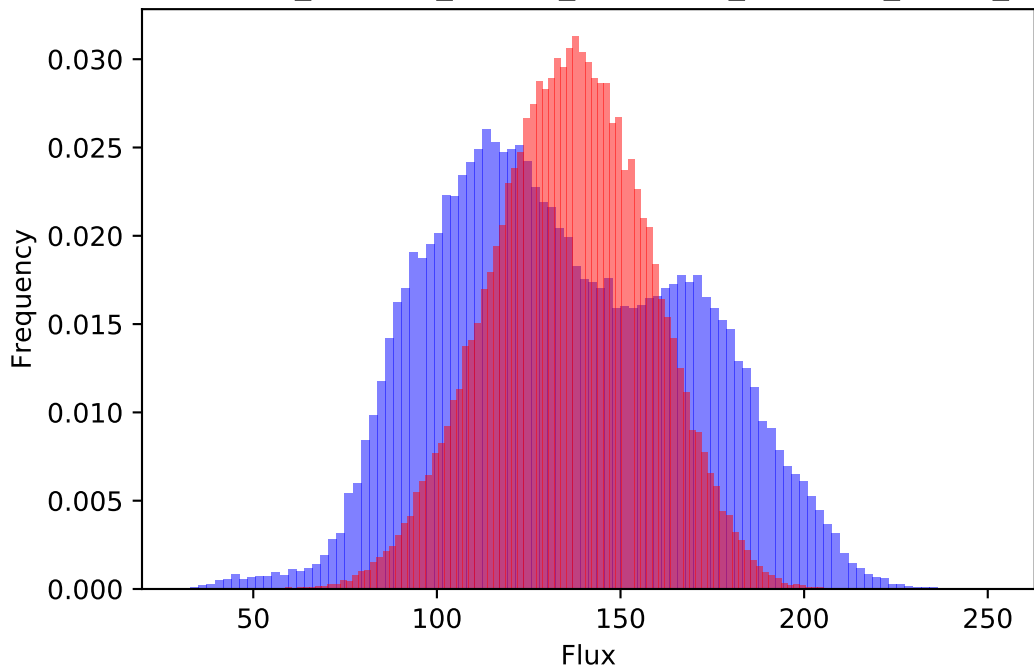
**\*\*321 : NO2\_c --> NO2\_h\*\***



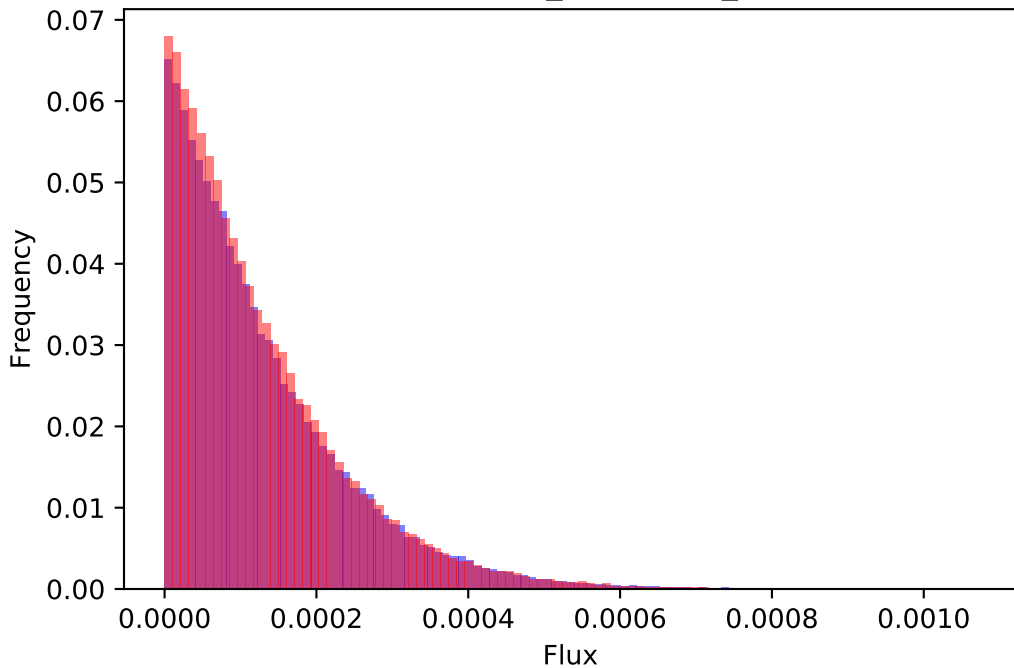
**\*\*322 : ADP\_h + ATP\_c + Pi\_h --> ADP\_c + ATP\_h + Pi\_c\*\***



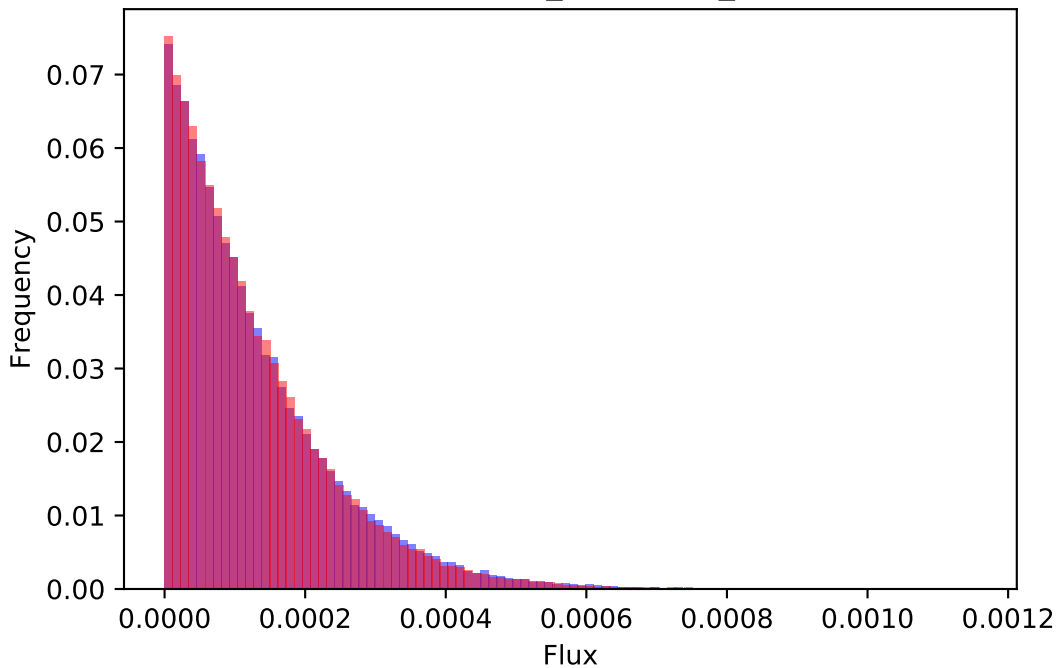
**\*\*323 : ADP\_c + ATP\_m + Pi\_c --> ADP\_m + ATP\_c + Pi\_m\*\***



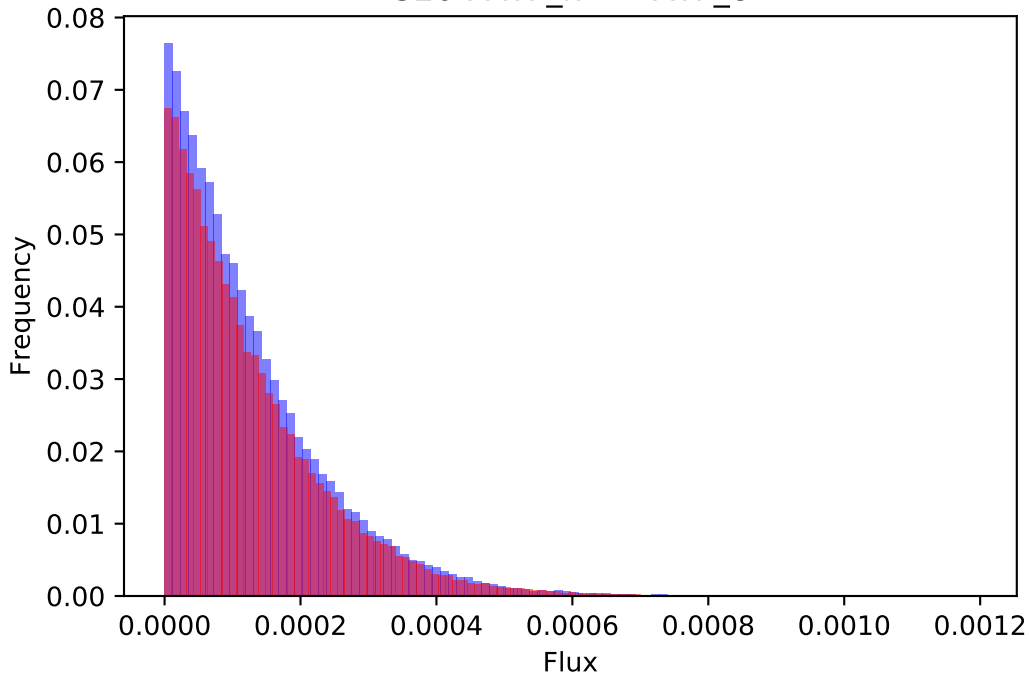
324 : AMP\_h --> AMP\_c



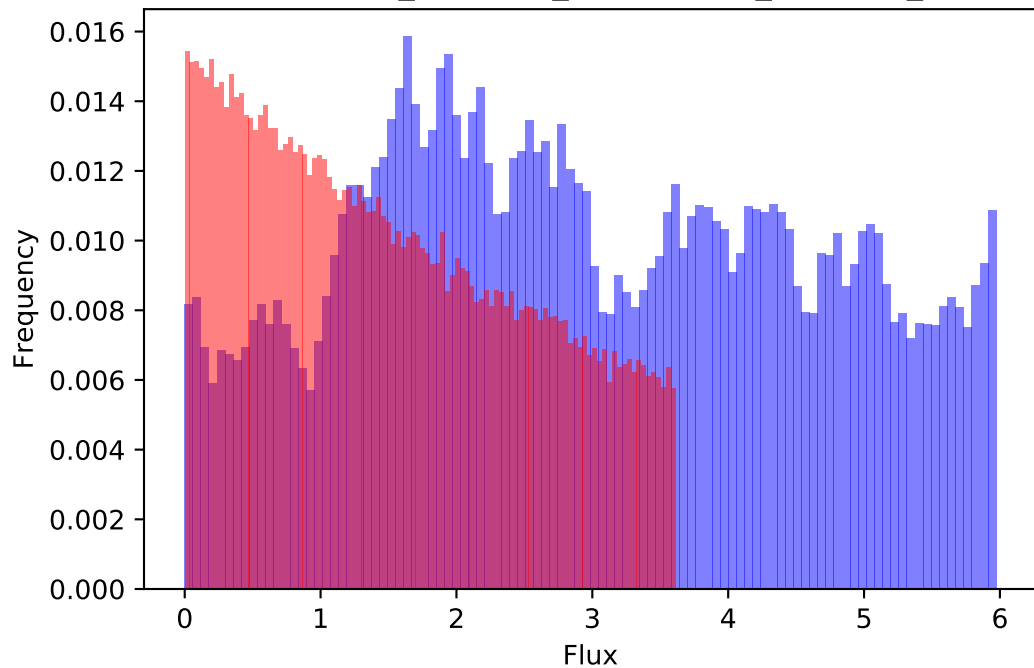
325 : ADP\_h --> ADP\_c



326 : ATP\_h --> ATP\_c

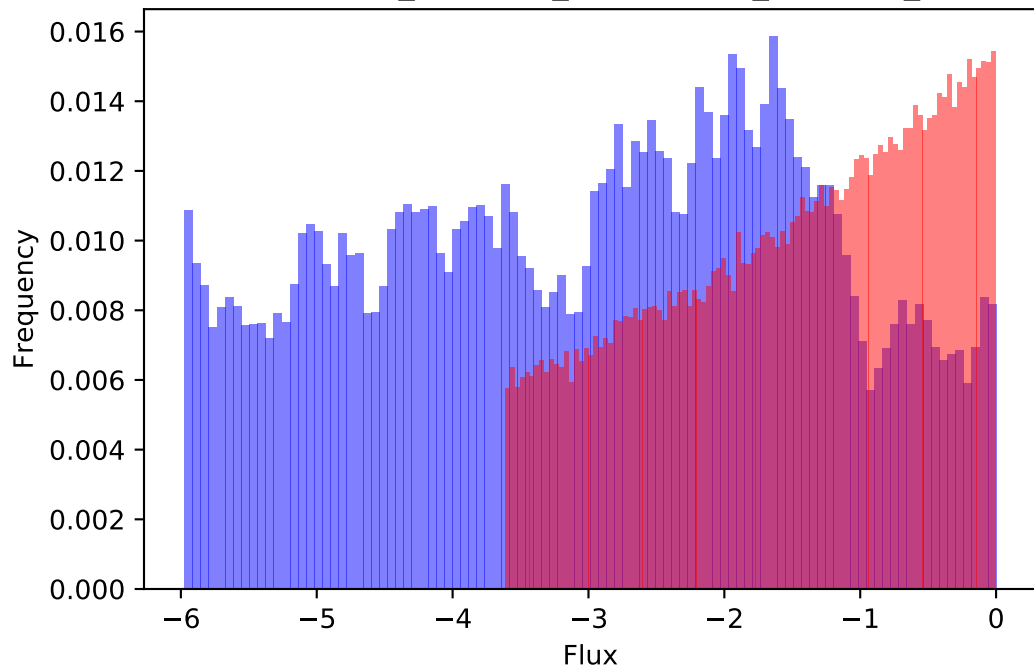


**\*\*327 : AMP\_h + NAD\_c <=> AMP\_c + NAD\_h\*\***

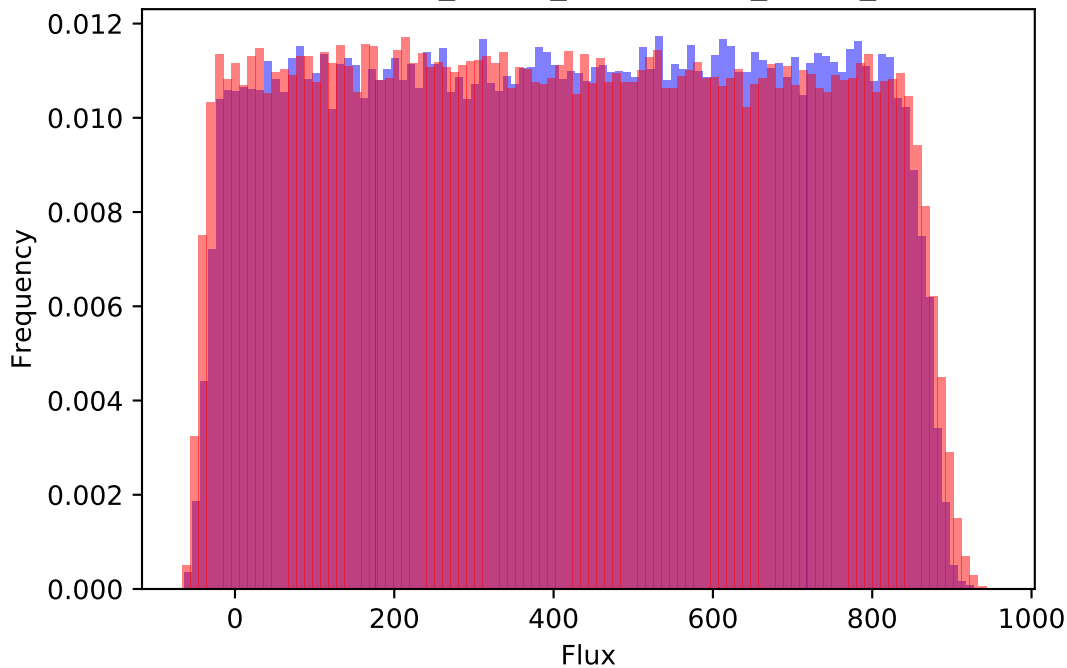




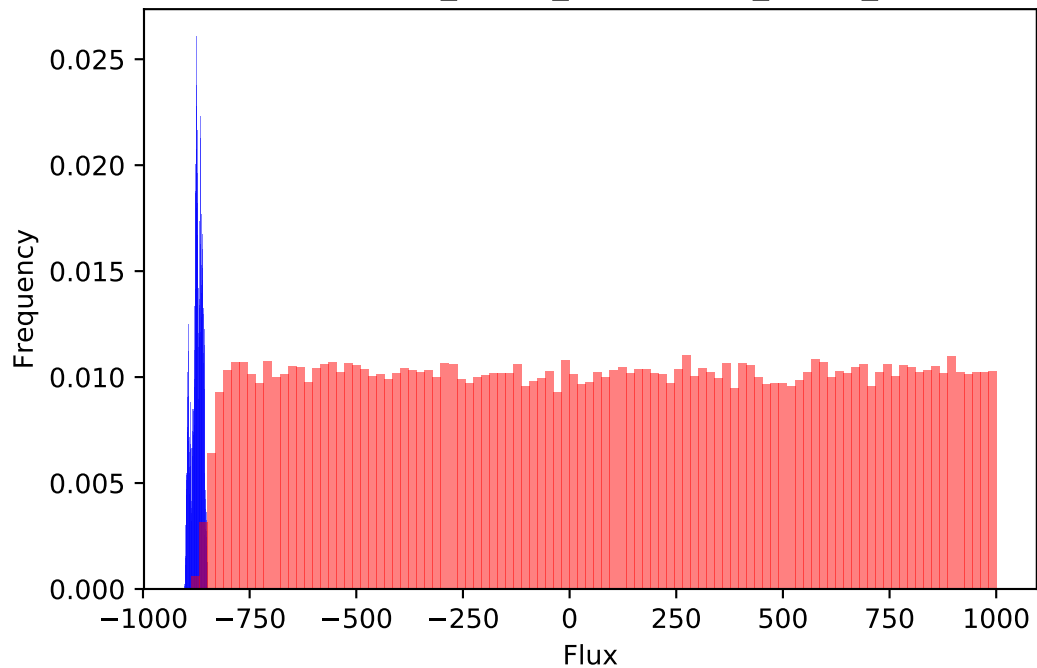
**\*\*328 : ADP\_h + NAD\_c <=> ADP\_c + NAD\_h\*\***



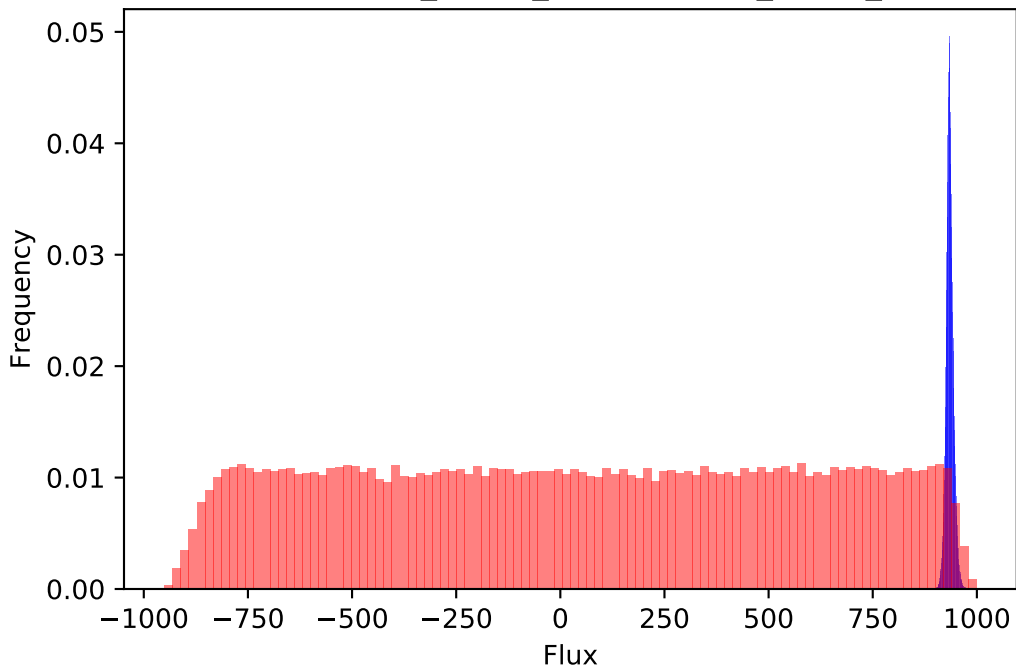
**\*\*329 : PGA\_h + Pi\_c <=> PGA\_c + Pi\_h\*\***



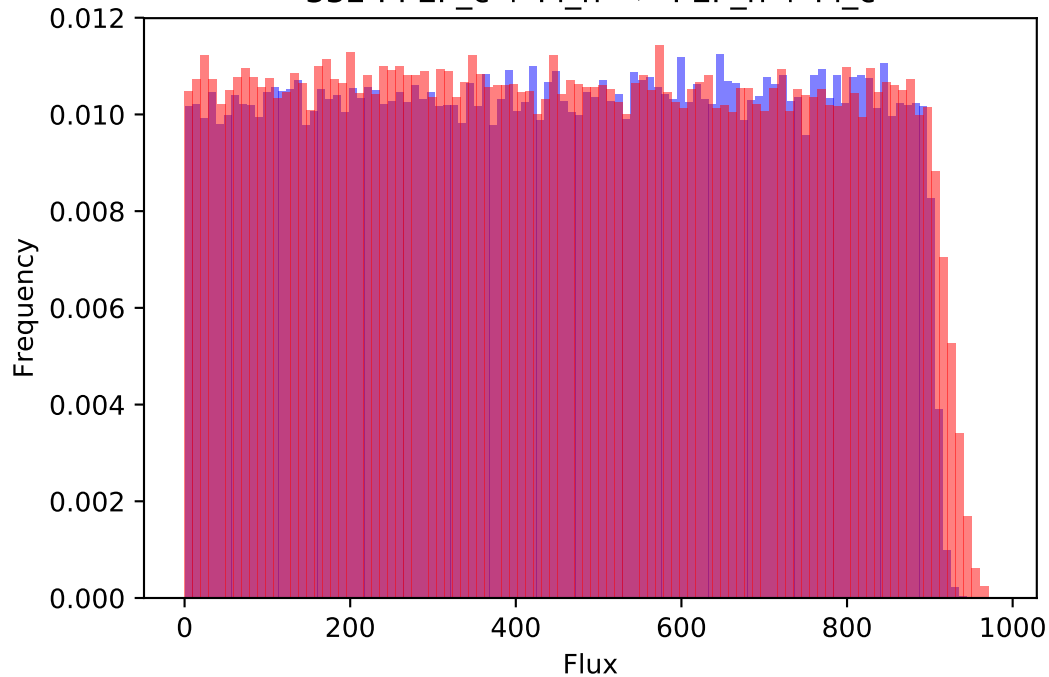
**\*\*330 : GAP\_h + Pi\_c <=> GAP\_c + Pi\_h\*\***



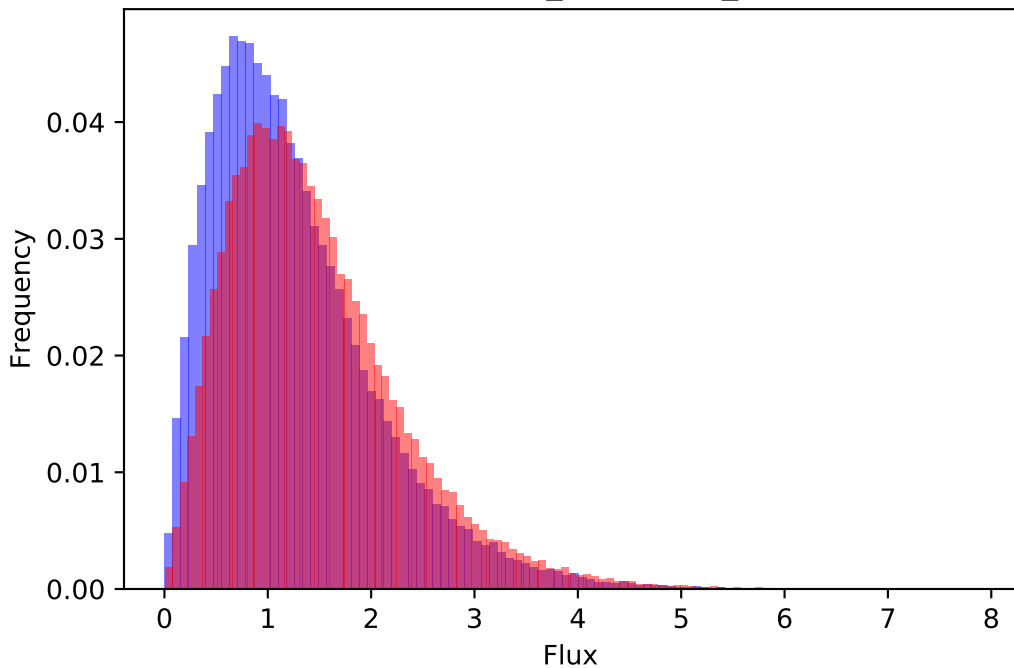
**\*\*331 : DHAP\_h + Pi\_c <=> DHAP\_c + Pi\_h\*\***



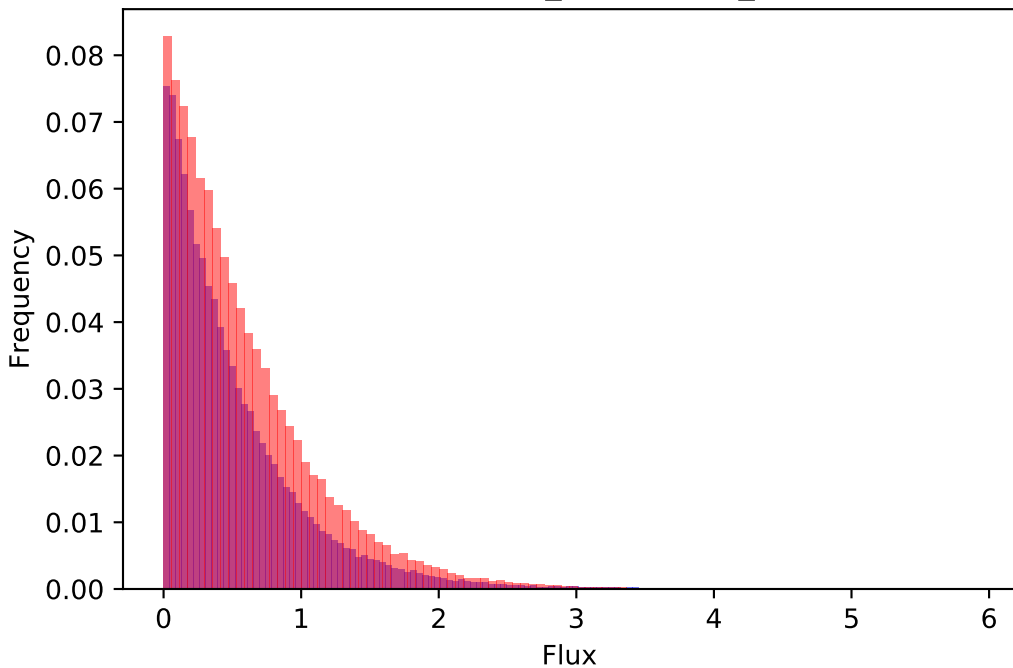
**\*\*332 : PEP\_c + Pi\_h --> PEP\_h + Pi\_c\*\***



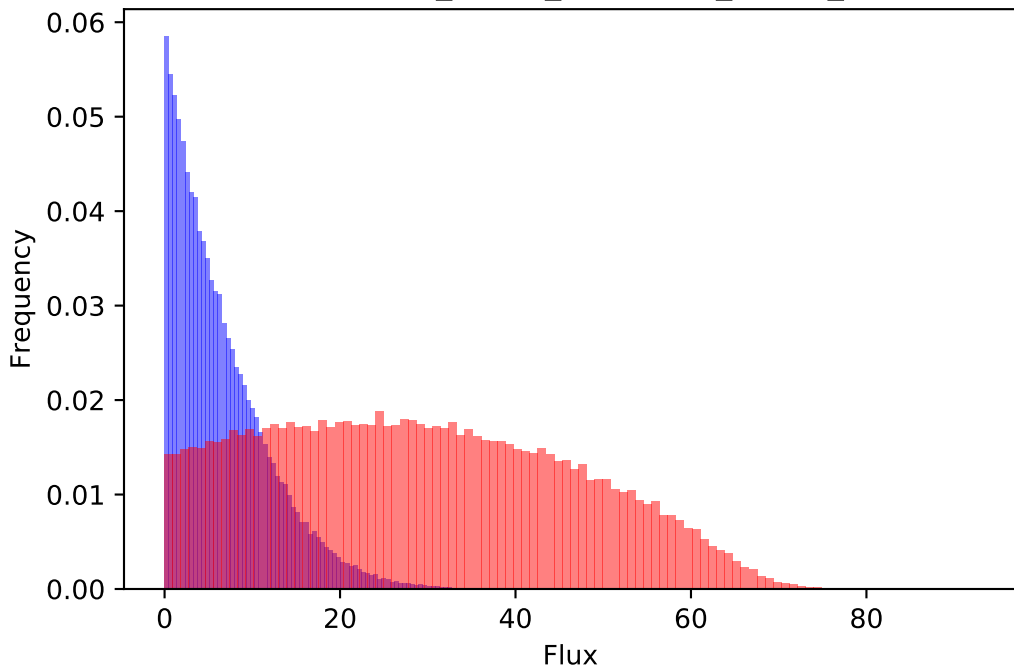
**\*\*333 : GCA\_h --> GCA\_c\*\***



**\*\*334 : GCEA\_c --> GCEA\_h\*\***

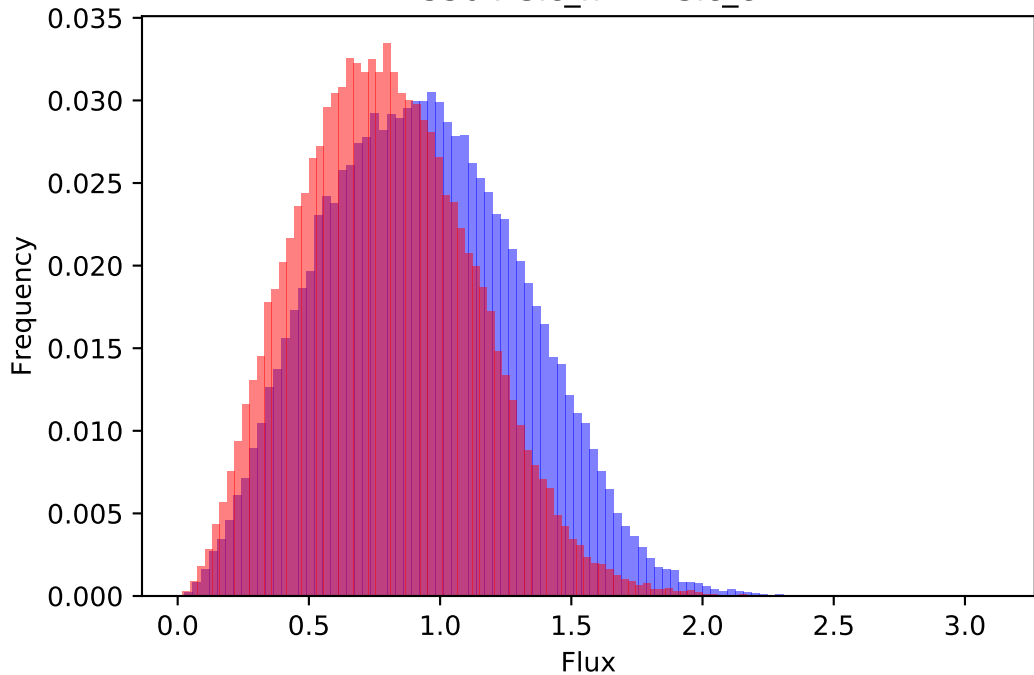


**\*\*335 : G6P\_c + Pi\_h --> G6P\_h + Pi\_c\*\***

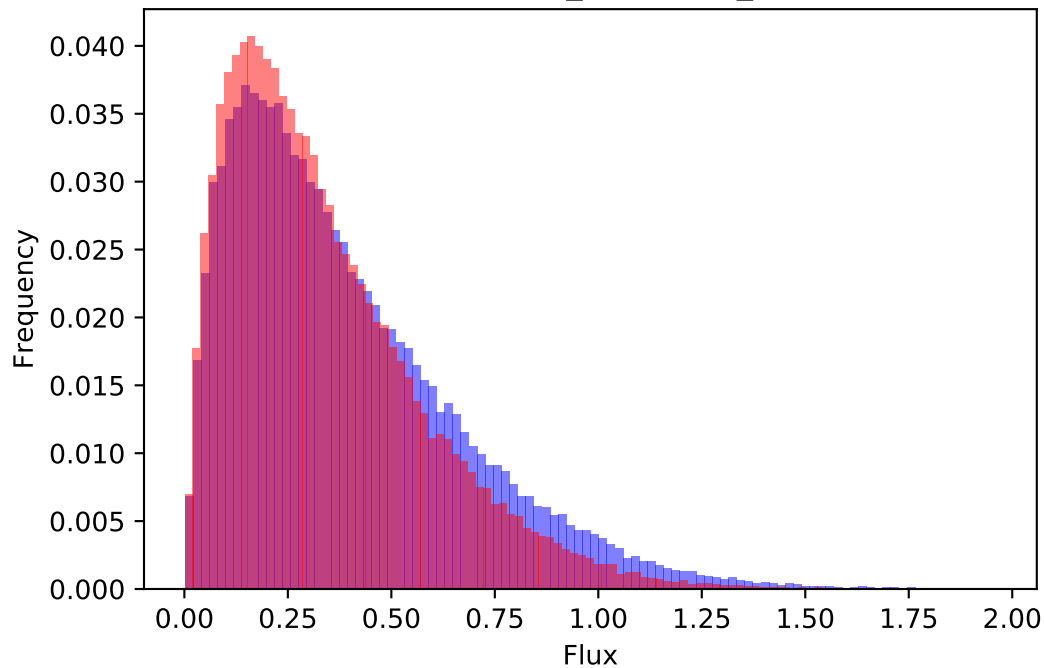




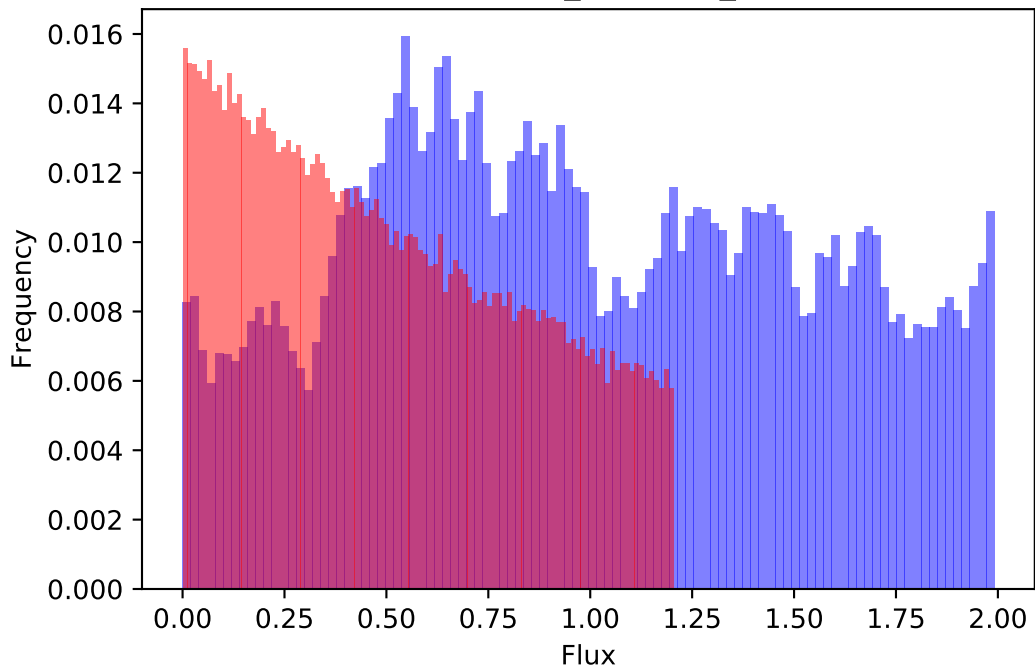
**\*\*336 : Glc\_h --> Glc\_c\*\***



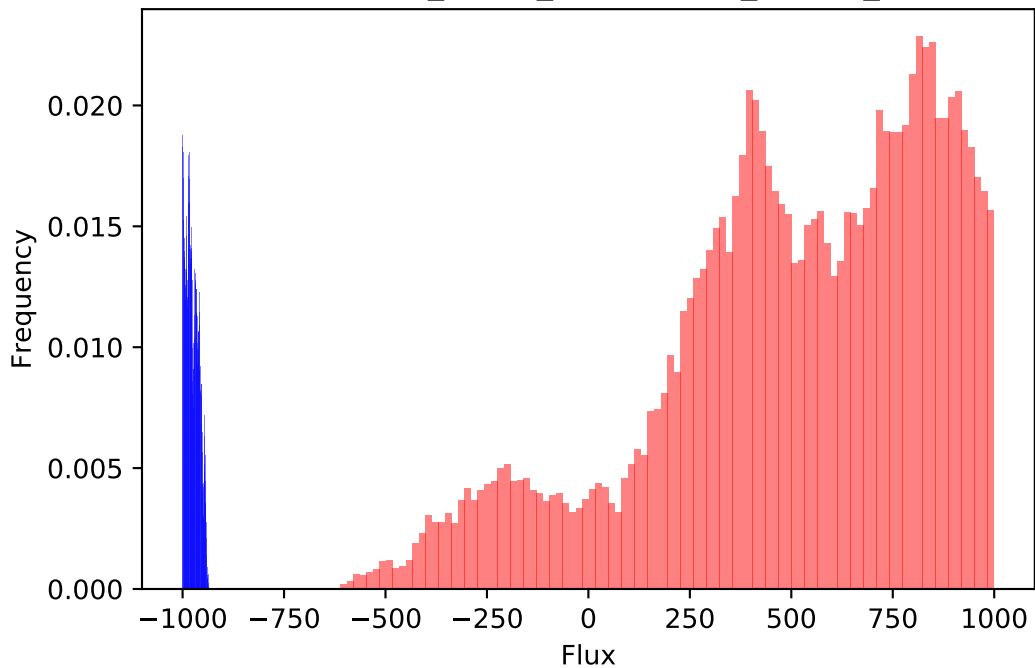
**\*\*337 : Mas\_h --> Mas\_c\*\***



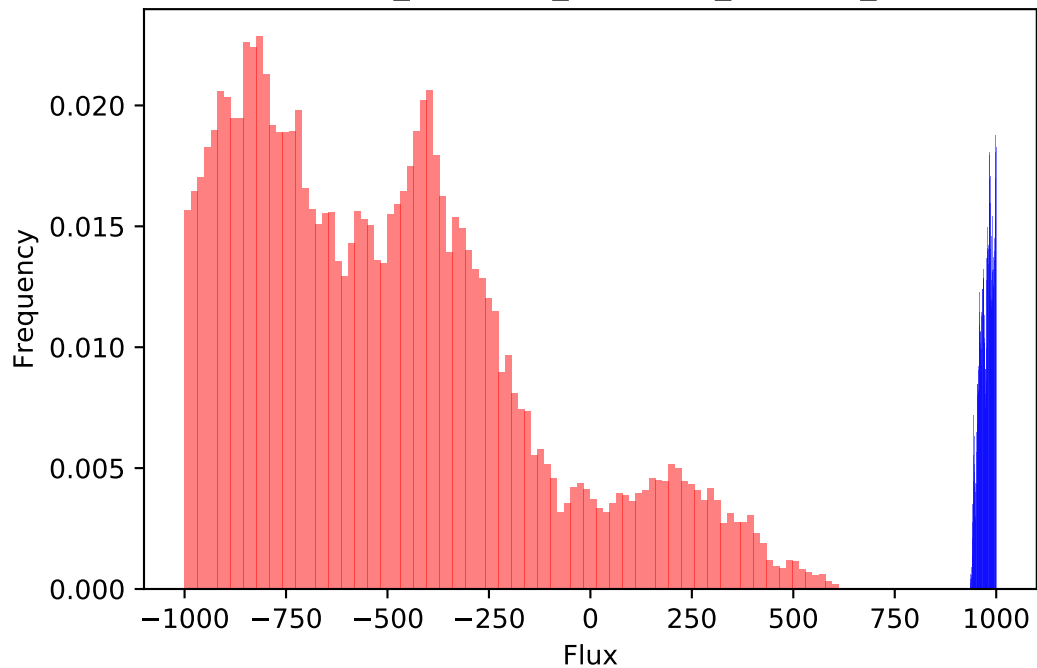
**\*\*338 : Rib\_c --> Rib\_h\*\***



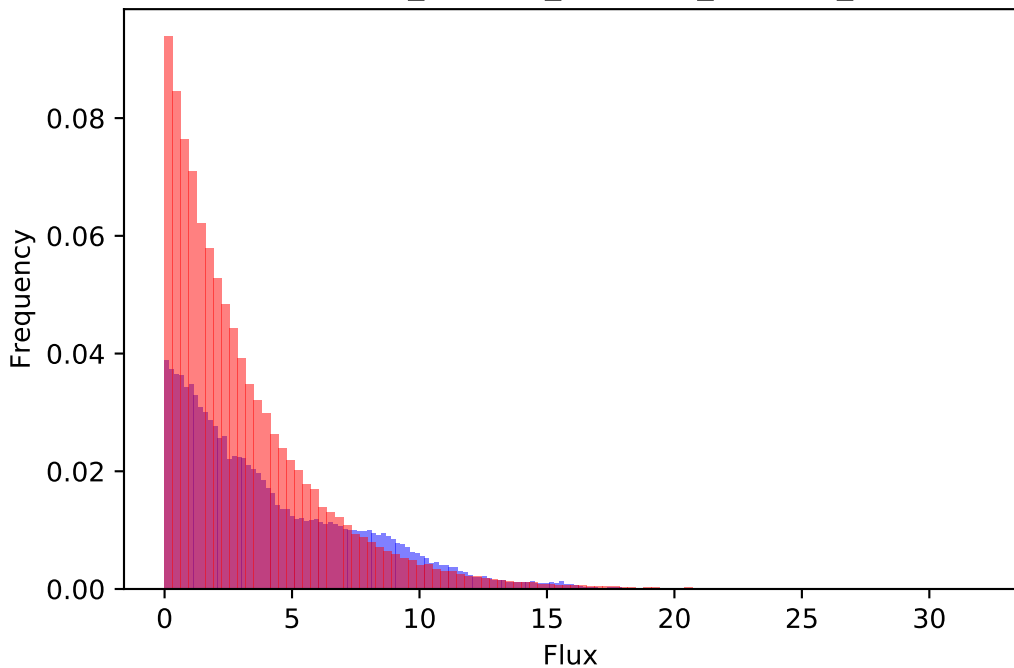
**\*\*339 : Mal\_c + Pi\_m <=> Mal\_m + Pi\_c\*\***



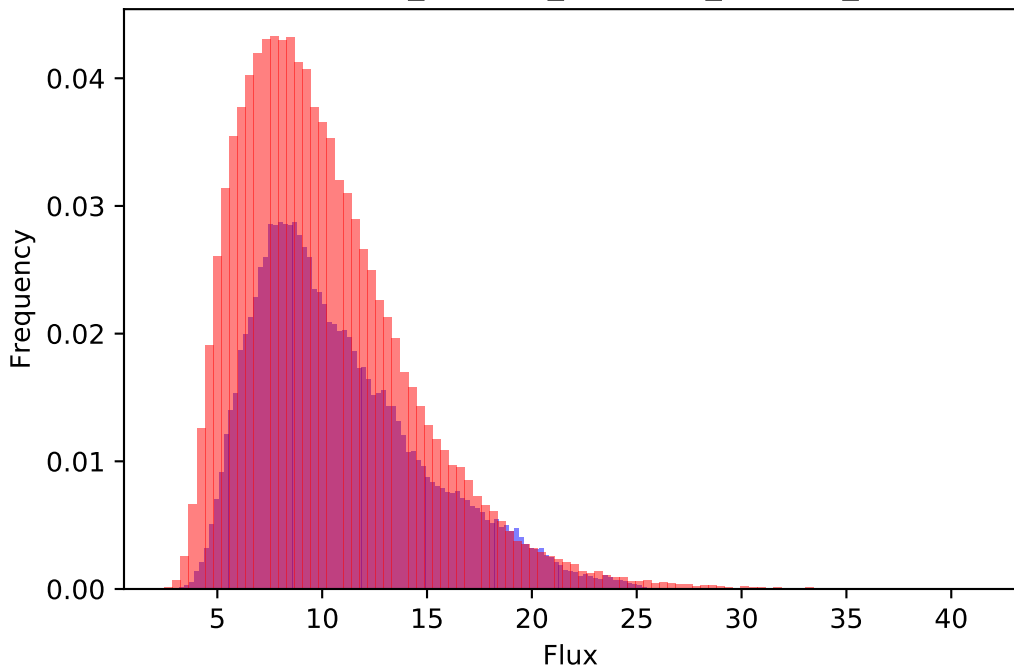
**\*\*340 : Pi\_m + SCA\_c <=> Pi\_c + SCA\_m\*\***



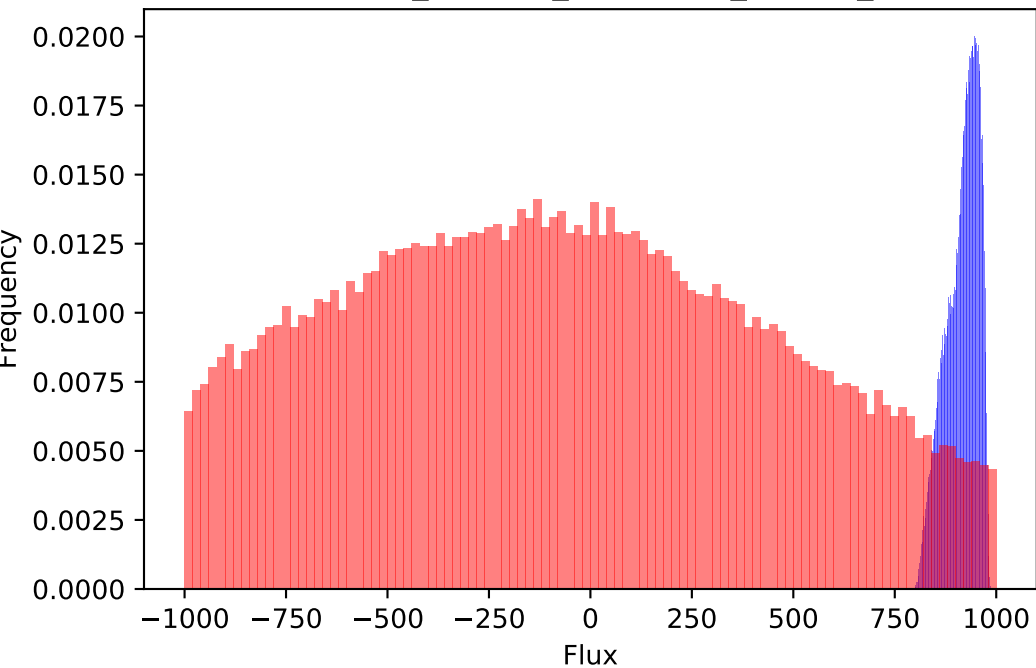
**\*\*341 : KG\_c + Mal\_h --> KG\_h + Mal\_c\*\***



**\*\*342 : Glu\_h + Mal\_c --> Glu\_c + Mal\_h\*\***

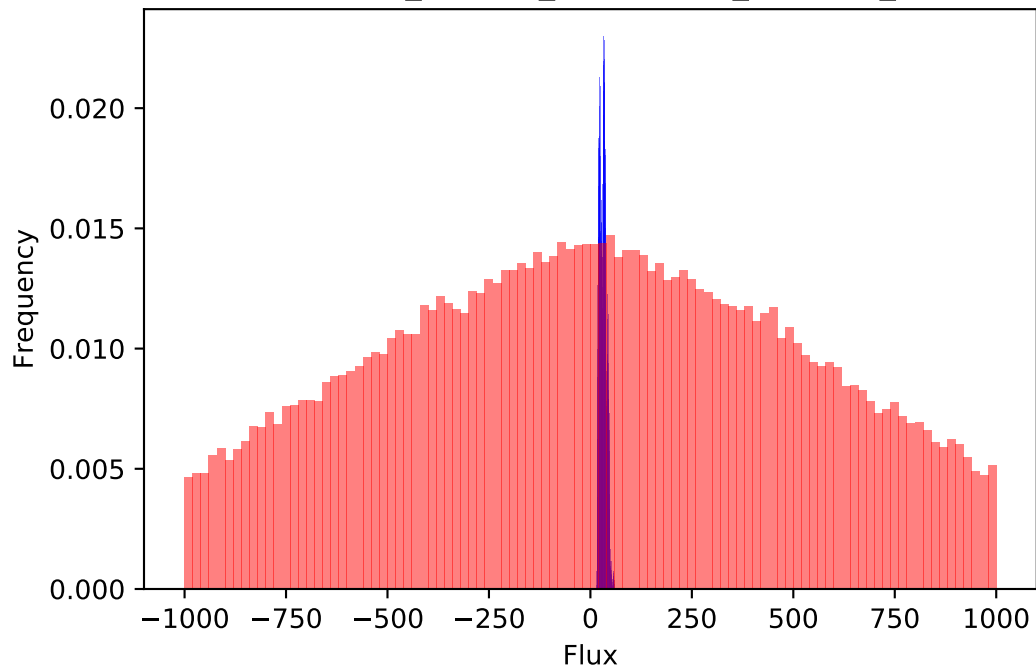


**\*\*343 : Cit\_m + KG\_c <=> Cit\_c + KG\_m\*\***

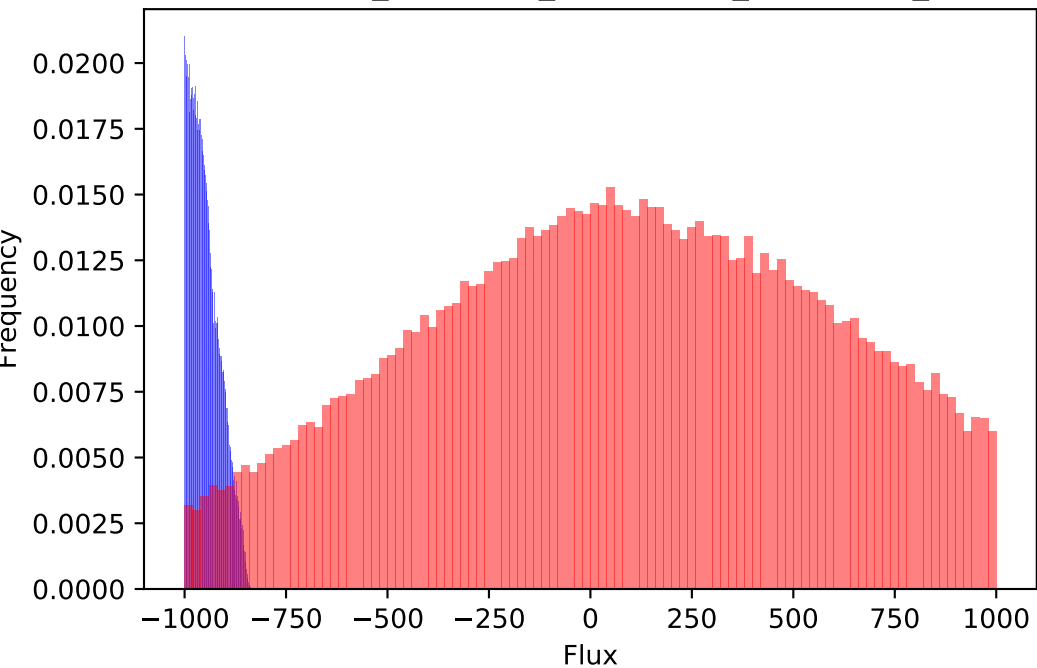




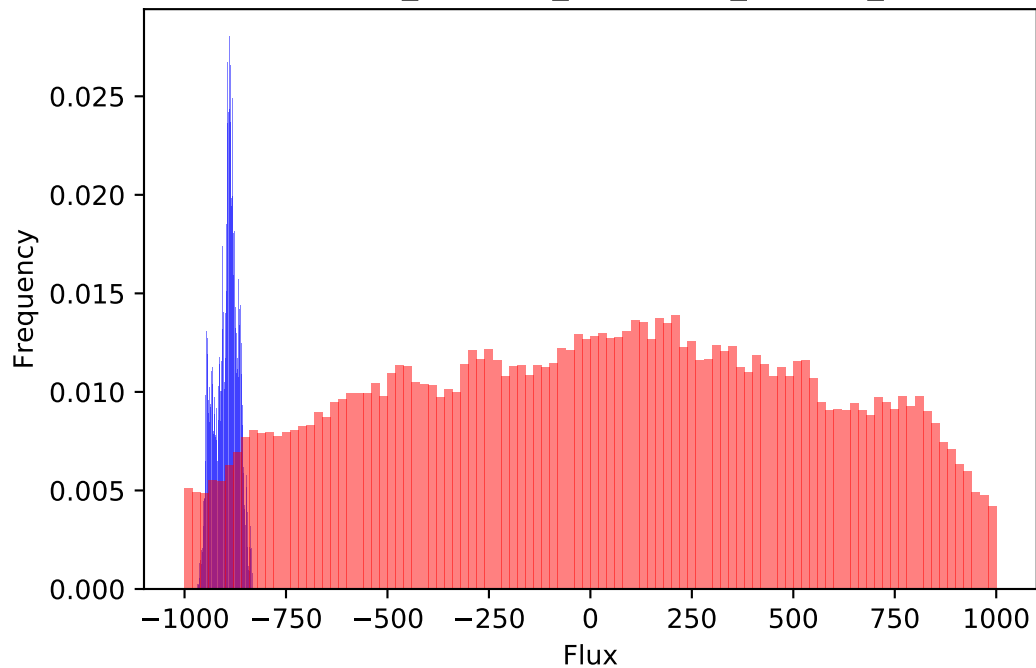
**\*\*344 : KG\_c + iCit\_m <=> KG\_m + iCit\_c\*\***



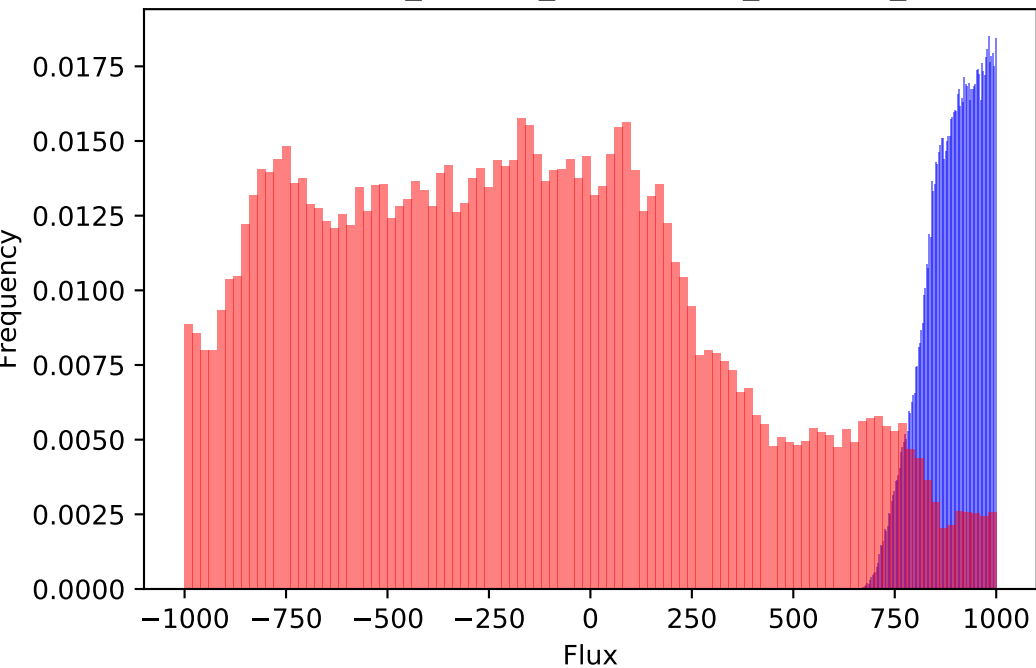
**\*\*345 : KG\_c + cACN\_m <=> KG\_m + cACN\_c\*\***



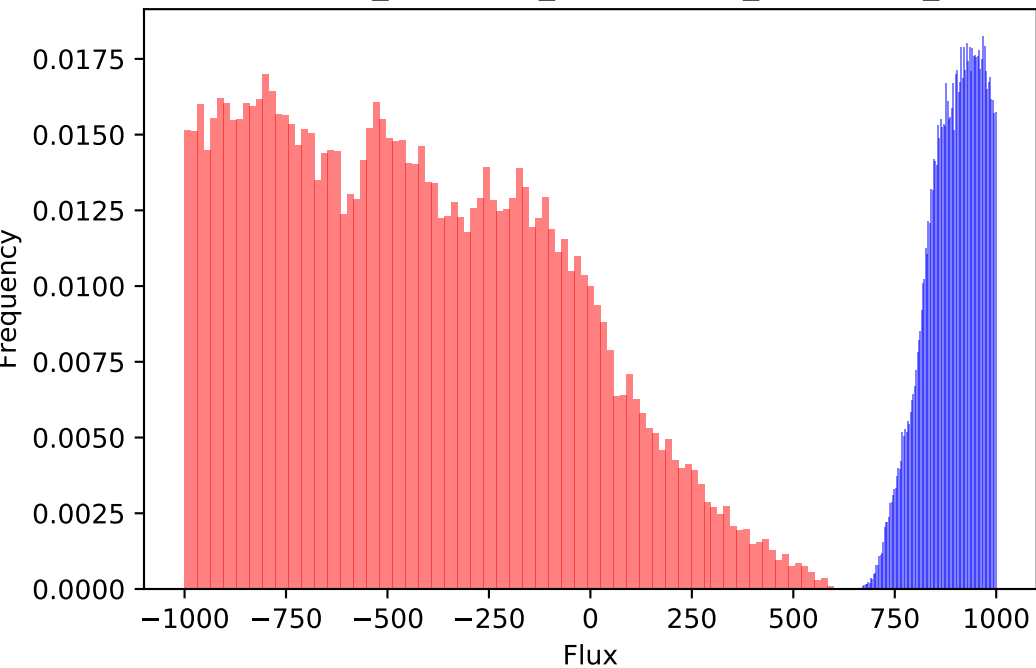
**\*\*346 : Cit\_m + Mal\_c <=> Cit\_c + Mal\_m\*\***



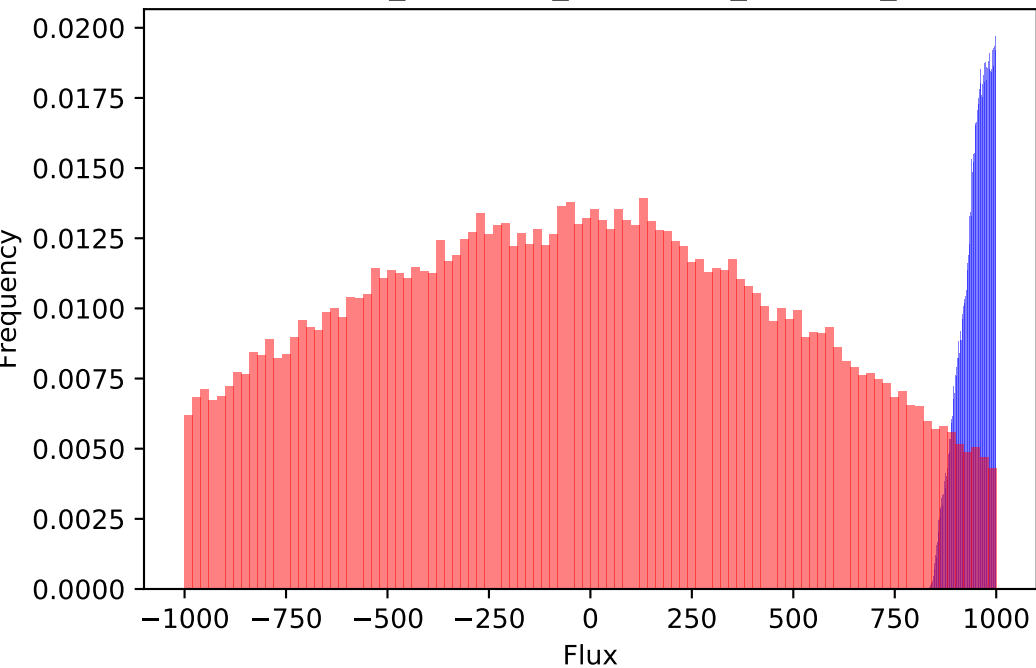
**\*\*347 : Mal\_c + iCit\_m <=> Mal\_m + iCit\_c\*\***



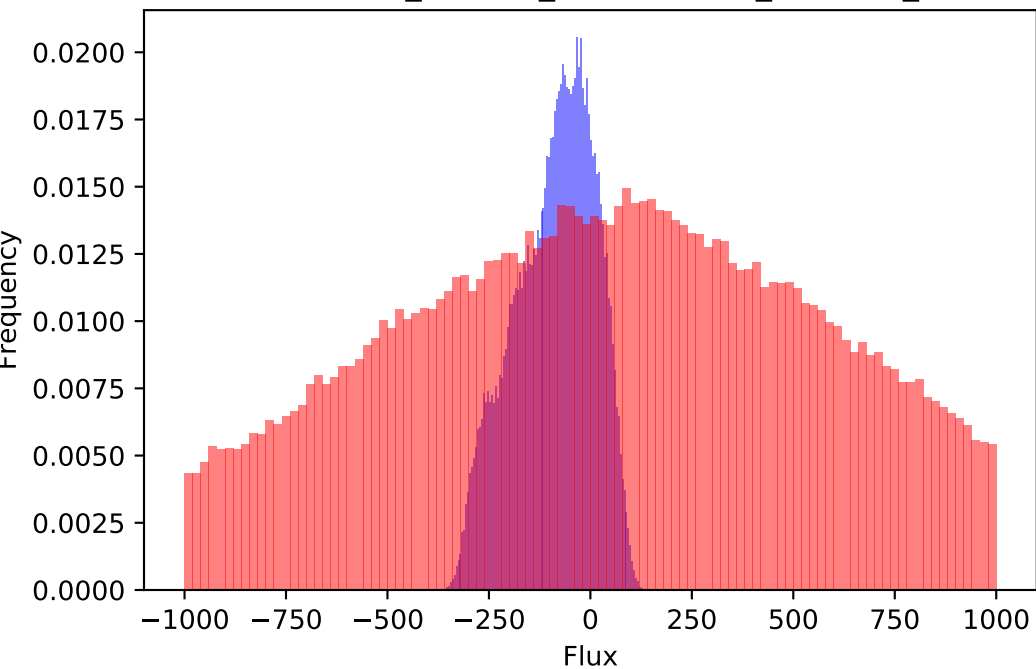
**\*\*348 : Mal\_c + cACN\_m <=> Mal\_m + cACN\_c\*\***



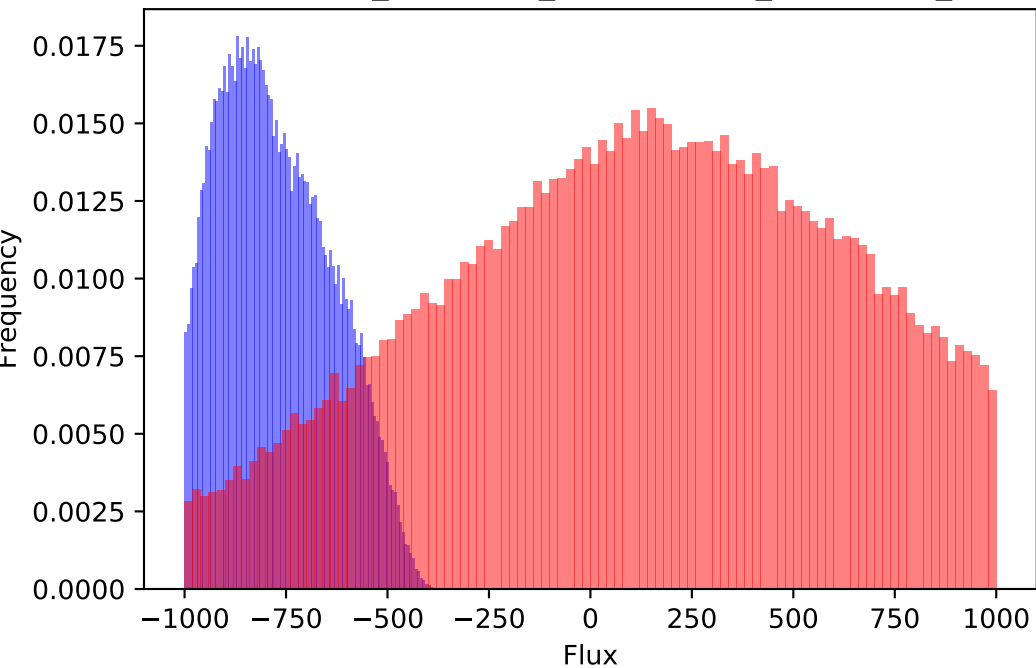
**\*\*349 : Cit\_m + OAA\_c <=> Cit\_c + OAA\_m\*\***



**\*\*350 : OAA\_c + iCit\_m <=> OAA\_m + iCit\_c\*\***

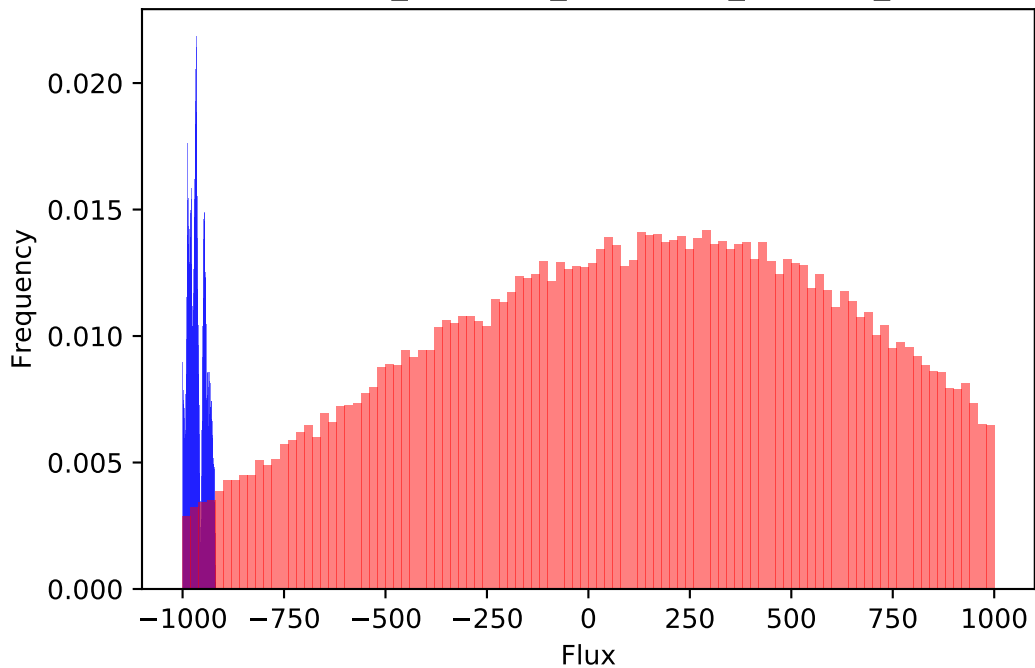


**\*\*351 : OAA\_c + cACN\_m <=> OAA\_m + cACN\_c\*\***

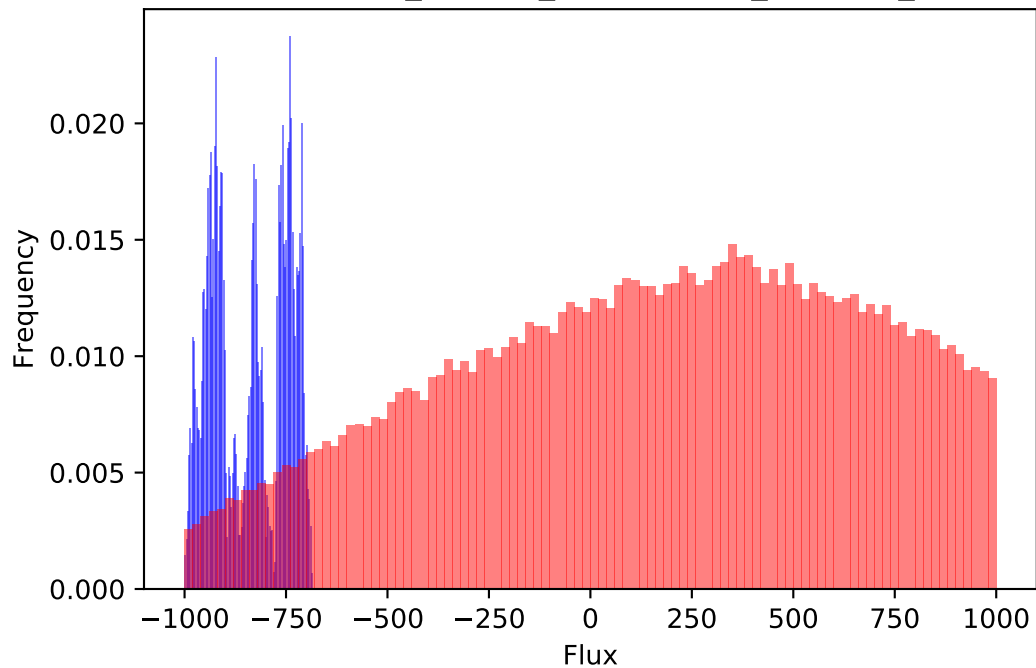




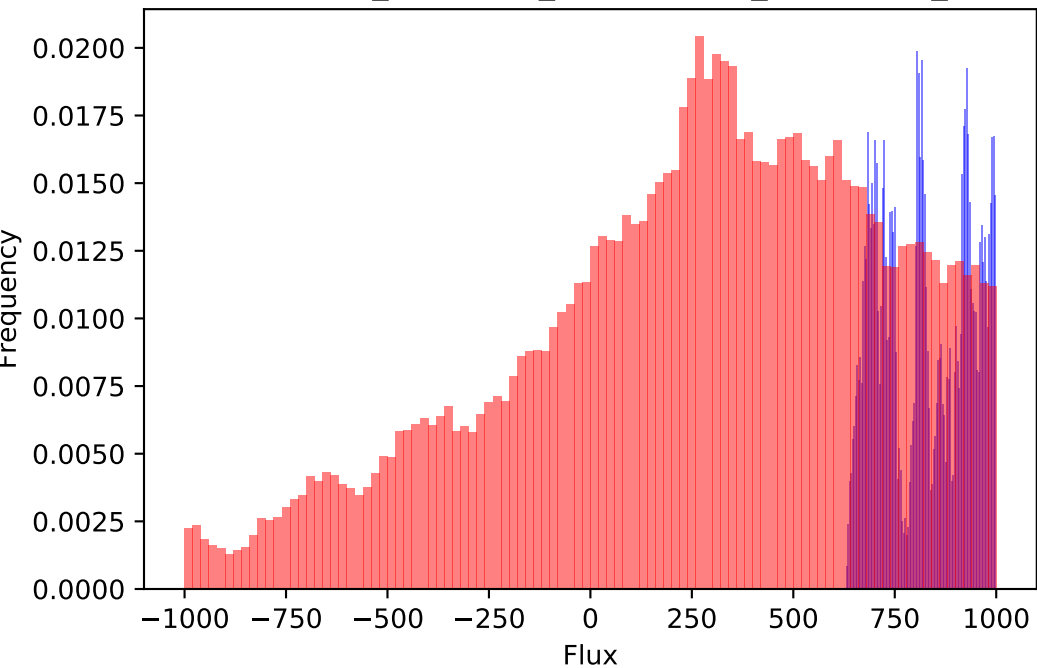
**\*\*352 : Cit\_m + SCA\_c <=> Cit\_c + SCA\_m\*\***



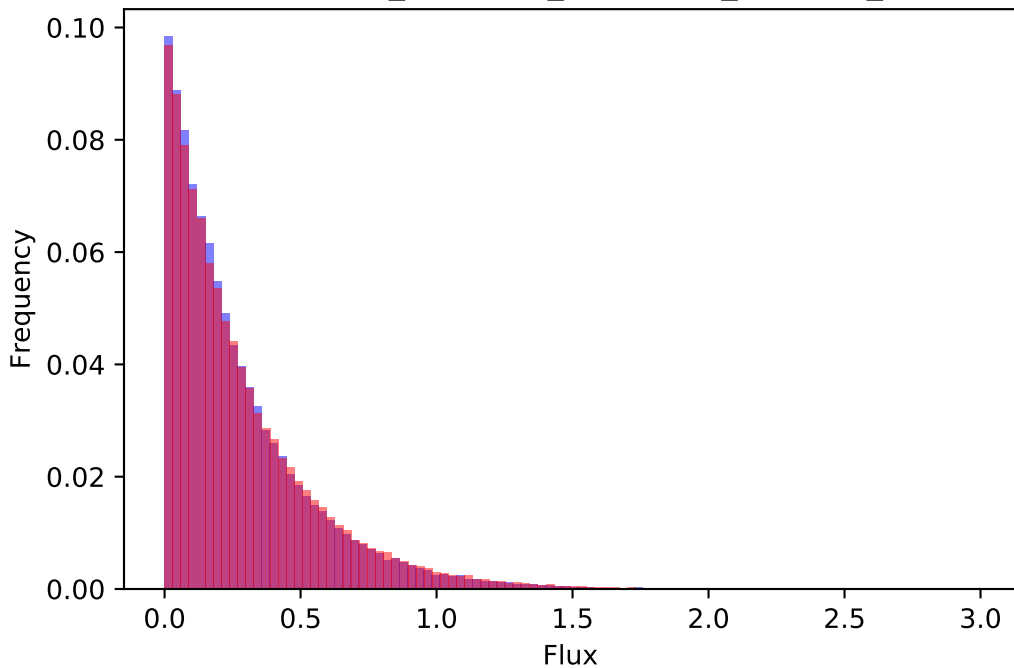
**\*\*353 : SCA\_c + iCit\_m <=> SCA\_m + iCit\_c\*\***



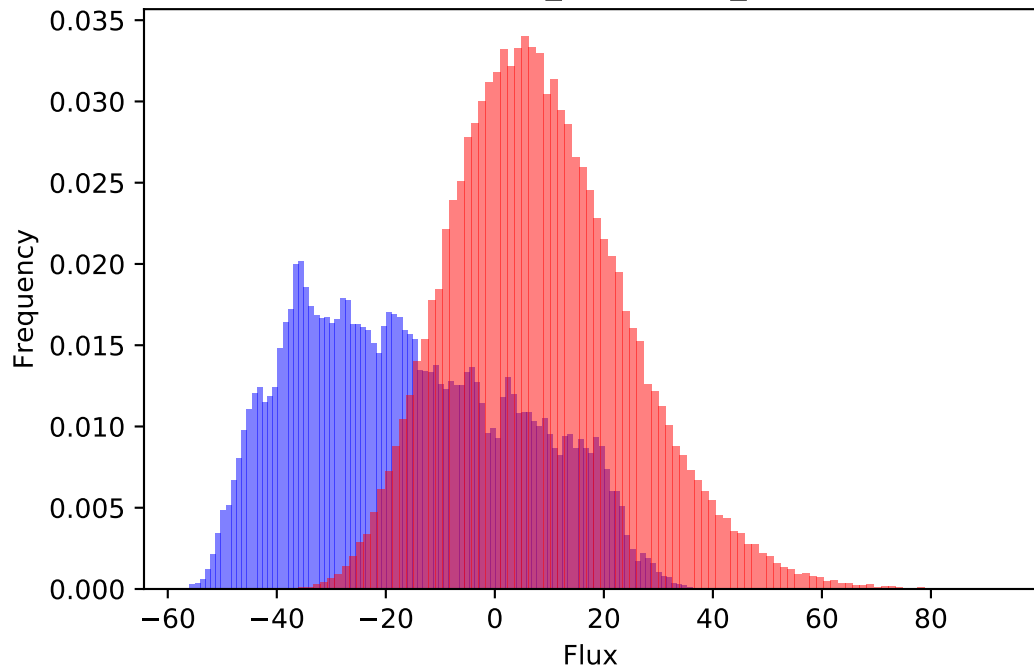
**\*\*354 : SCA\_c + cACN\_m <=> SCA\_m + cACN\_c\*\***



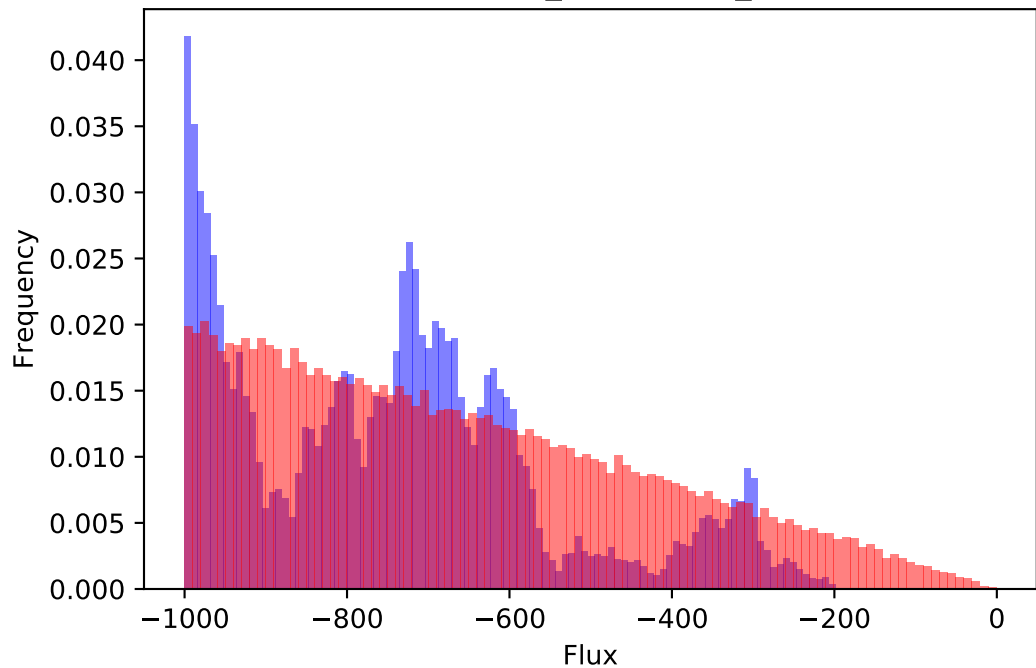
**\*\*355 : Fum\_m + SCA\_c --> Fum\_c + SCA\_m\*\***



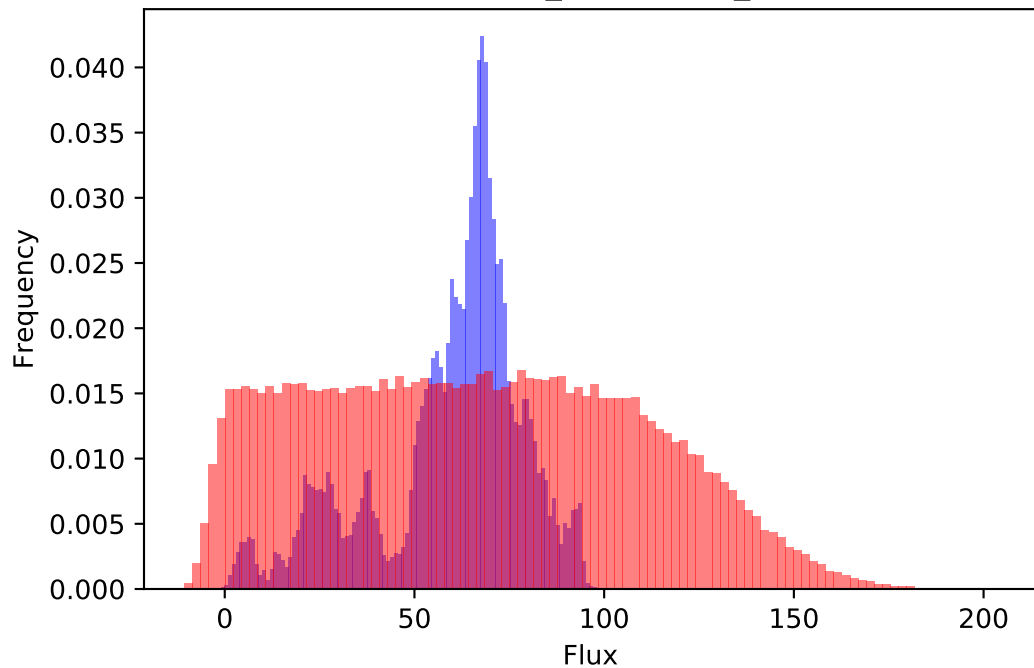
**\*\*356 : Ala\_c <=> Ala\_m\*\***



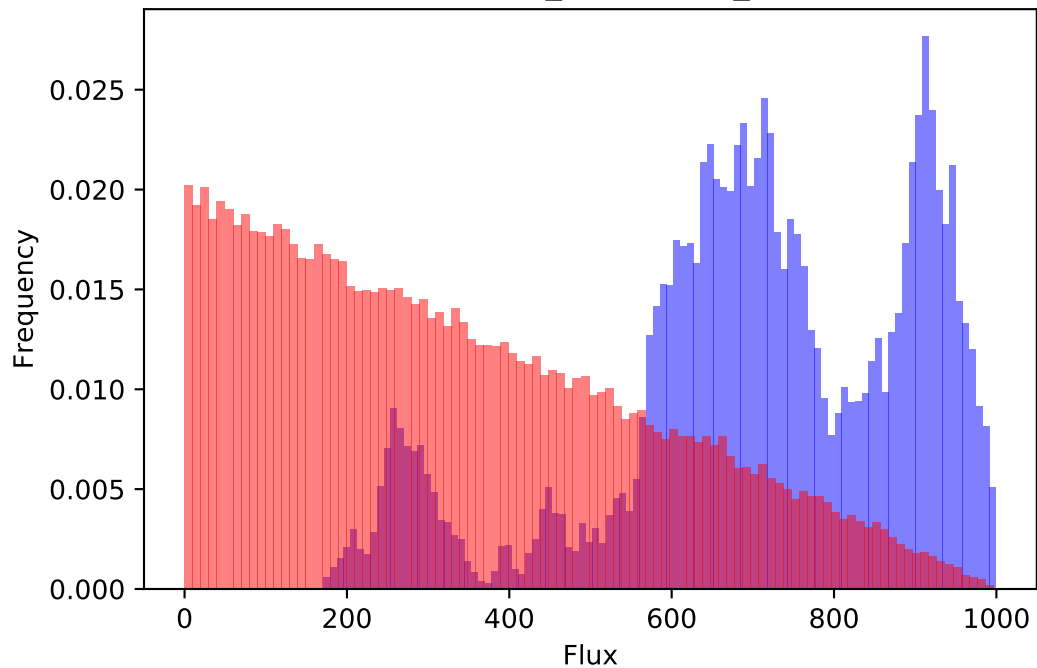
**\*\*357 : Arg\_c <=> Arg\_m\*\***



**\*\*358 : Glu\_c <=> Glu\_m\*\***

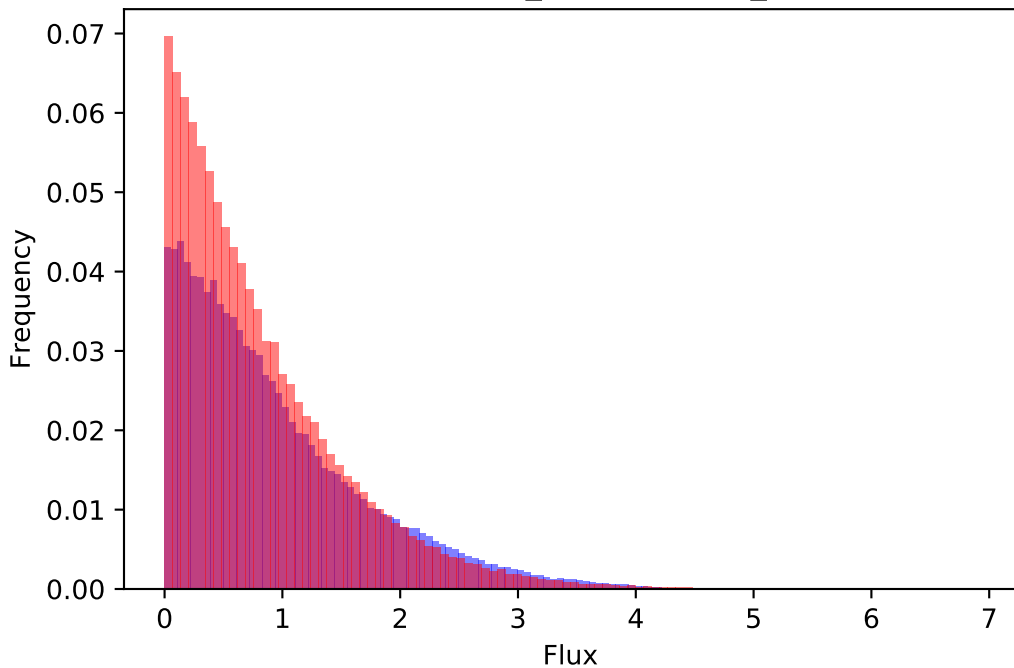


**\*\*359 : Lys\_c <=> Lys\_m\*\***

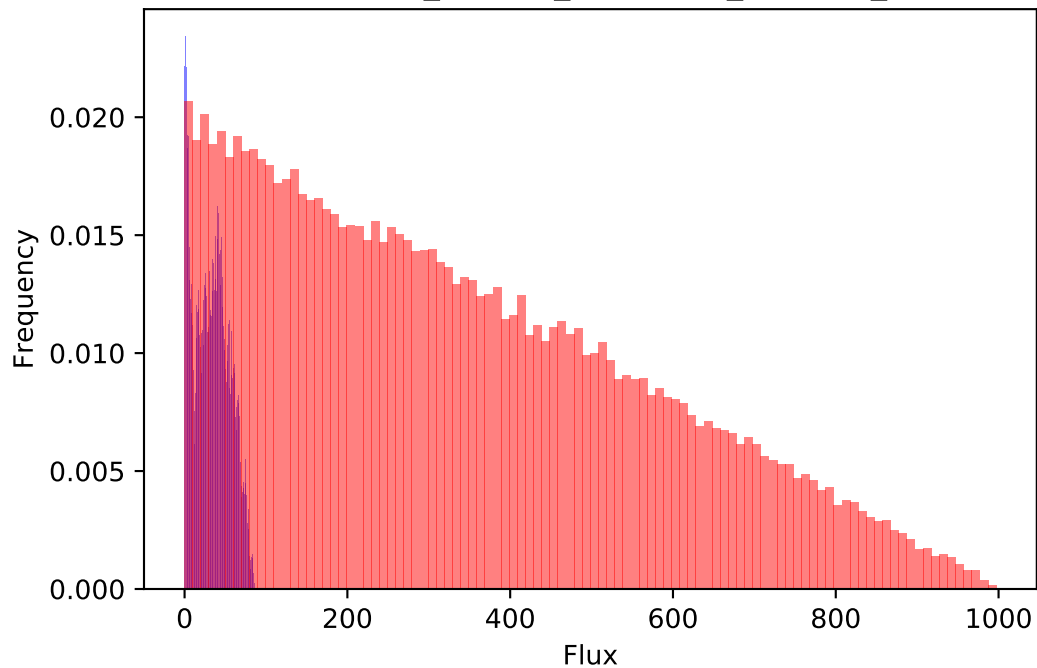




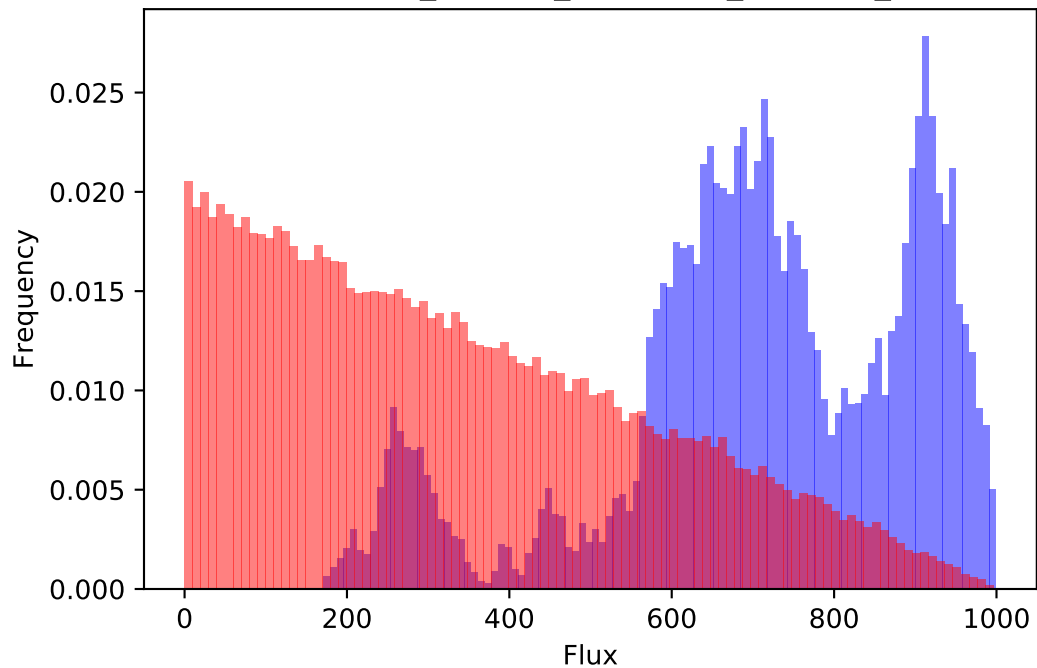
**\*\*360 : GABA\_c <=> GABA\_m\*\***



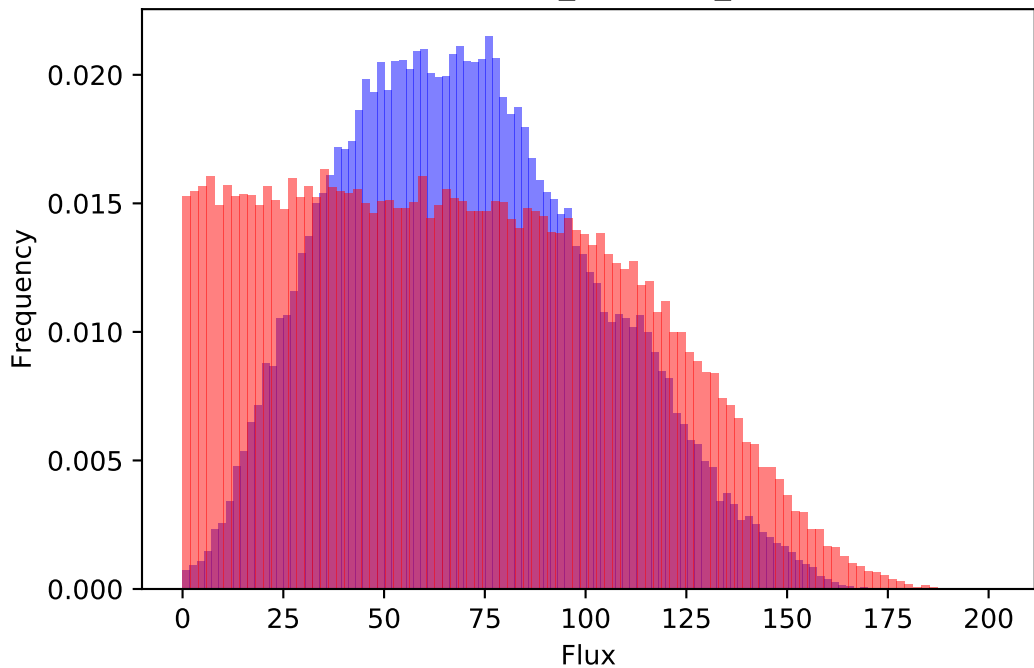
**\*\*361 : Arg\_c + His\_m --> Arg\_m + His\_c\*\***



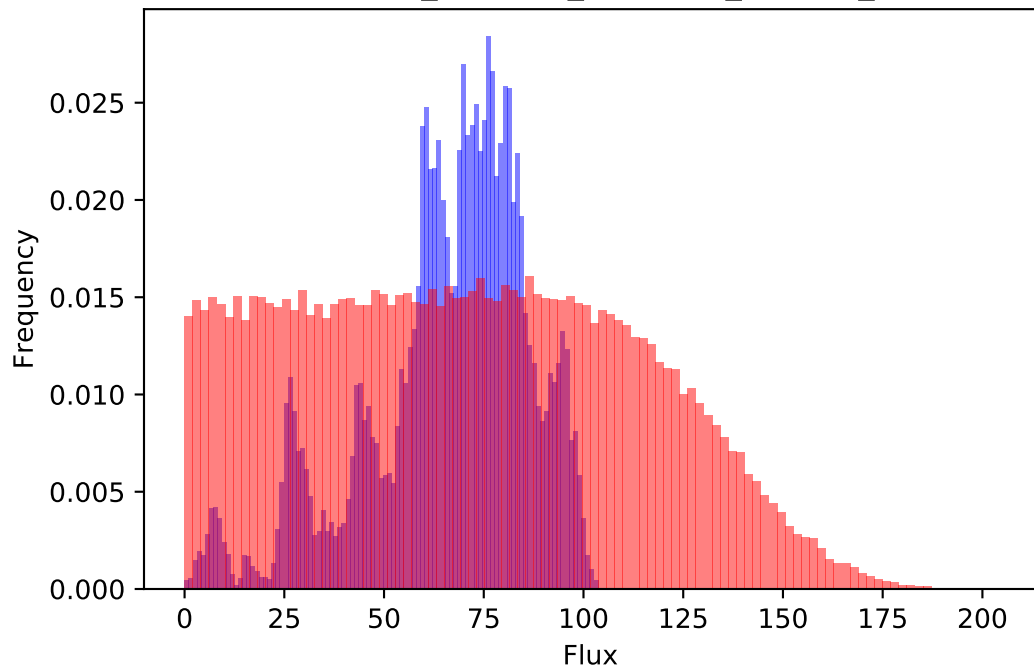
**\*\*362 : Arg\_c + Lys\_m --> Arg\_m + Lys\_c\*\***



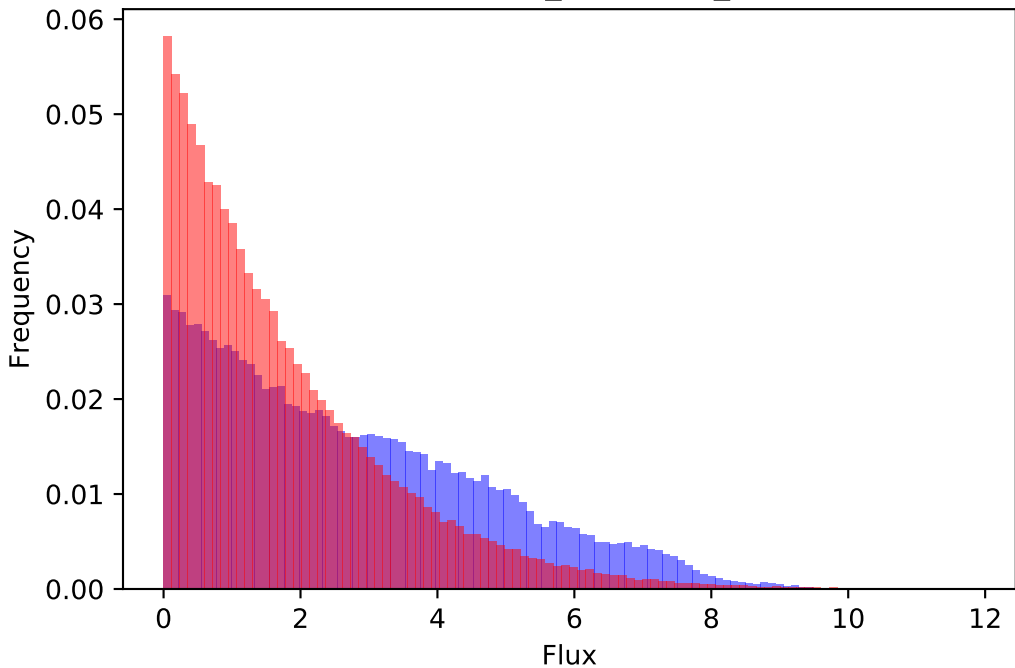
**\*\*363 : Pro\_c --> Pro\_m\*\***



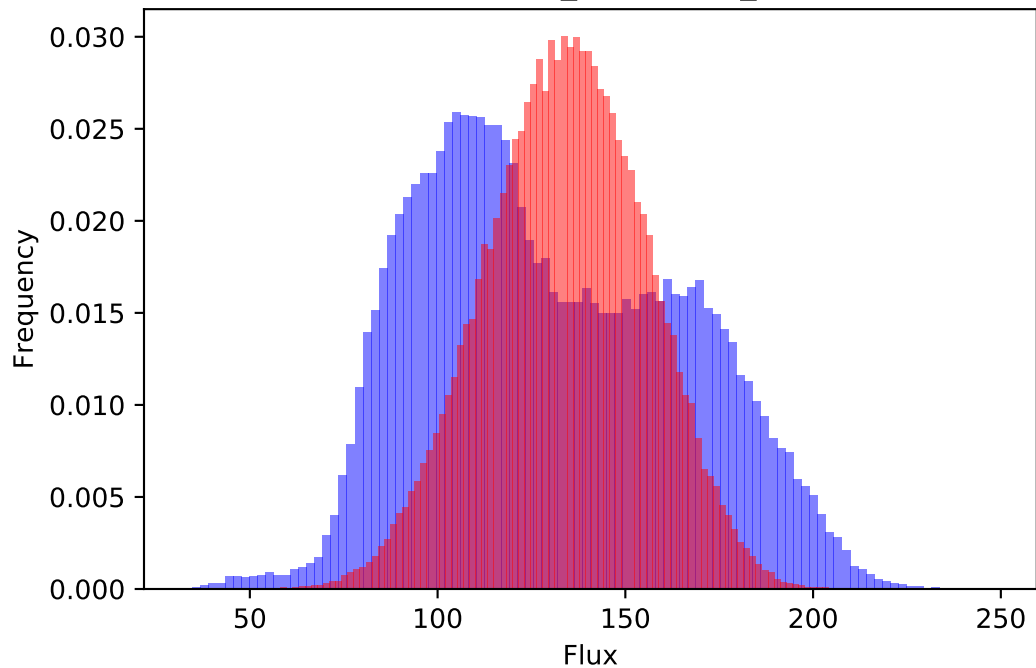
**\*\*364 : Glu\_m + Pro\_c --> Glu\_c + Pro\_m\*\***



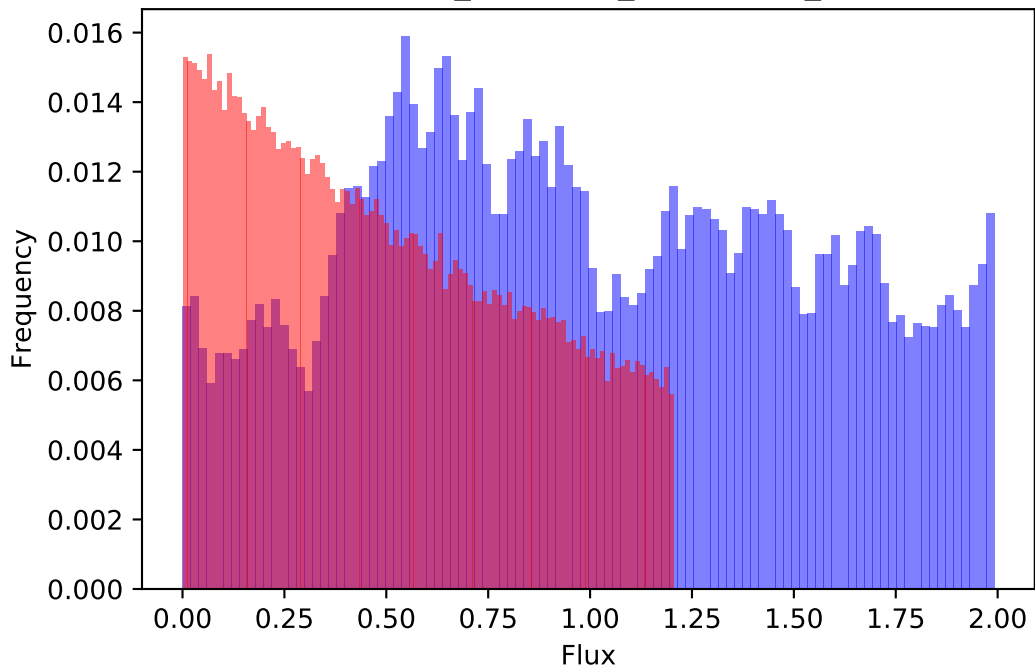
**\*\*365 : P5C\_h --> P5C\_c\*\***



**\*\*366 : P5C\_m --> P5C\_c\*\***

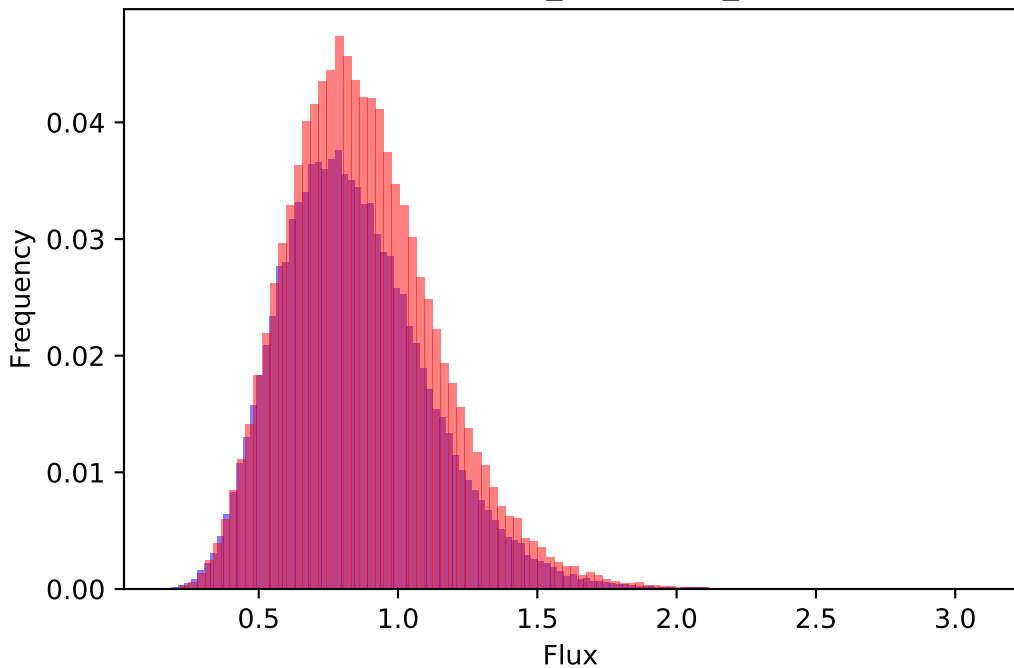


**\*\*367 : H\_h + PRPP\_h --> PRPP\_c\*\***

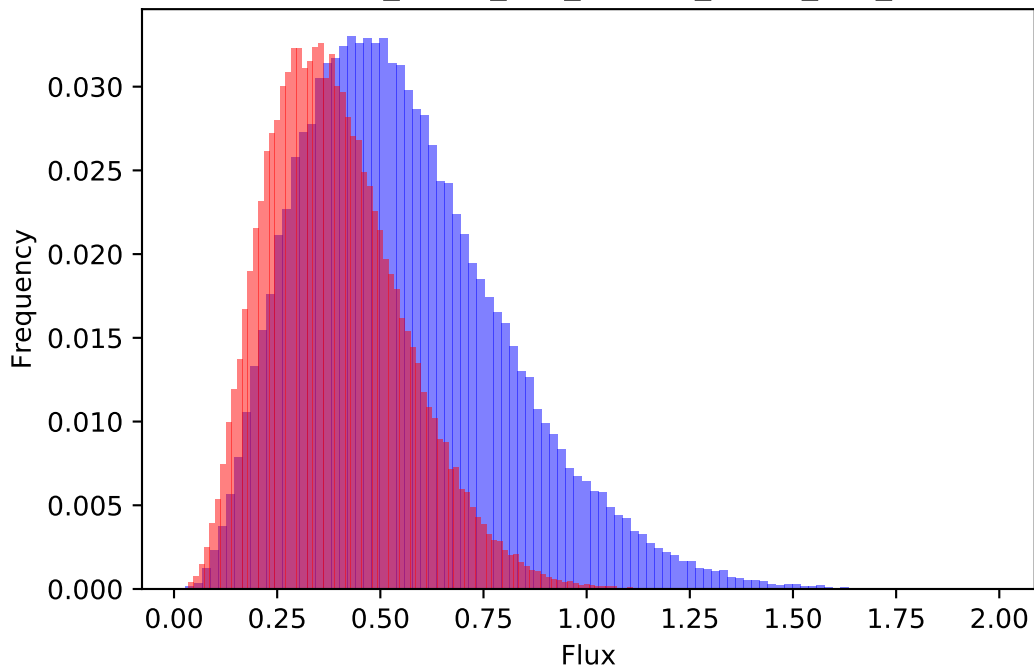




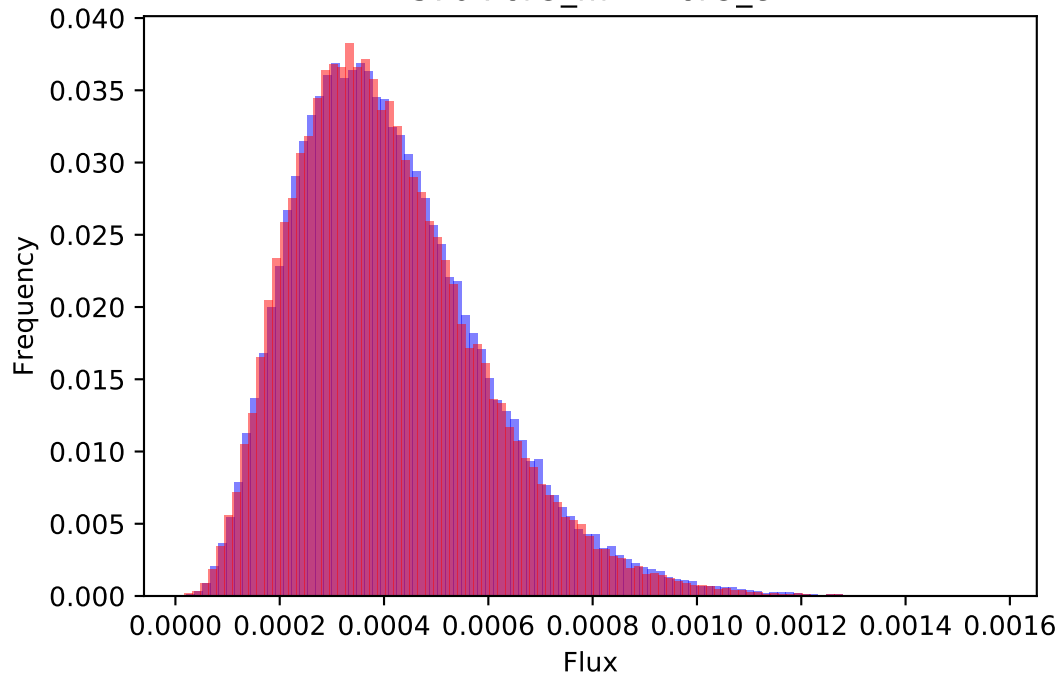
**\*\*368 : Fum\_h --> Fum\_c\*\***



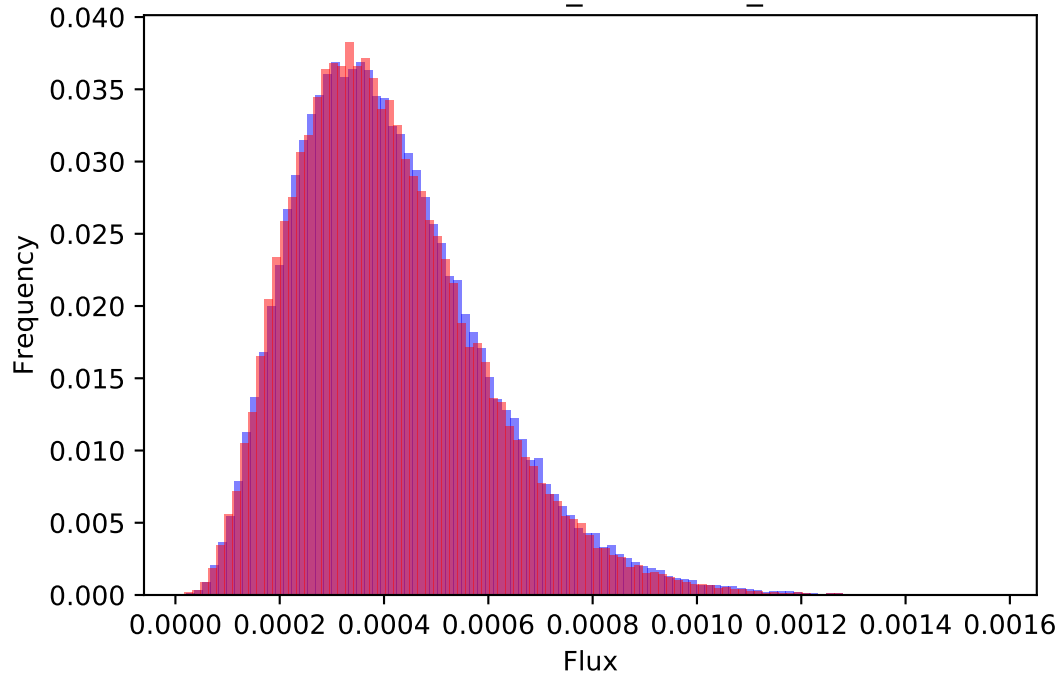
**\*\*369 : H\_DASH\_Cys\_h --> H\_DASH\_Cys\_c\*\***



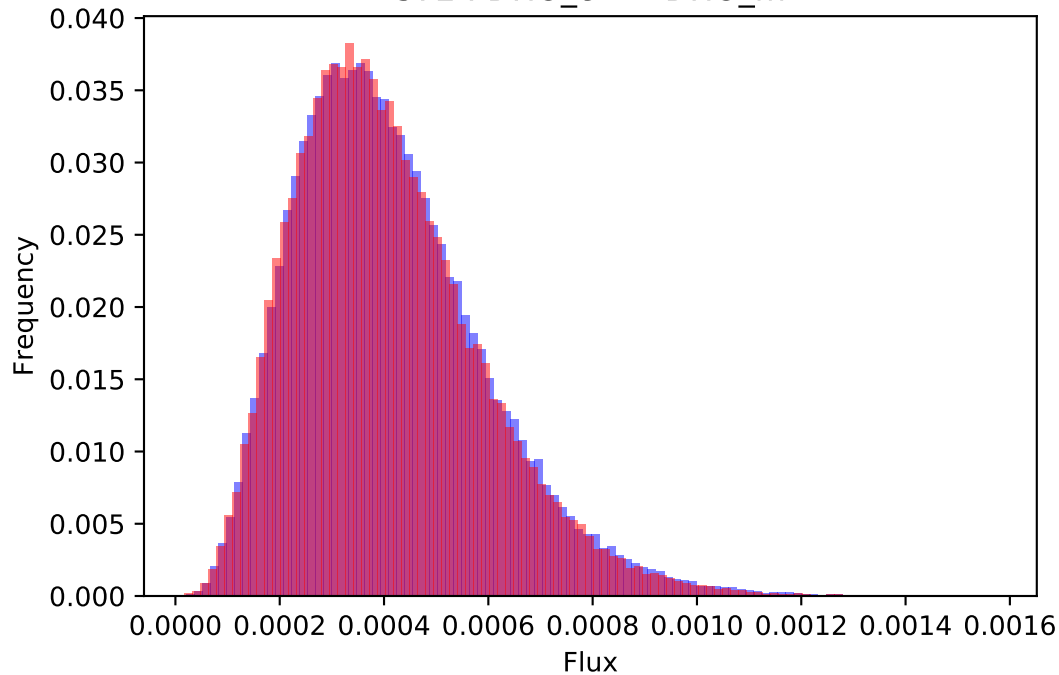
**\*\*370 : orO\_m --> orO\_c\*\***



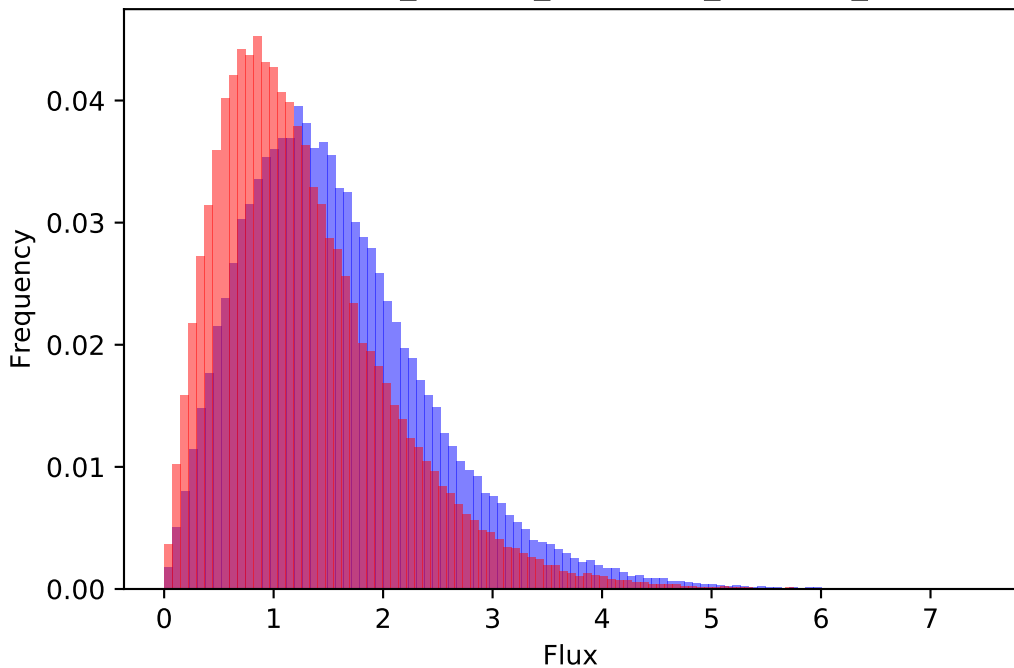
**\*\*371 : DHO\_h --> DHO\_c\*\***



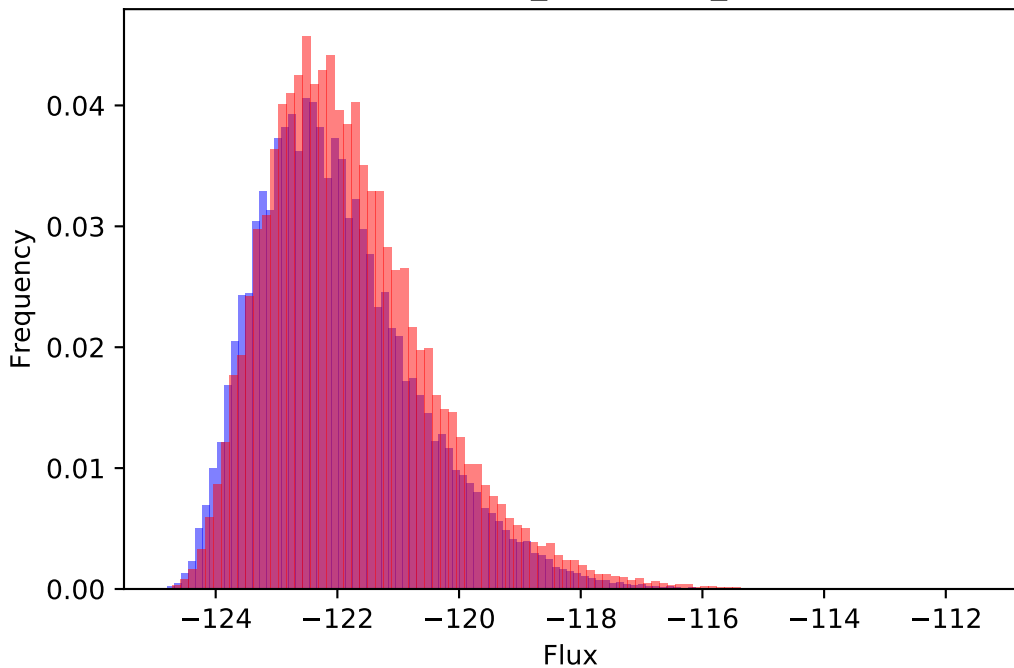
**\*\*372 : DHO\_c --> DHO\_m\*\***



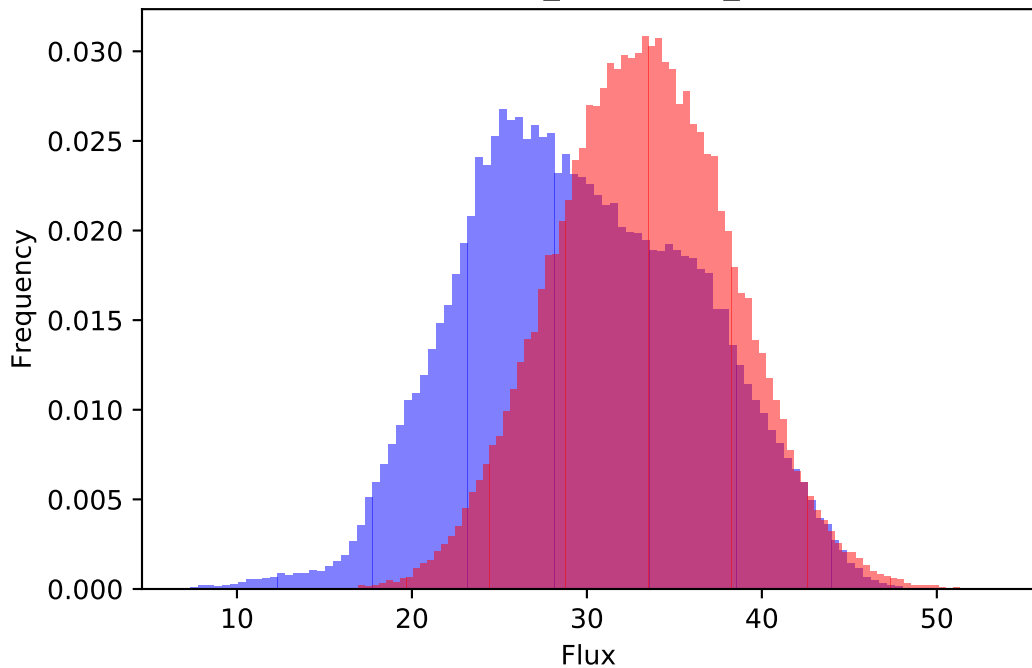
**\*\*373 : Gly\_c + Ser\_m --> Gly\_m + Ser\_c\*\***



**\*\*374 : O2\_c <=> O2\_h\*\***

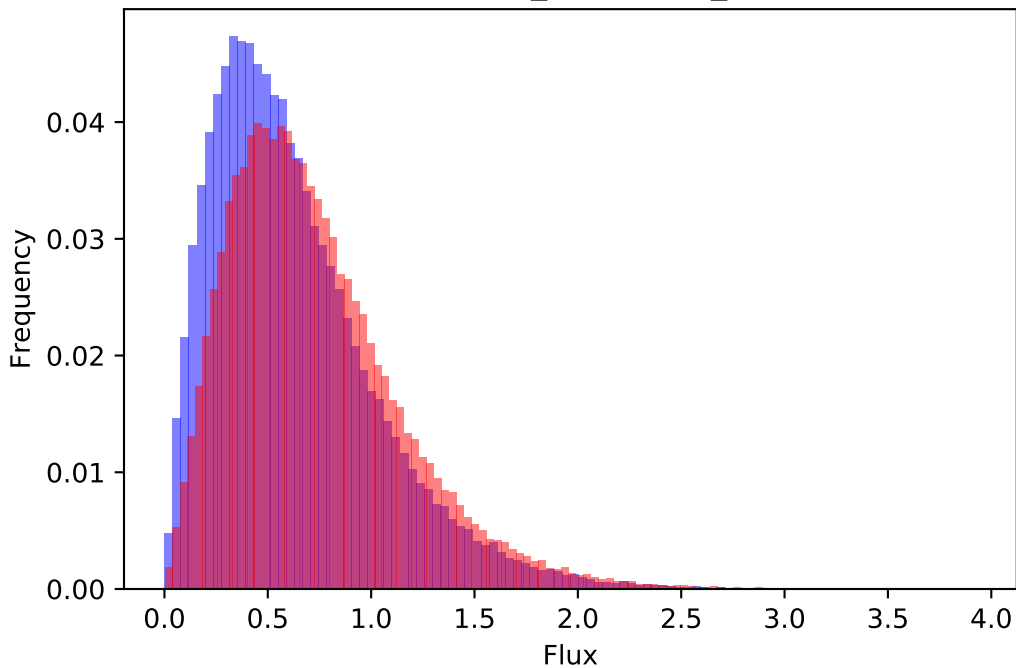


**\*\*375 : O2\_c <=> O2\_m\*\***

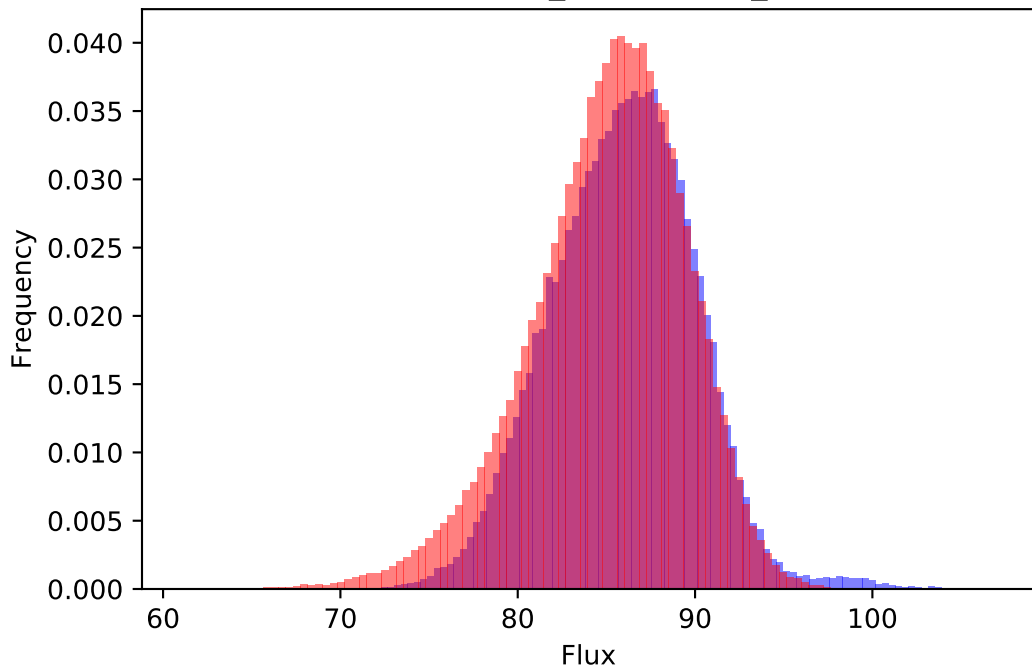




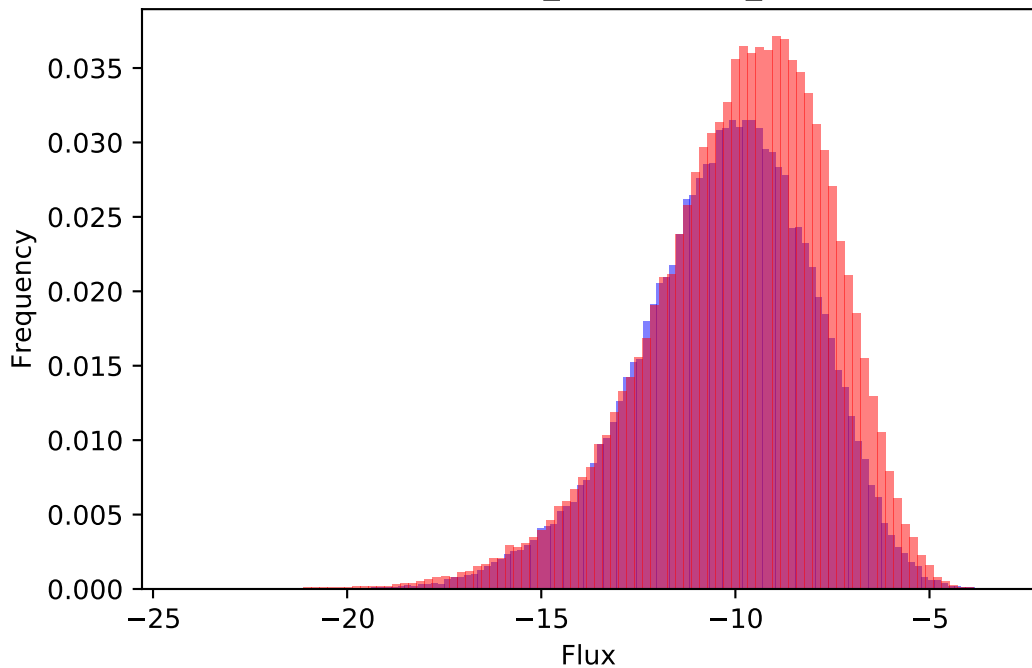
**\*\*376 : O2\_c <=> O2\_p\*\***



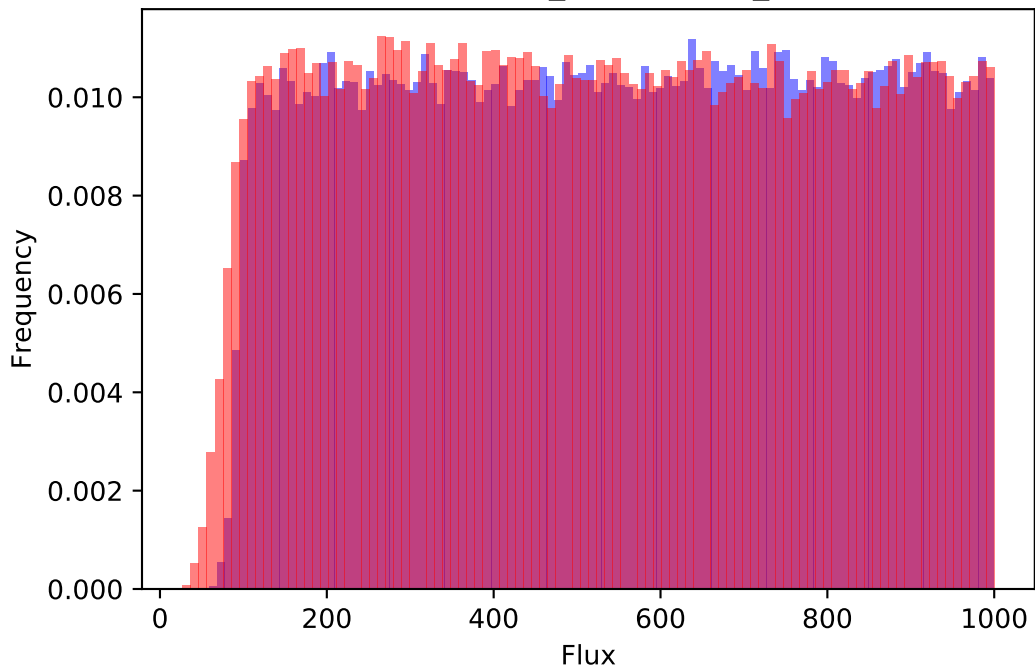
**\*\*377 : CO2\_c <=> CO2\_h\*\***



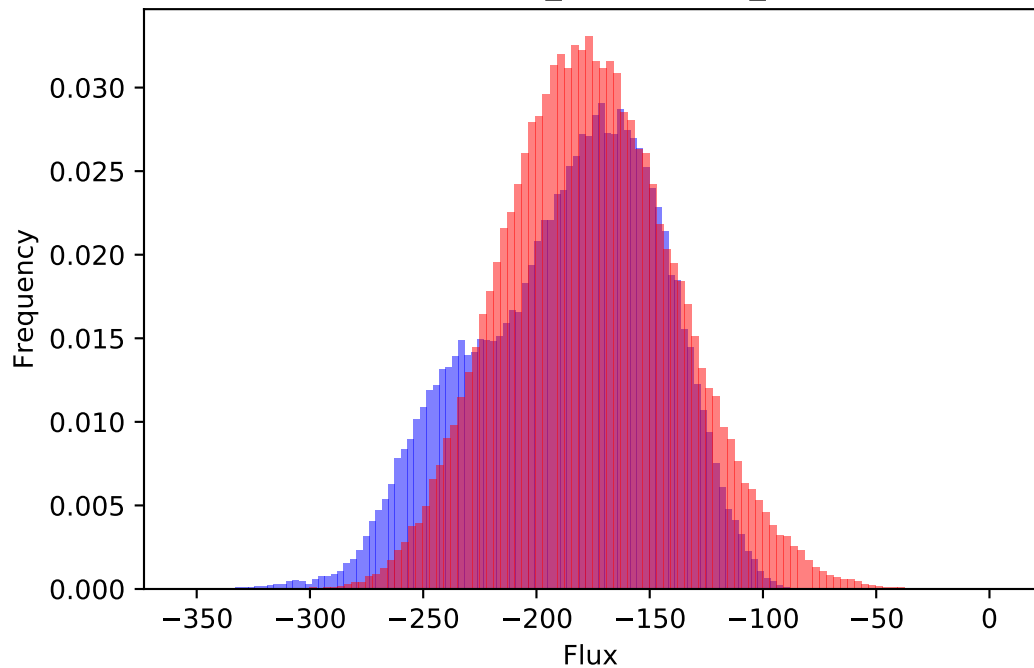
**\*\*378 : CO2\_c <=> CO2\_m\*\***



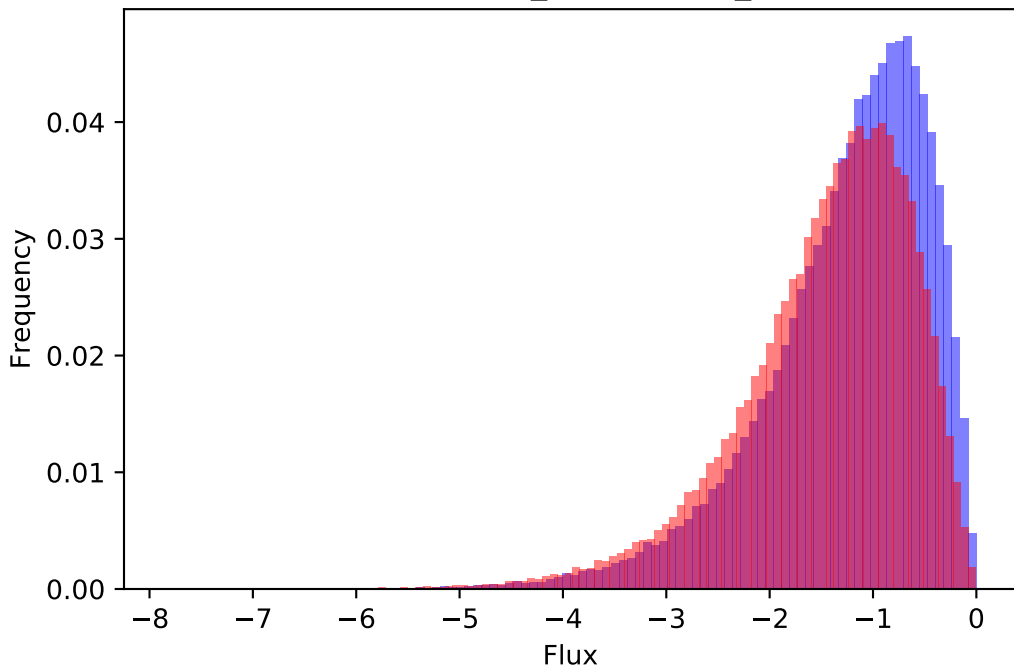
**\*\*379 : H2O\_c <=> H2O\_h\*\***



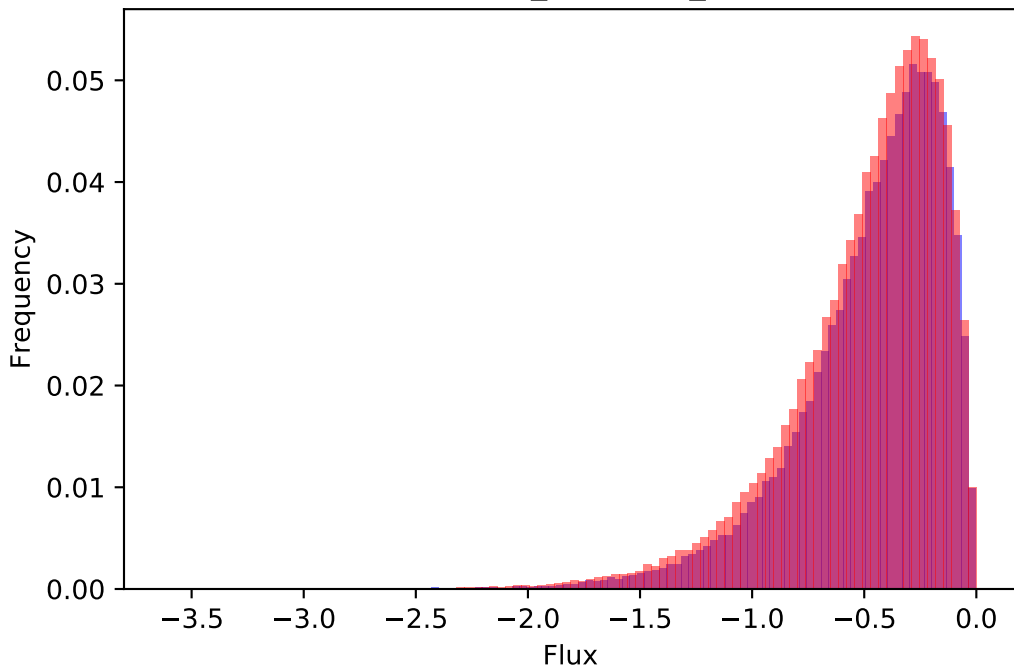
**\*\*380 : H2O\_c <=> H2O\_m\*\***



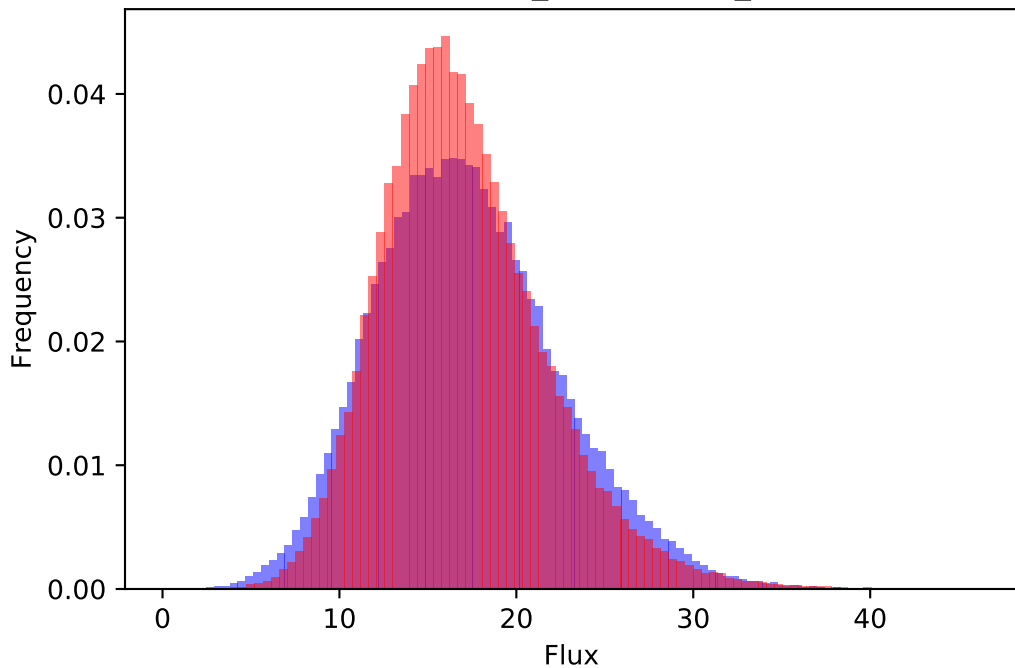
**\*\*381 : H2O\_c <=> H2O\_p\*\***



**\*\*382 : H\_c <=> H\_p\*\***

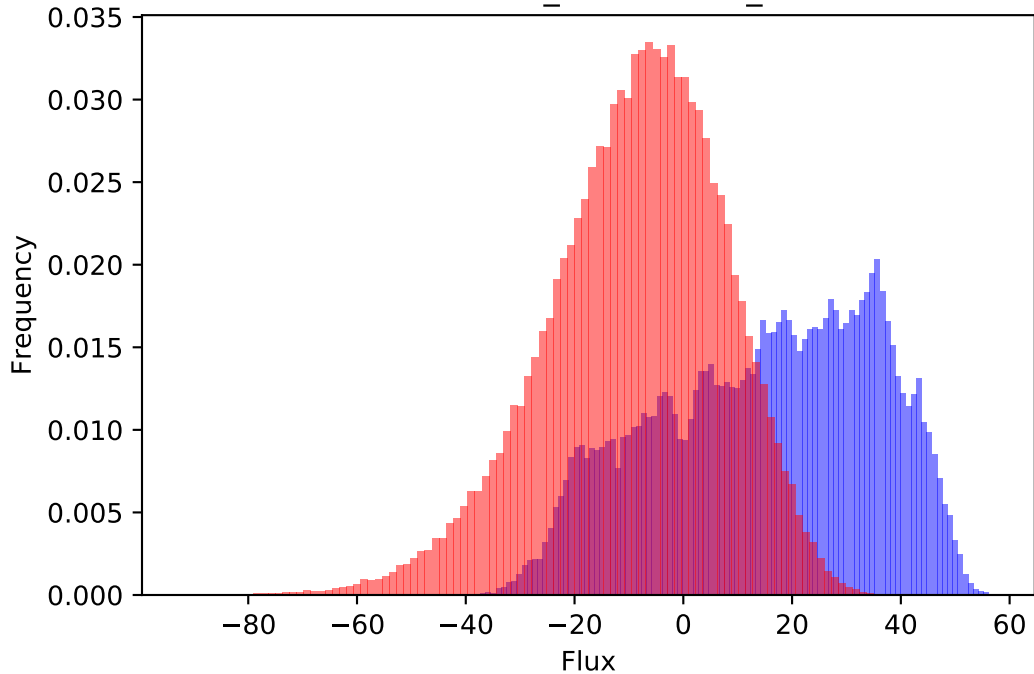


**\*\*383 : NH4\_c <=> NH4\_h\*\***

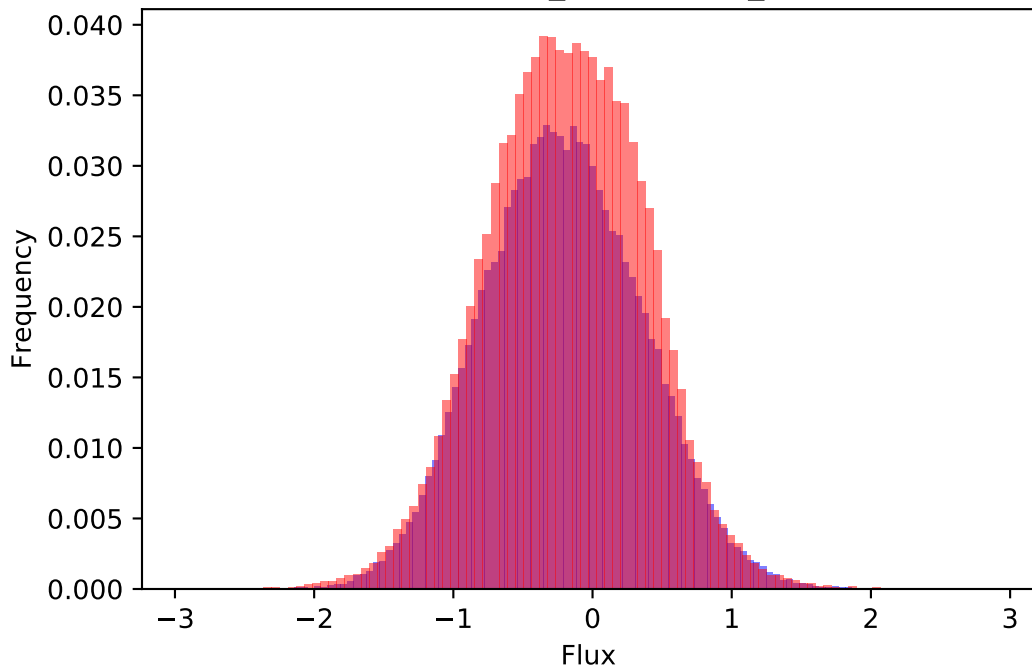




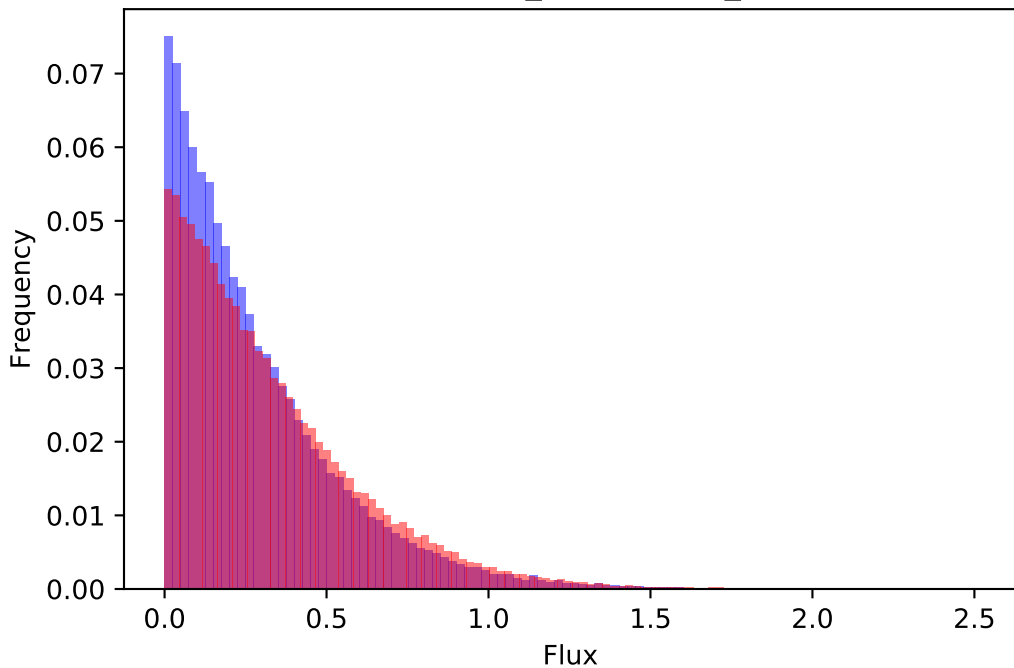
**\*\*384 : NH4\_c <=> NH4\_m\*\***



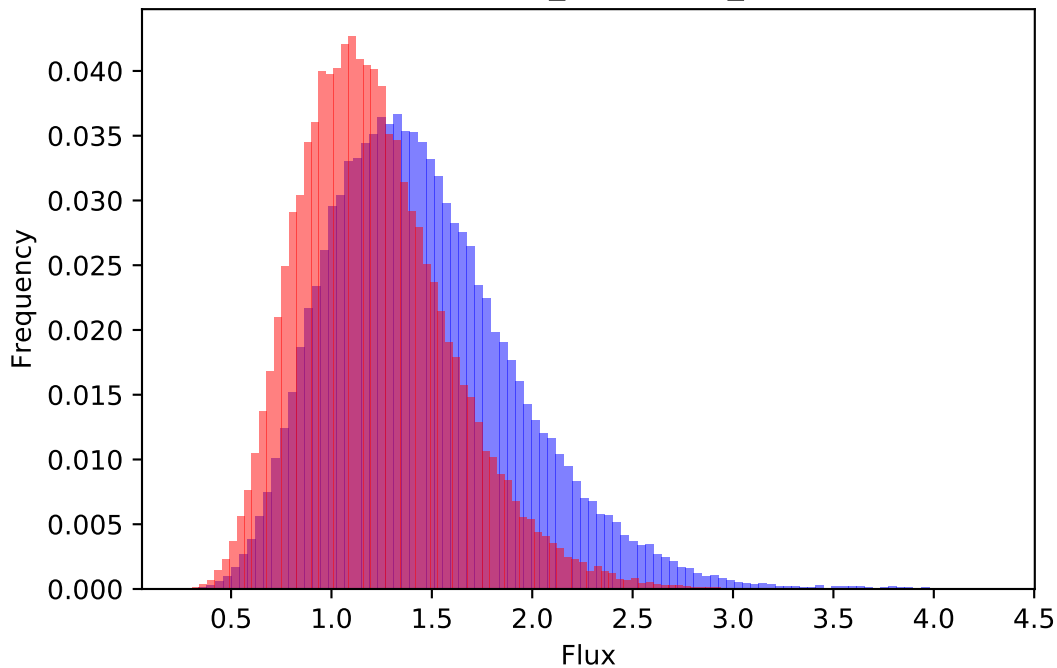
**\*\*385 : H2S\_c <=> H2S\_h\*\***



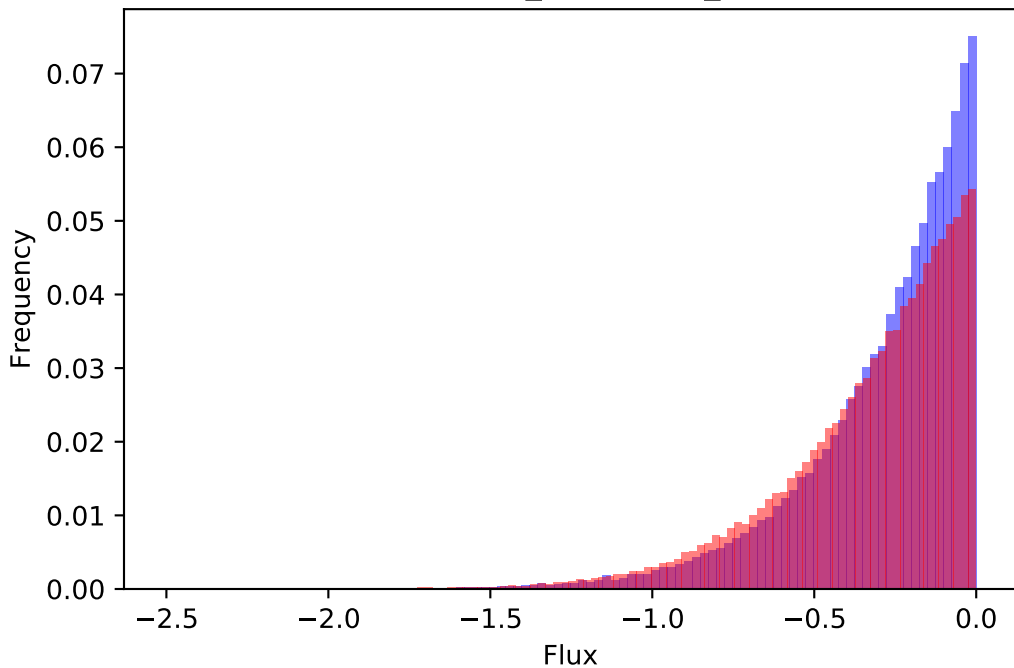
**\*\*386 : H2S\_c <=> H2S\_m\*\***



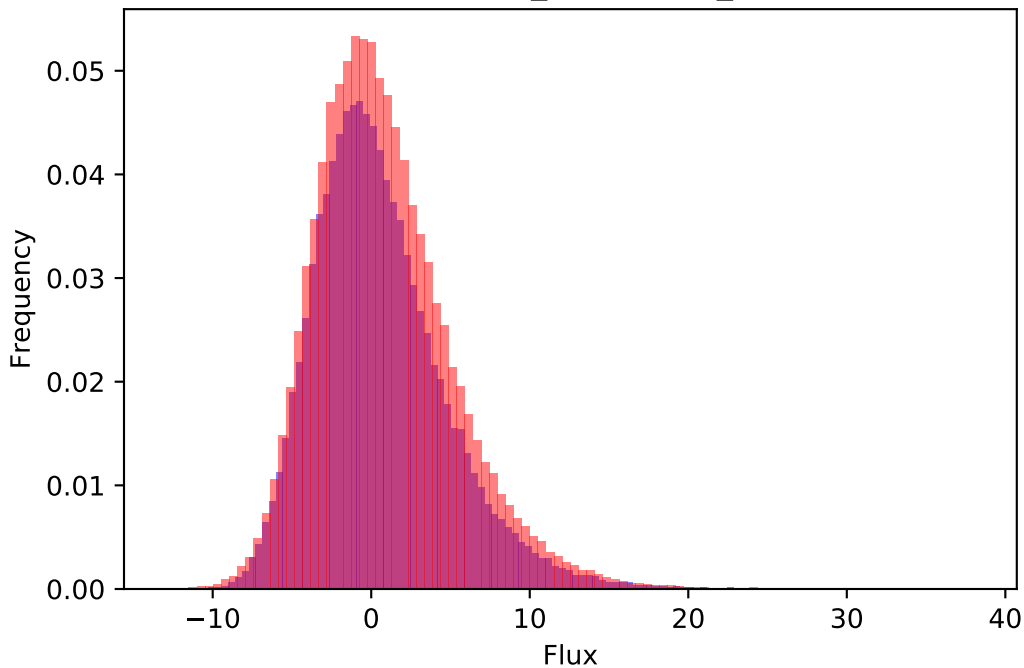
**\*\*387 : AC\_c <=> AC\_h\*\***



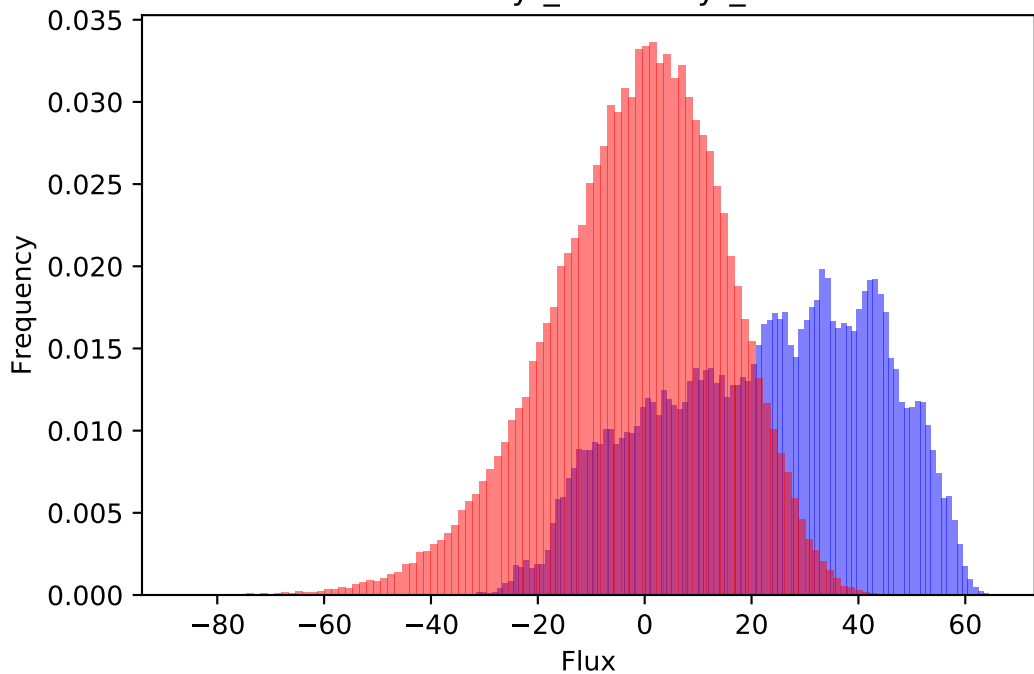
**\*\*388 : AC\_c <=> AC\_m\*\***



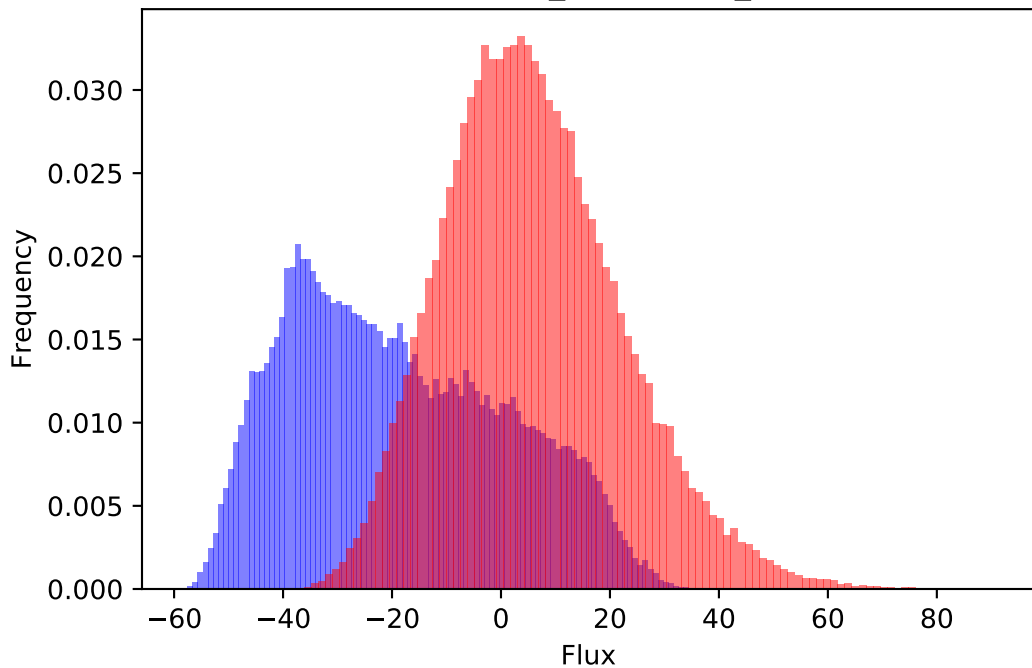
**\*\*389 : Pyr\_c <=> Pyr\_h\*\***



**\*\*390 : Pyr\_c <=> Pyr\_m\*\***

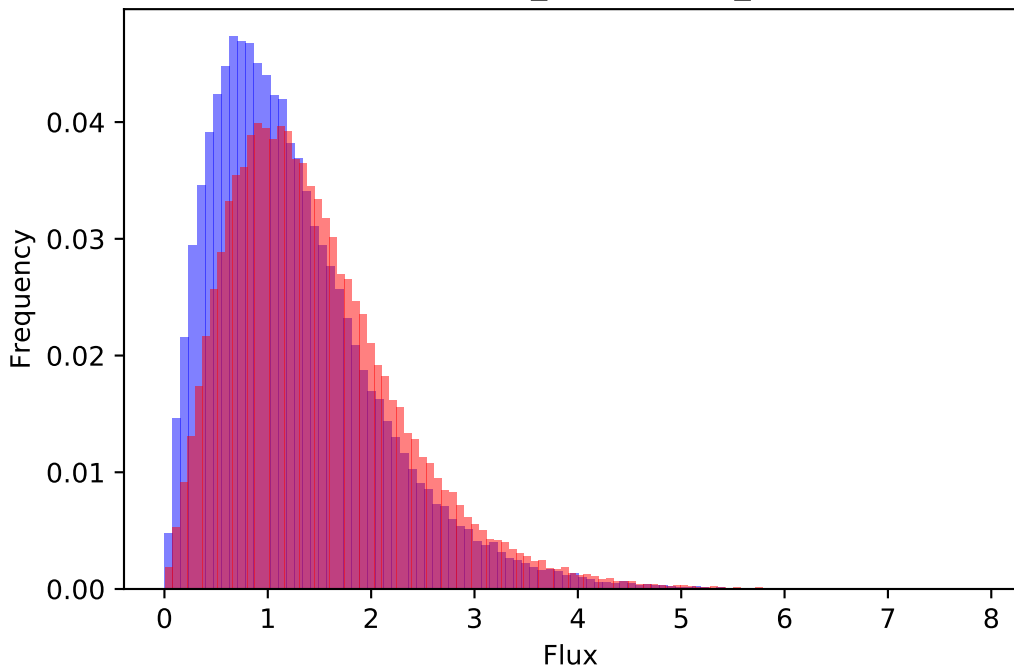


**\*\*391 : Pyr\_c <=> Pyr\_p\*\***

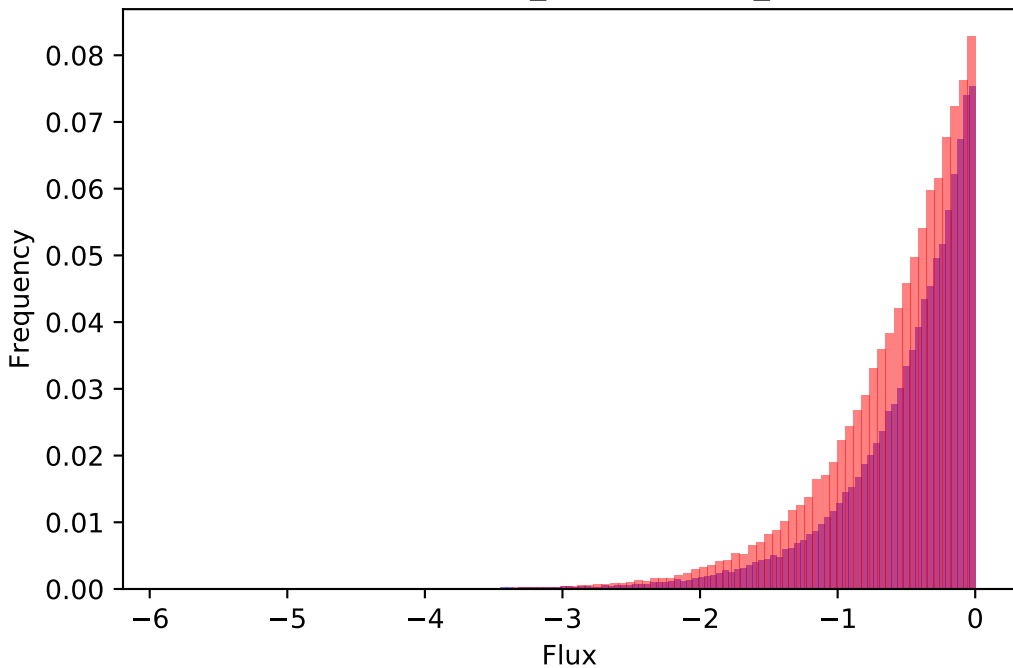




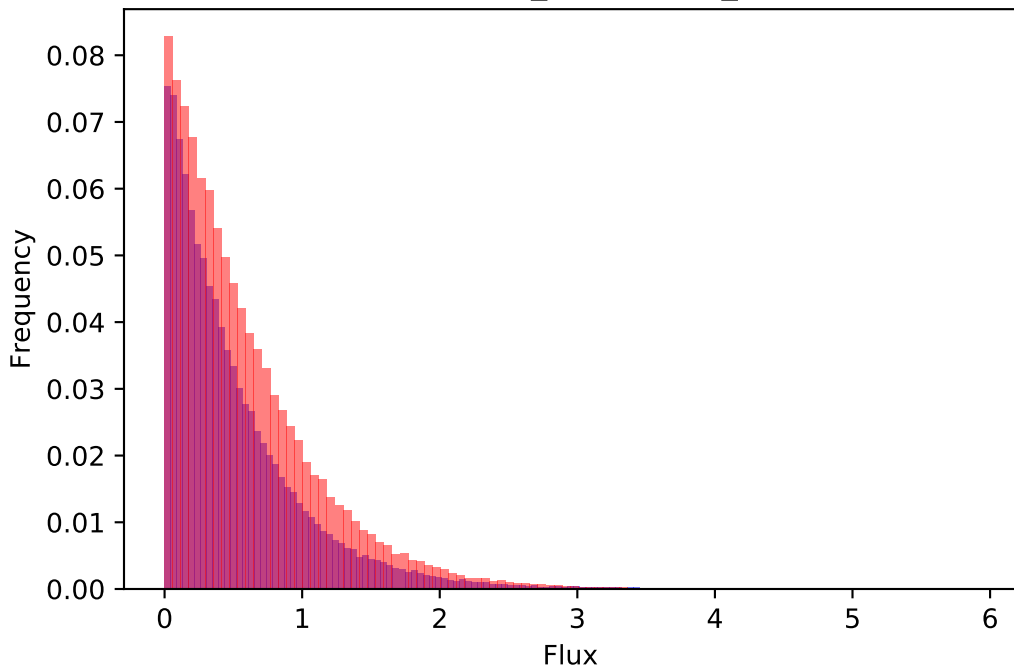
**\*\*392 : GCA\_c <=> GCA\_p\*\***



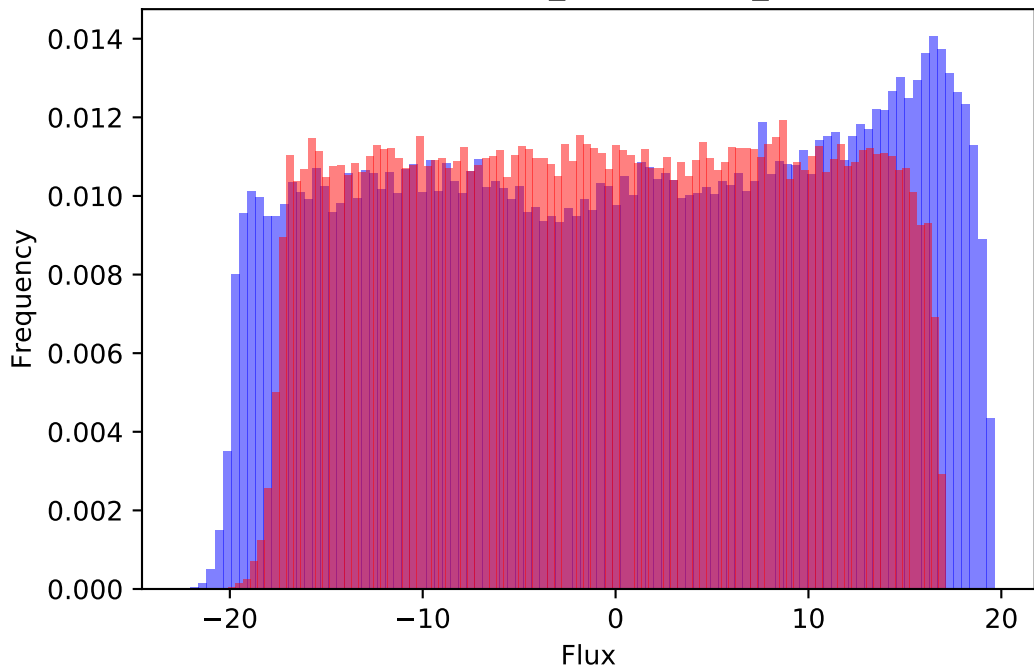
**\*\*393 : GCEA\_c <=> GCEA\_p\*\***



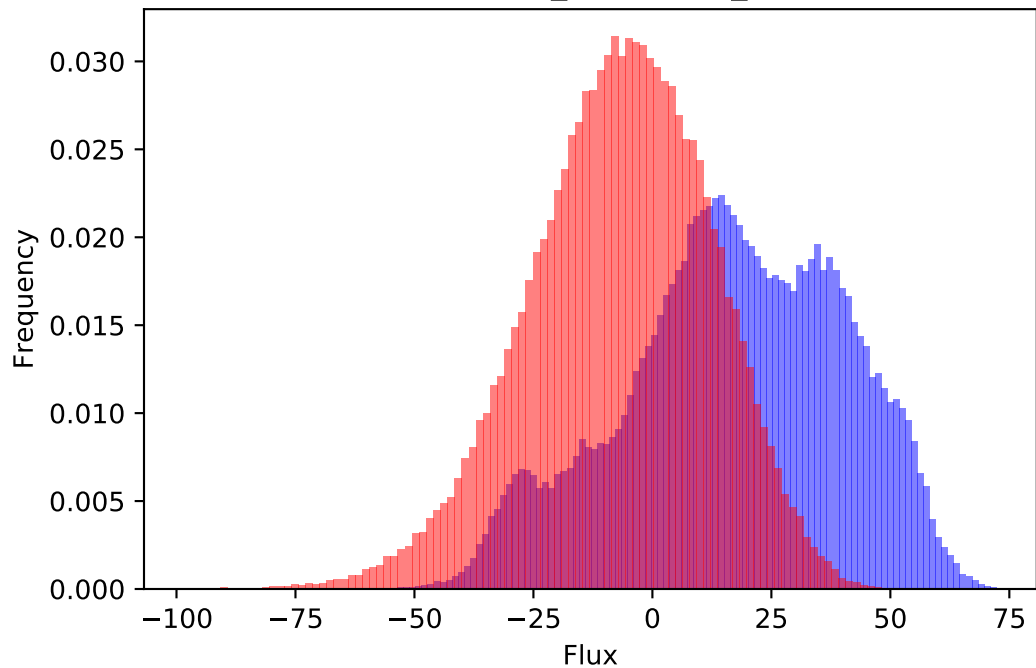
**\*\*394 : Mal\_c <=> Mal\_p\*\***



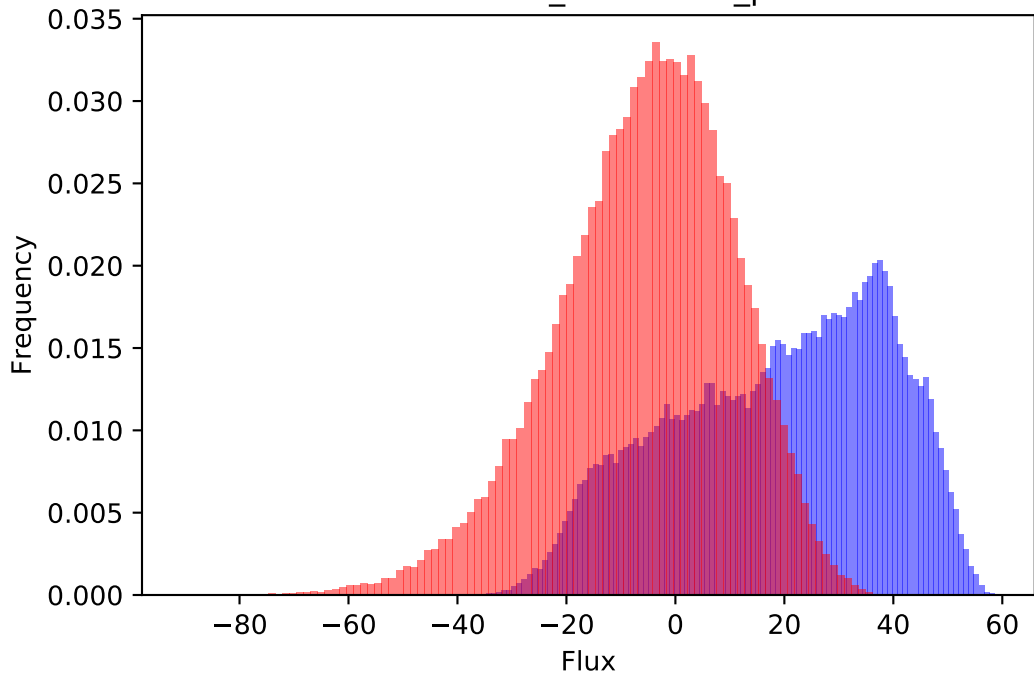
**\*\*395 : OAA\_c <=> OAA\_p\*\***



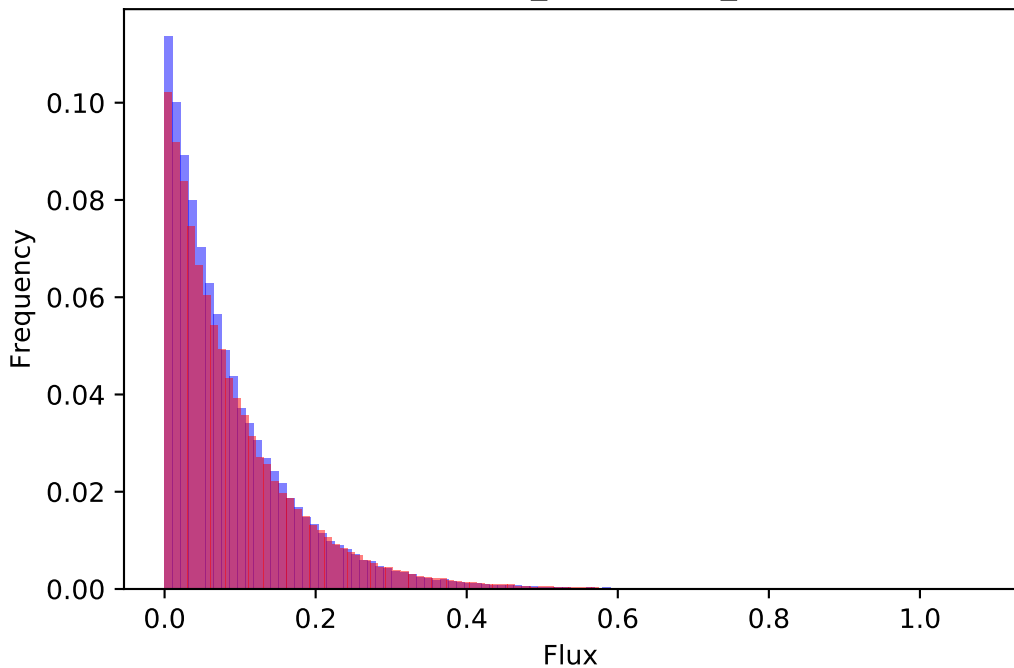
**\*\*396 : KG\_c <=> KG\_p\*\***



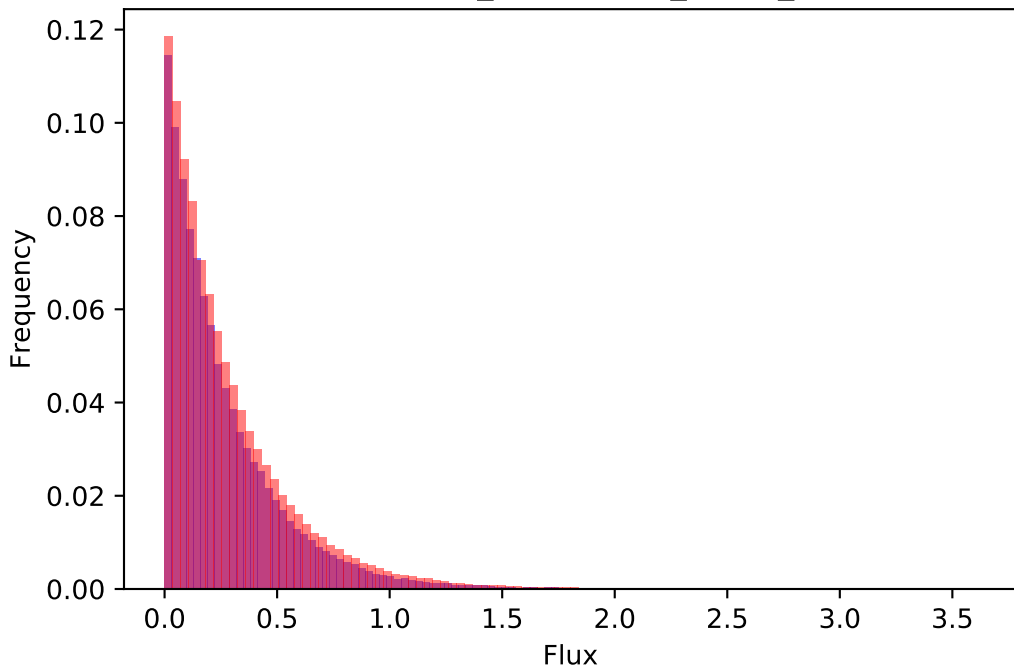
**\*\*397 : Ala\_c <=> Ala\_p\*\***



**\*\*398 : Arg\_c <=> Arg\_p\*\***

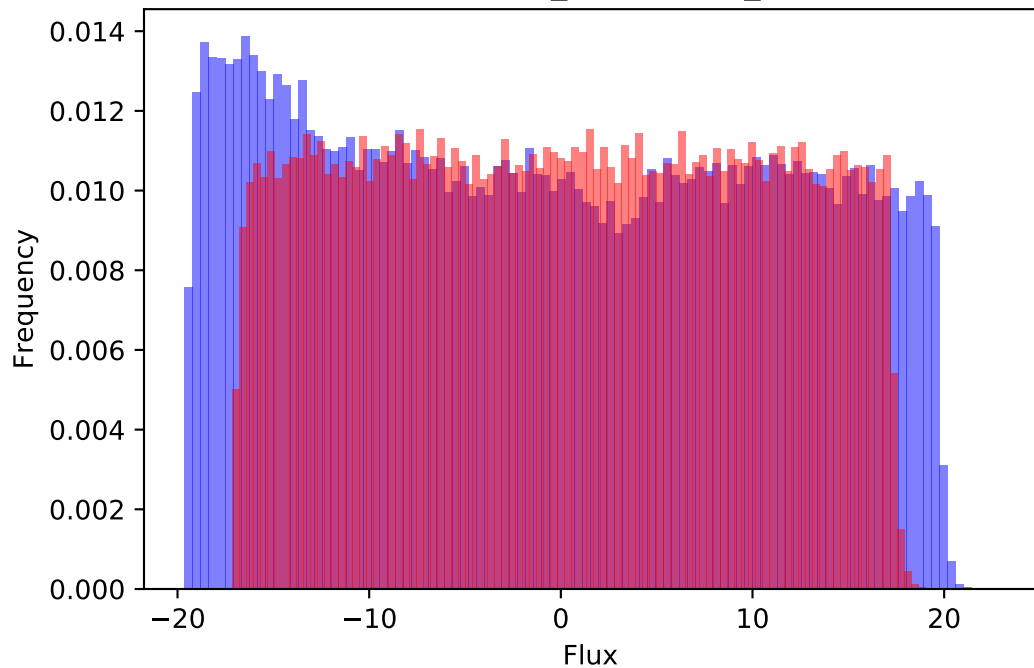


**\*\*399 : Asn\_c <=> Asn\_p + H\_p\*\***

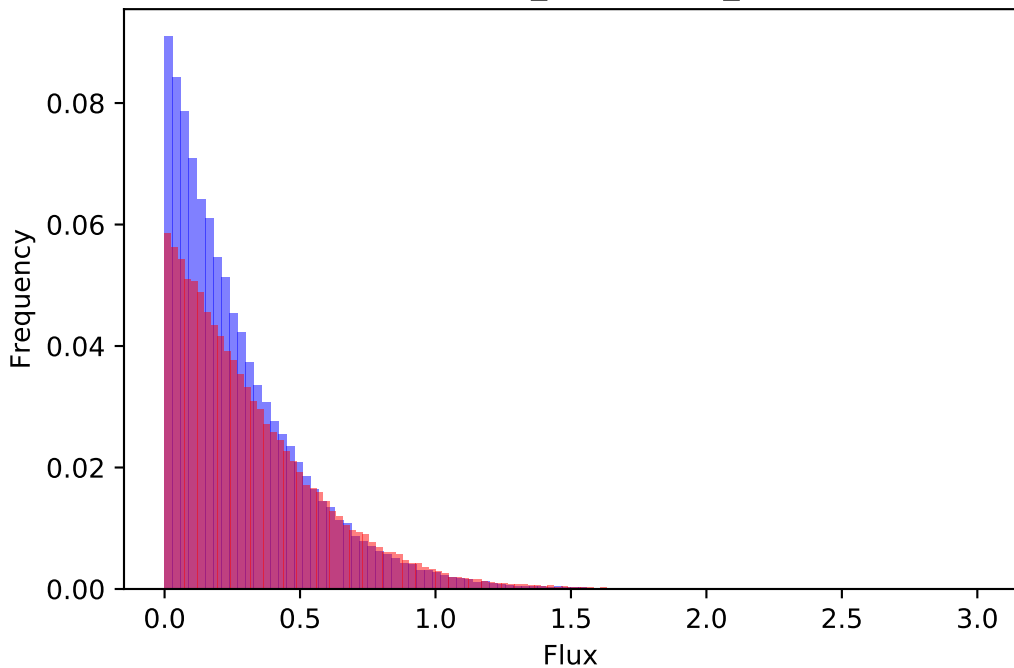




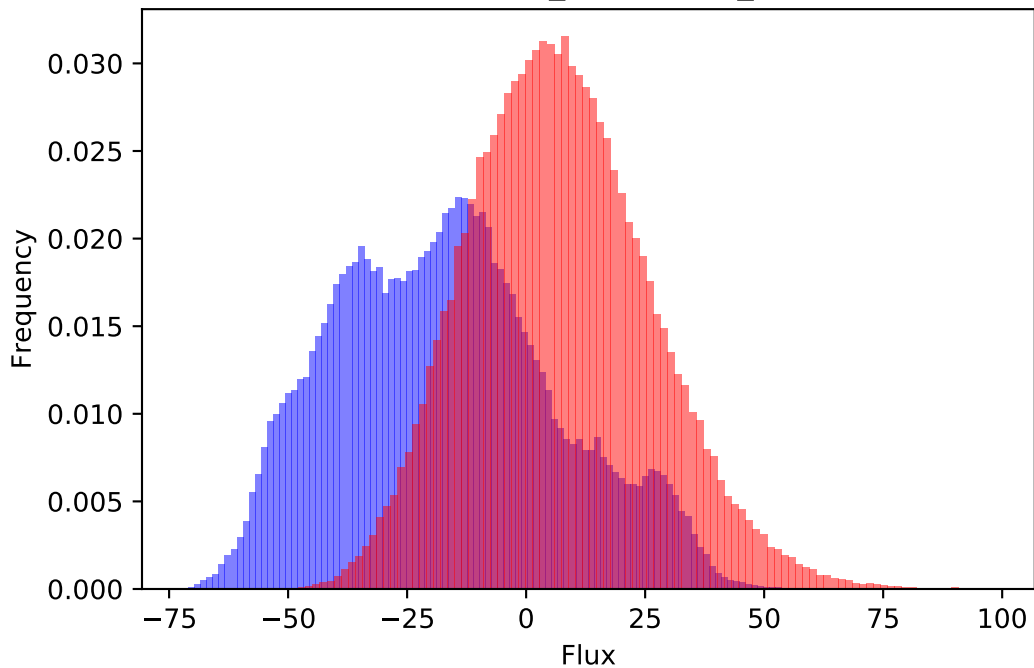
**\*\*400 : Asp\_c <=> Asp\_p\*\***



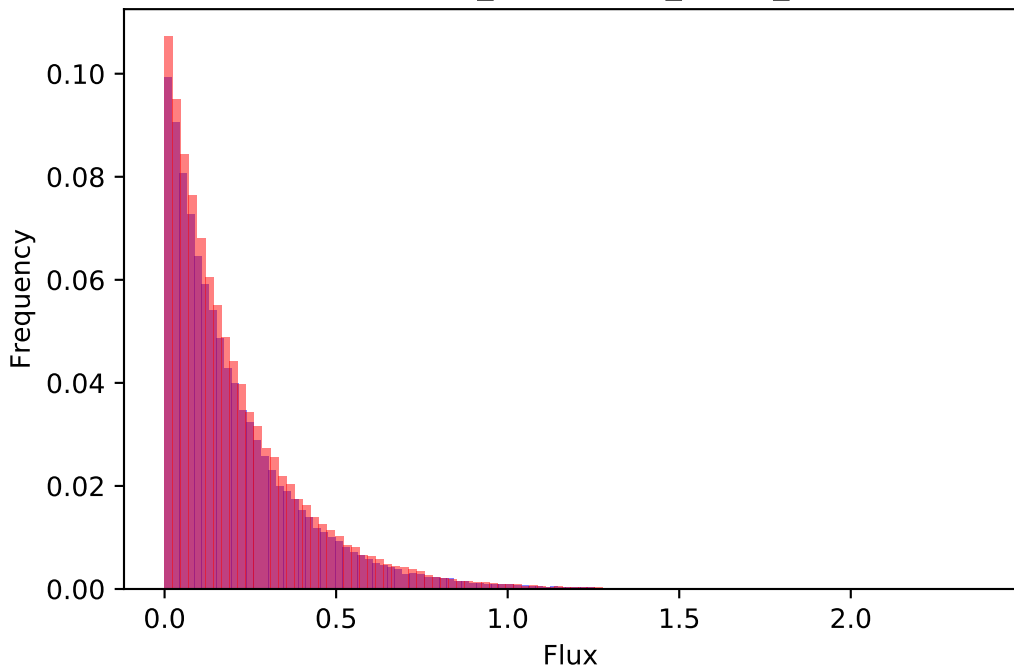
**\*\*401 : Cys\_c <=> Cys\_p\*\***



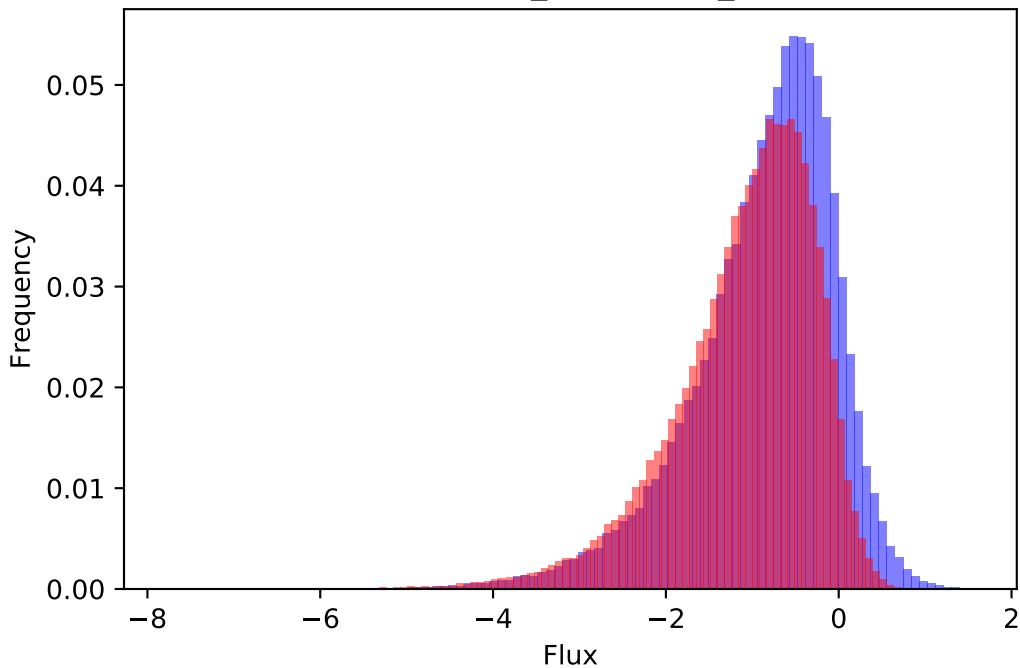
**\*\*402 : Glu\_c <=> Glu\_p\*\***



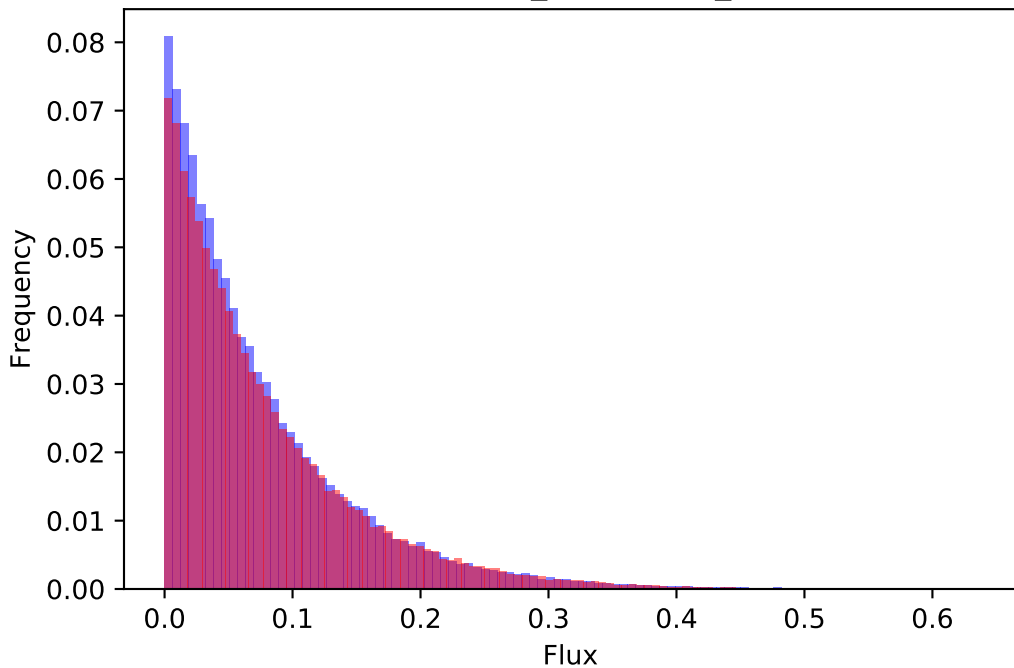
403 :  $\text{Gln\_c} \rightleftharpoons \text{Gln\_p} + \text{H\_p}$



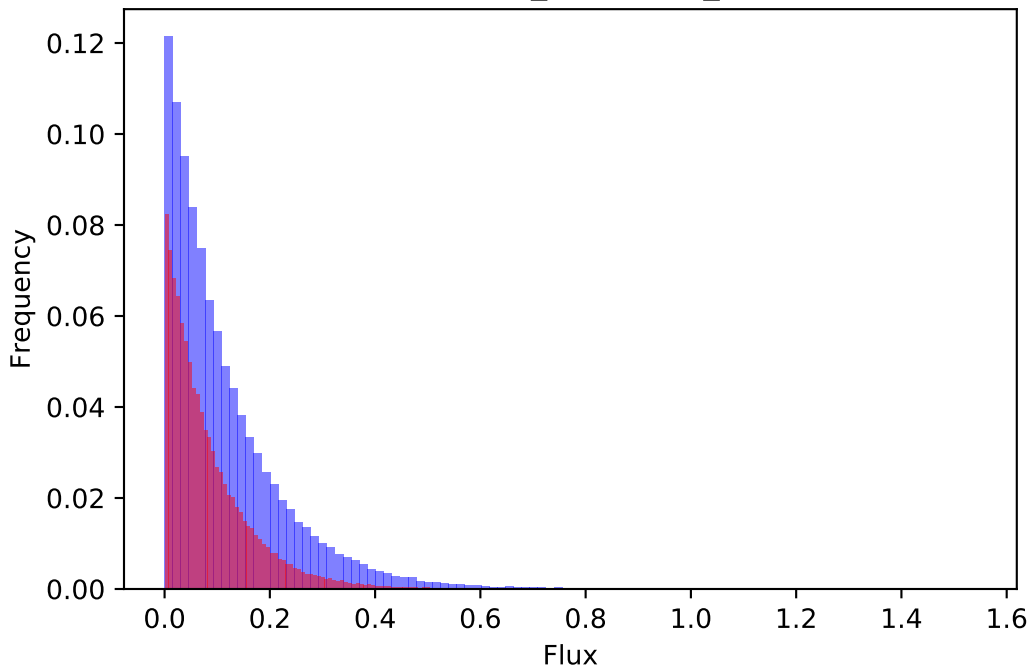
**\*\*404 : Gly\_c <=> Gly\_p\*\***



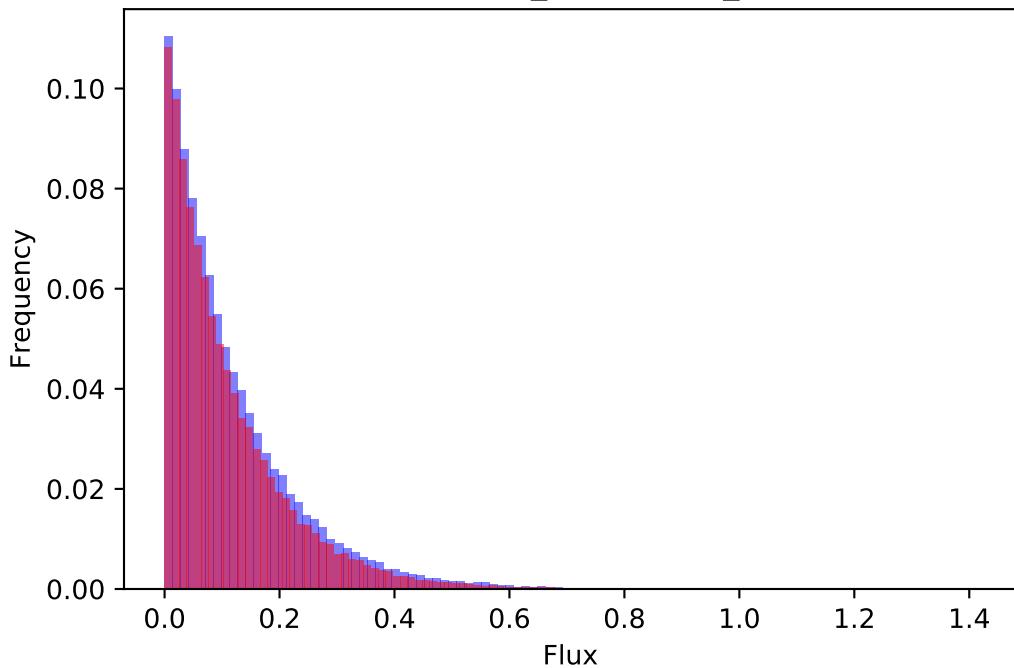
**\*\*405 : His\_c <=> His\_p\*\***



**\*\*406 : Ile\_c <=> Ile\_p\*\***

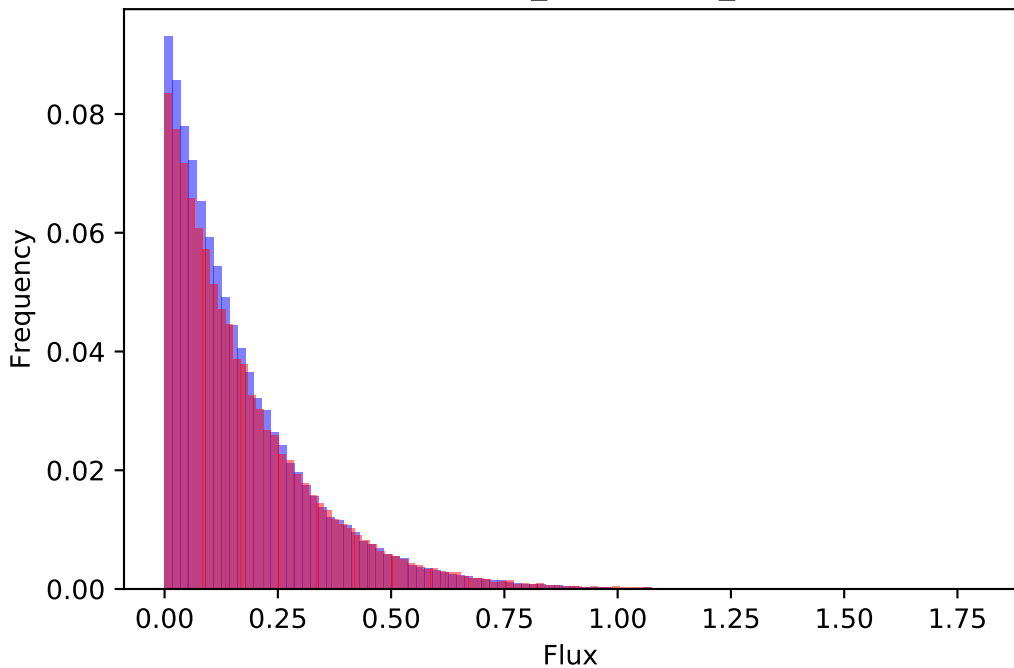


**\*\*407 : Leu\_c <=> Leu\_p\*\***

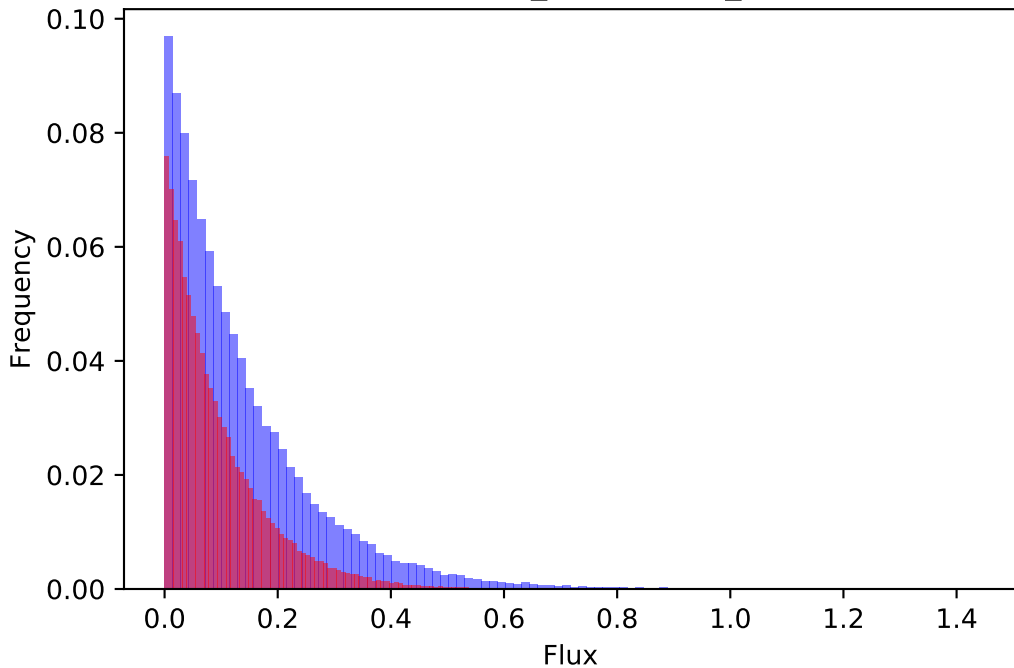




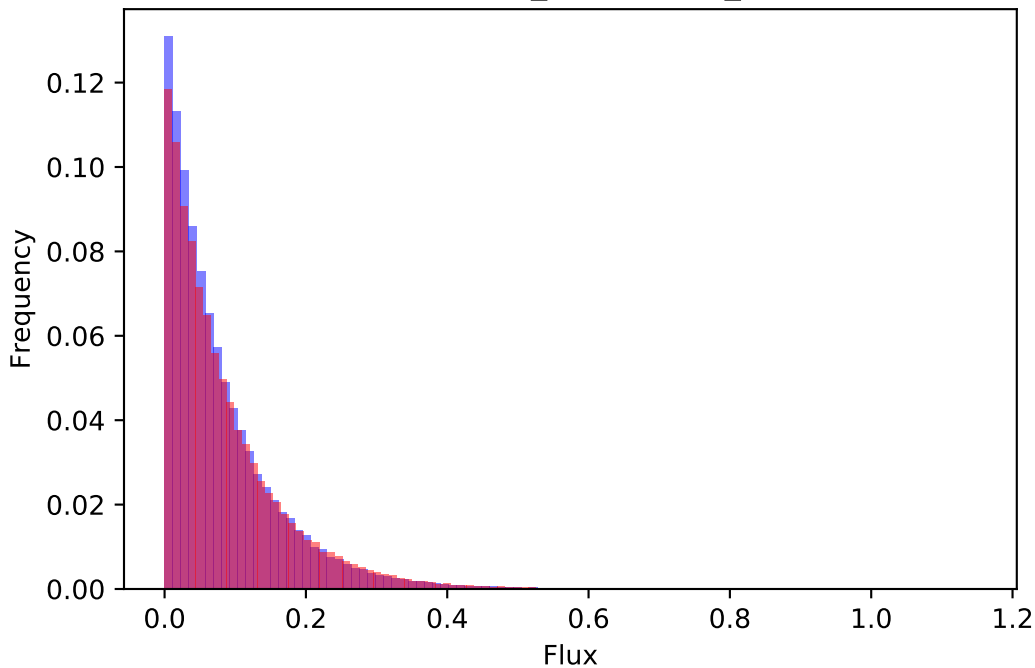
**\*\*408 : Lys\_c <=> Lys\_p\*\***



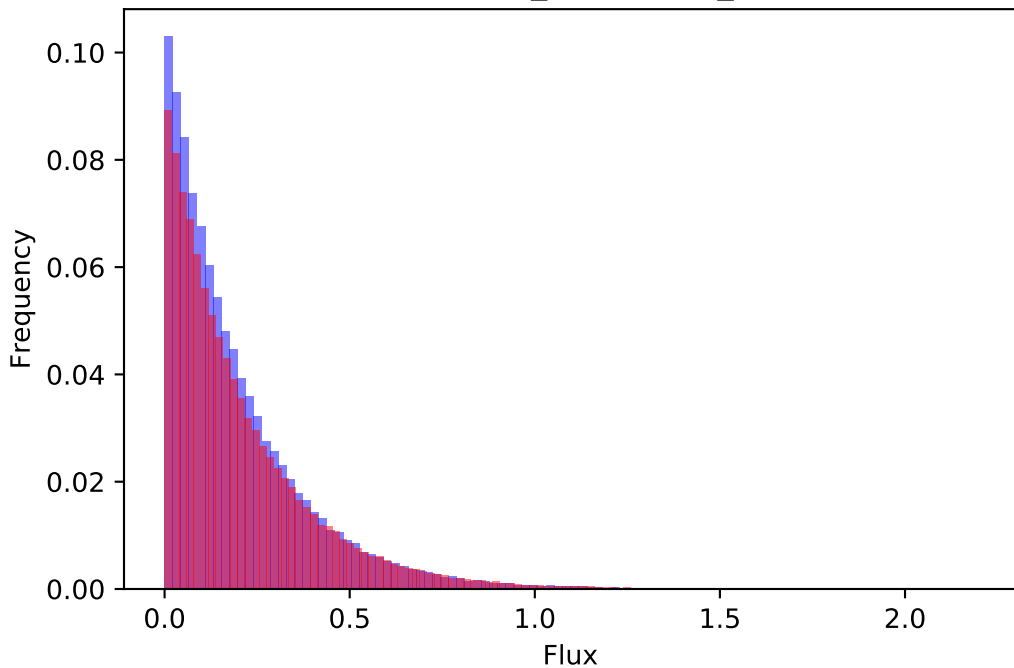
**\*\*409 : Met\_c <=> Met\_p\*\***



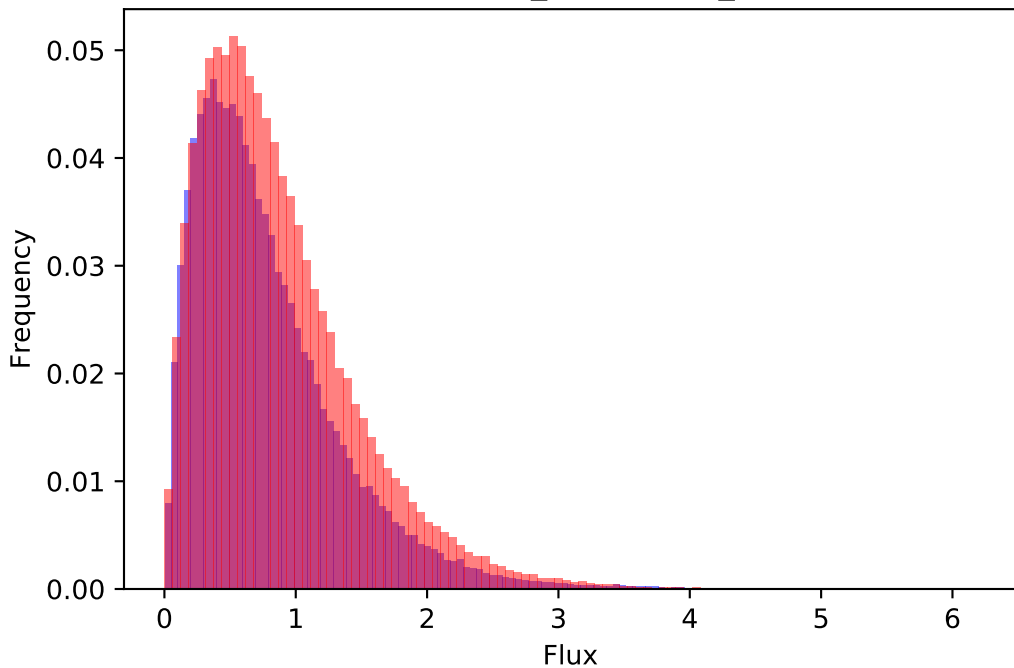
**\*\*410 : Phe\_c <=> Phe\_p\*\***



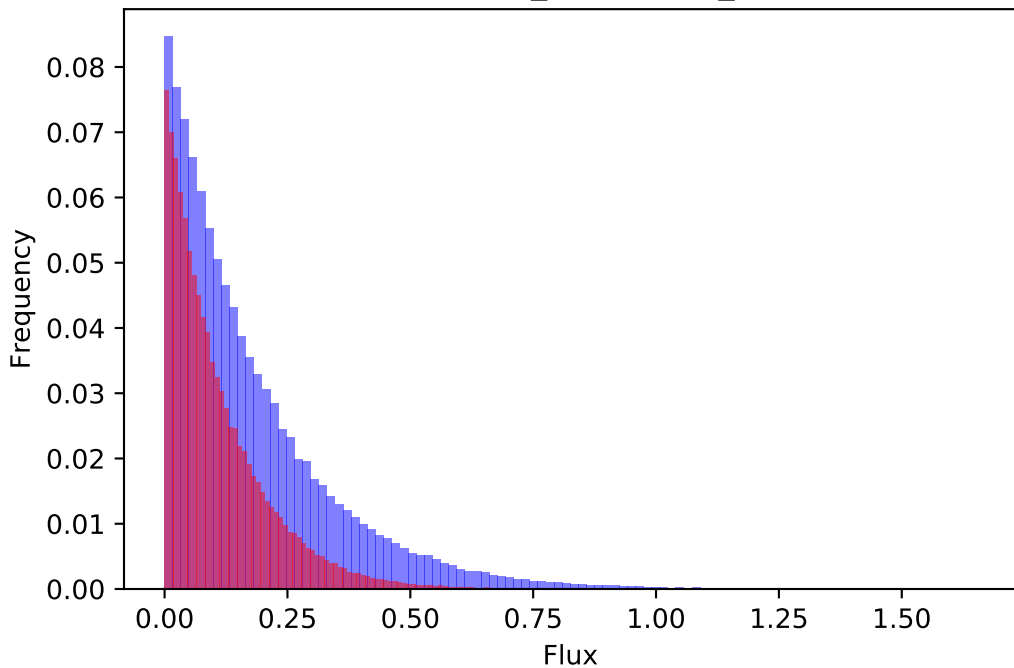
**\*\*411 : Pro\_c <=> Pro\_p\*\***



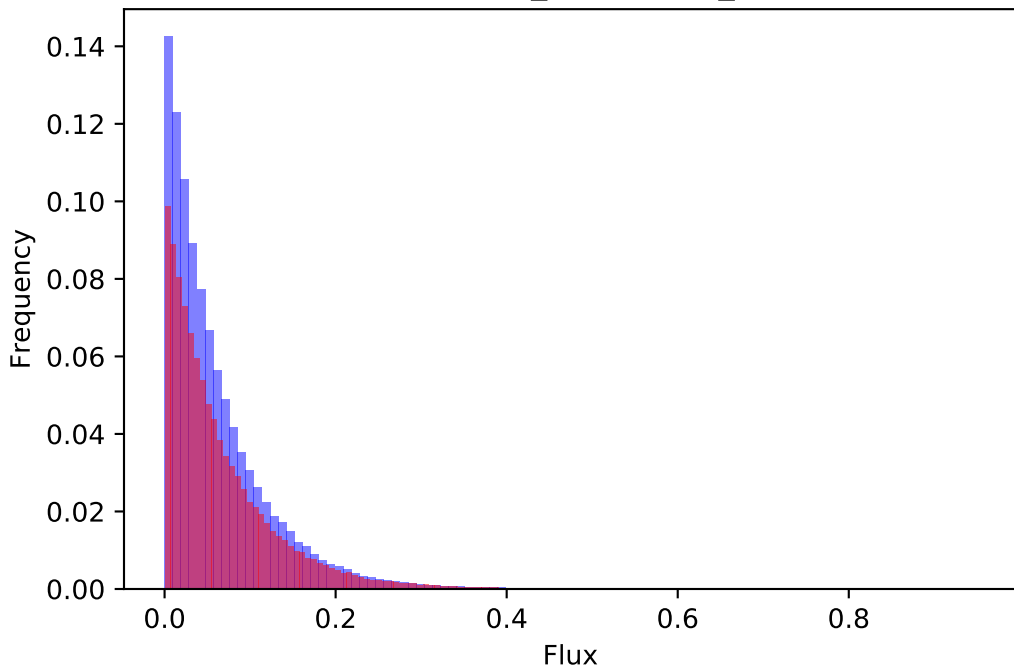
**\*\*412 : Ser\_c <=> Ser\_p\*\***



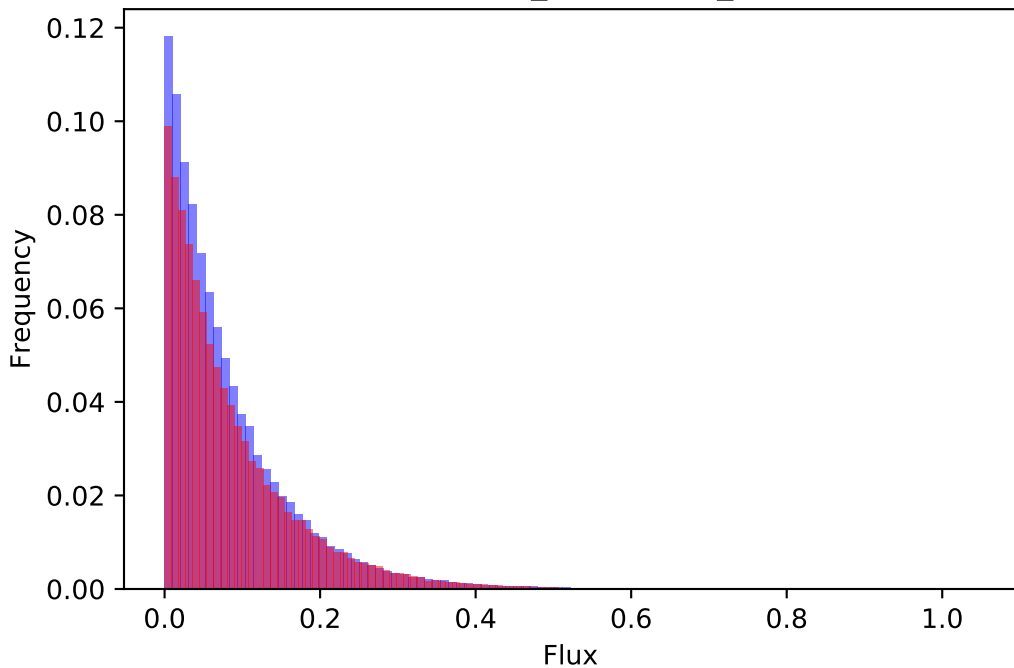
**\*\*413 : Thr\_c <=> Thr\_p\*\***



**\*\*414 : Trp\_c <=> Trp\_p\*\***

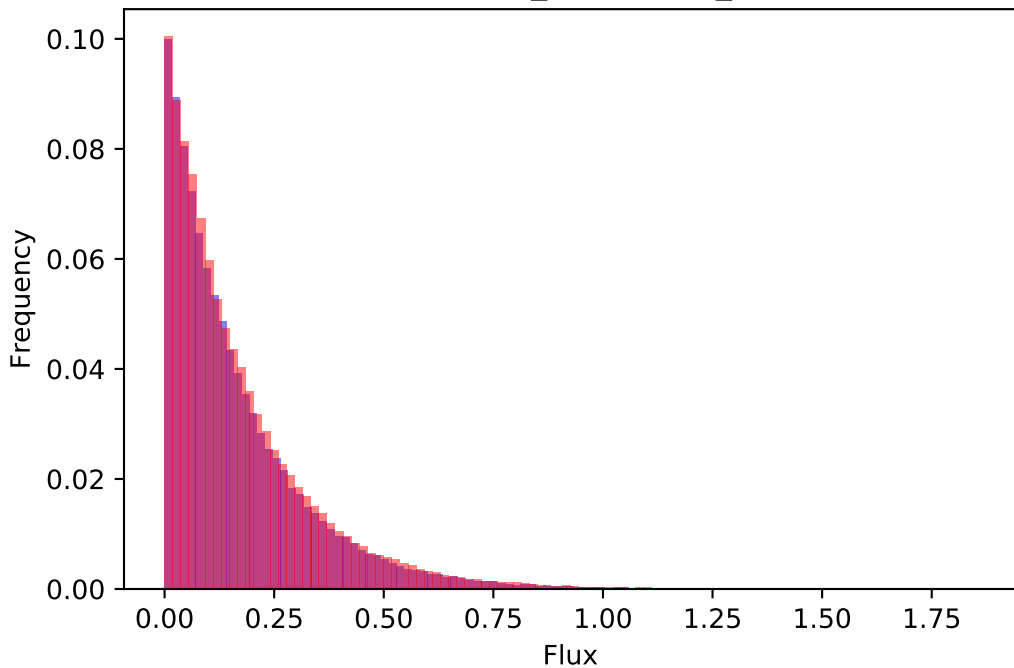


**\*\*415 : Tyr\_c <=> Tyr\_p\*\***

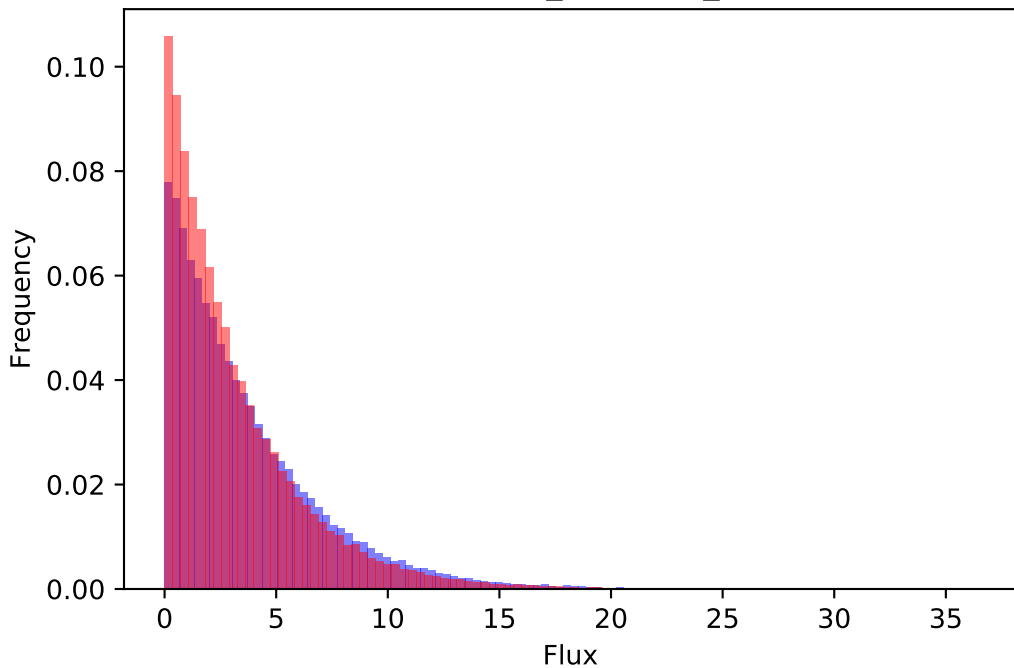




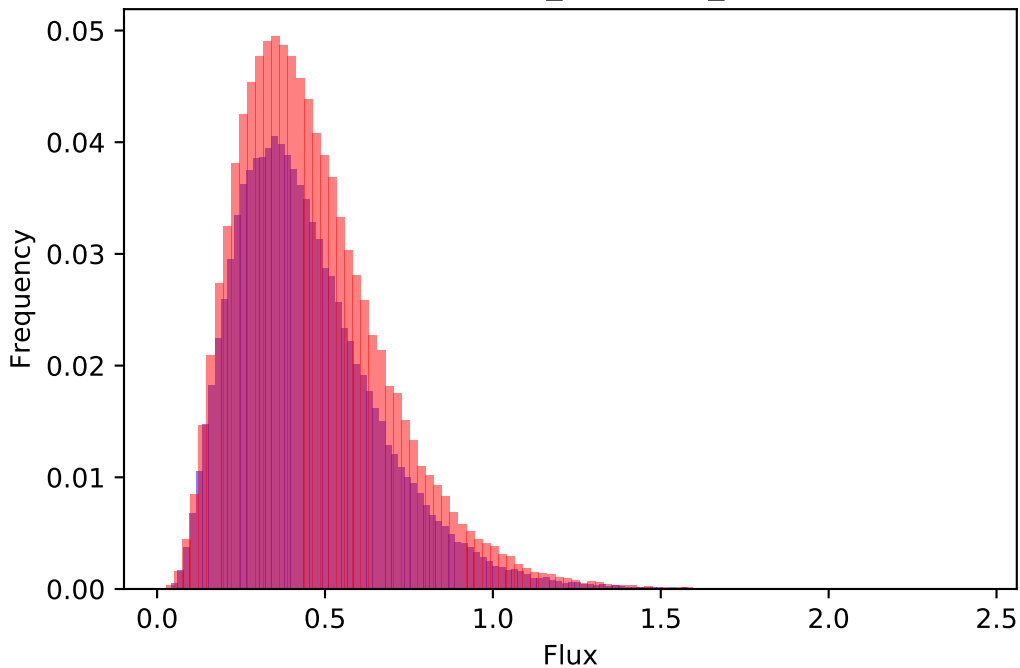
**\*\*416 : Val\_c <=> Val\_p\*\***



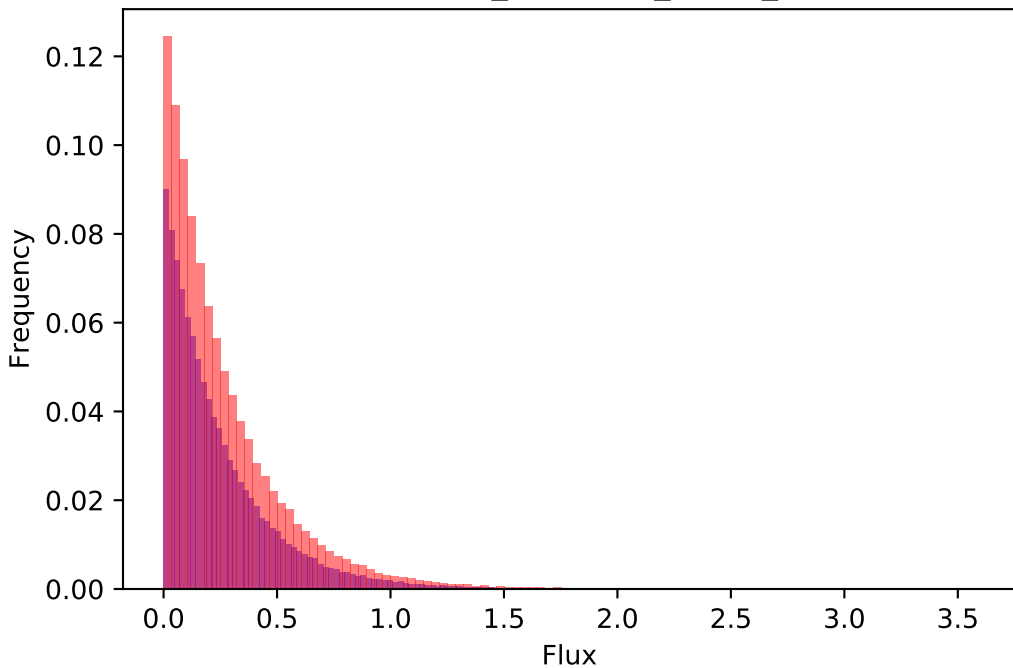
**\*\*417 : Ala\_h --> Ala\_c\*\***



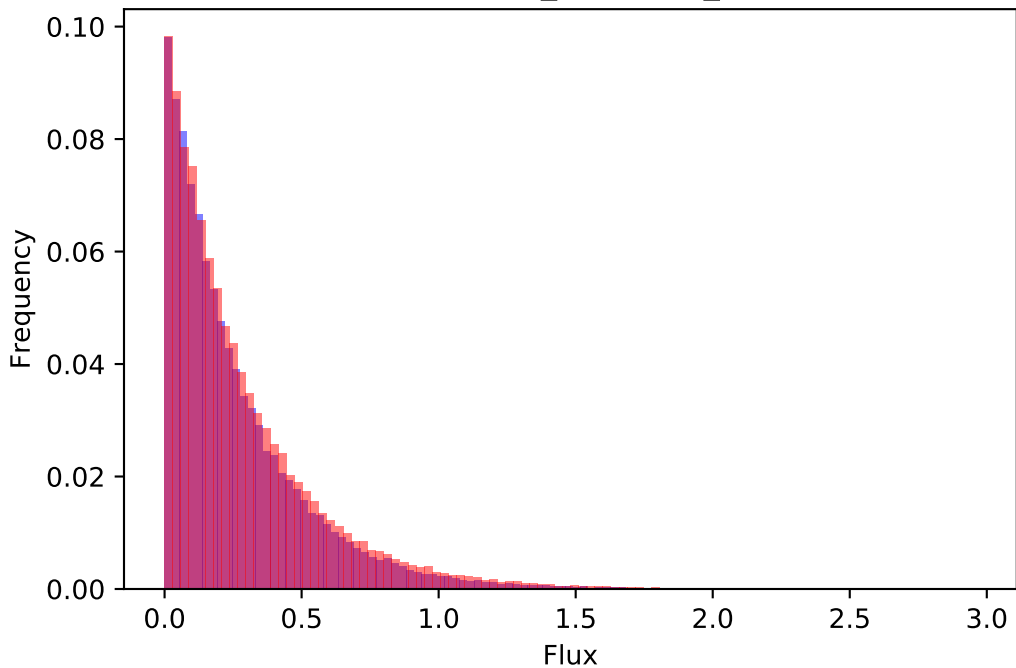
**\*\*418 : Arg\_h --> Arg\_c\*\***



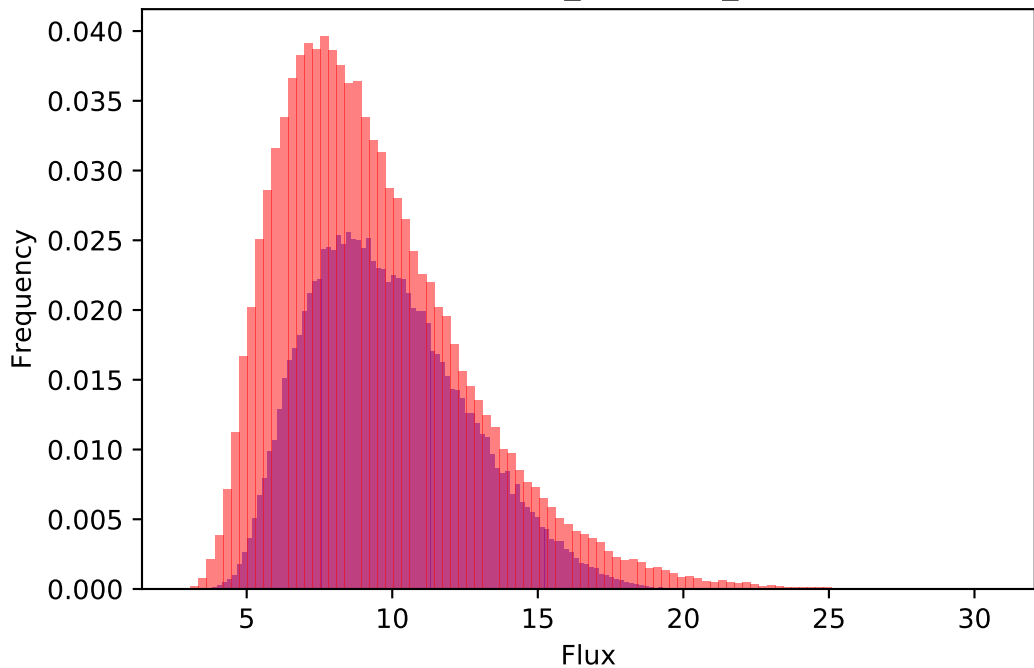
**\*\*419 : Asn\_c --> Asn\_h + H\_h\*\***



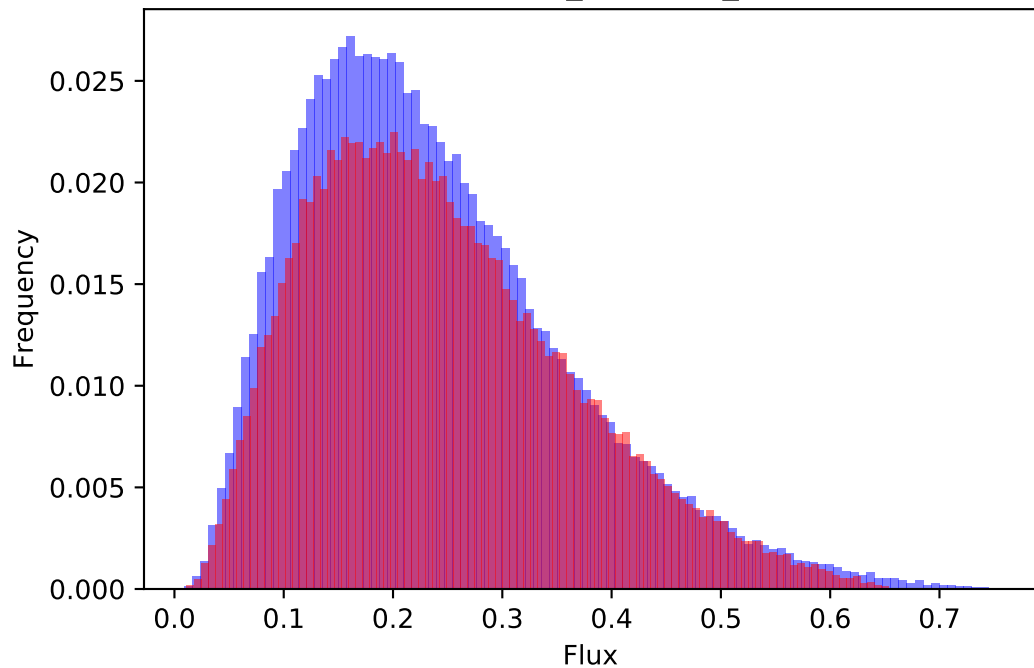
**\*\*420 : Asn\_c --> Asn\_m\*\***



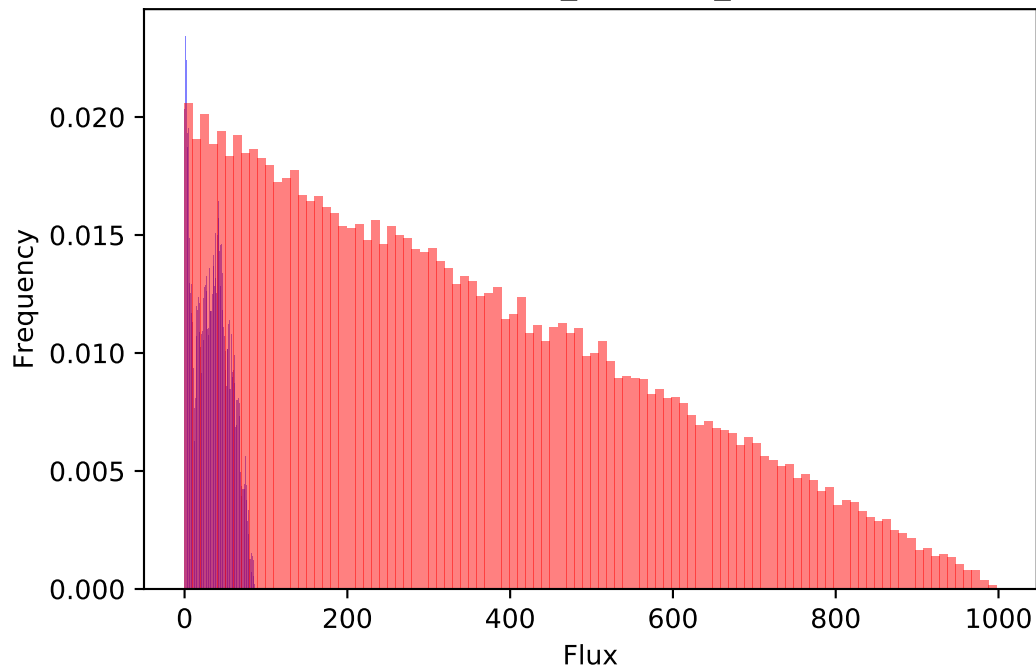
**\*\*421 : Glu\_c --> Glu\_h\*\***



**\*\*422 : His\_h --> His\_c\*\***

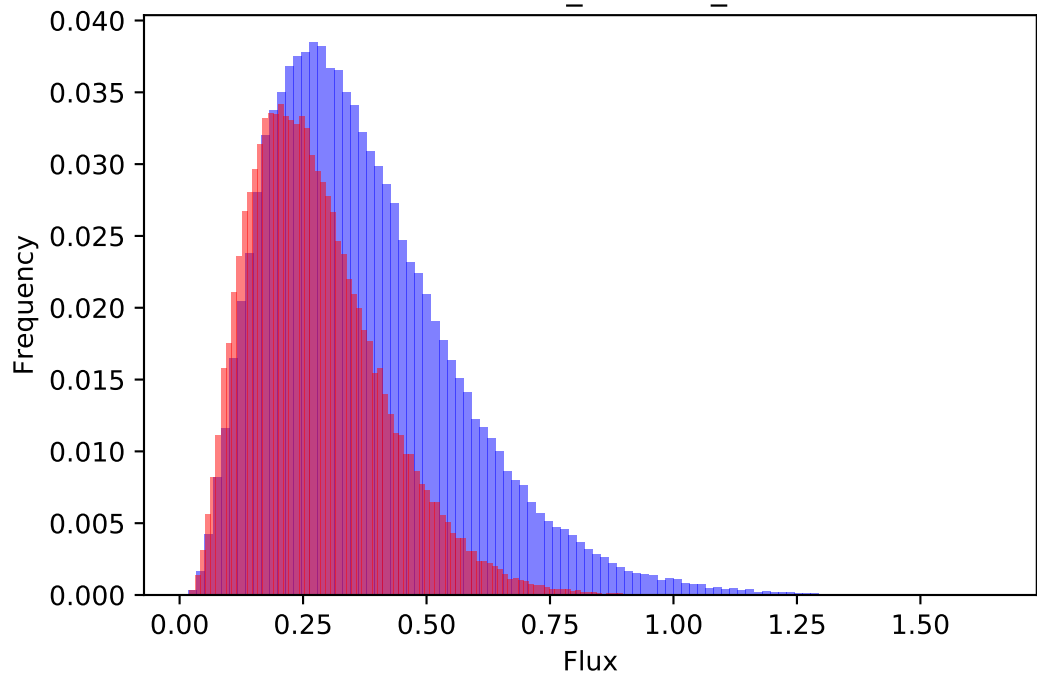


**\*\*423 : His\_c --> His\_m\*\***

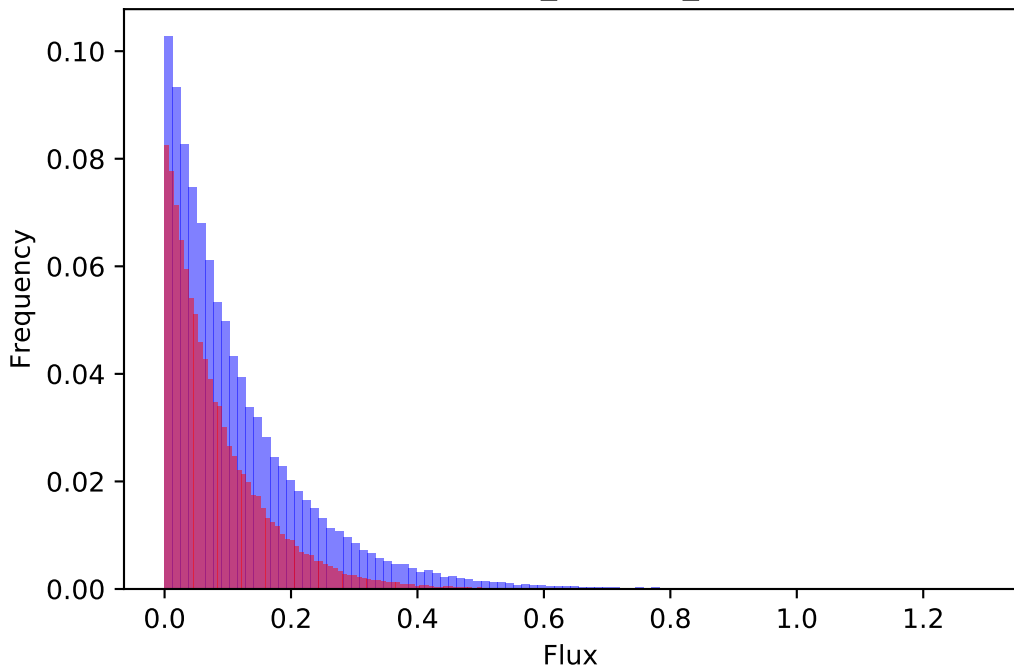




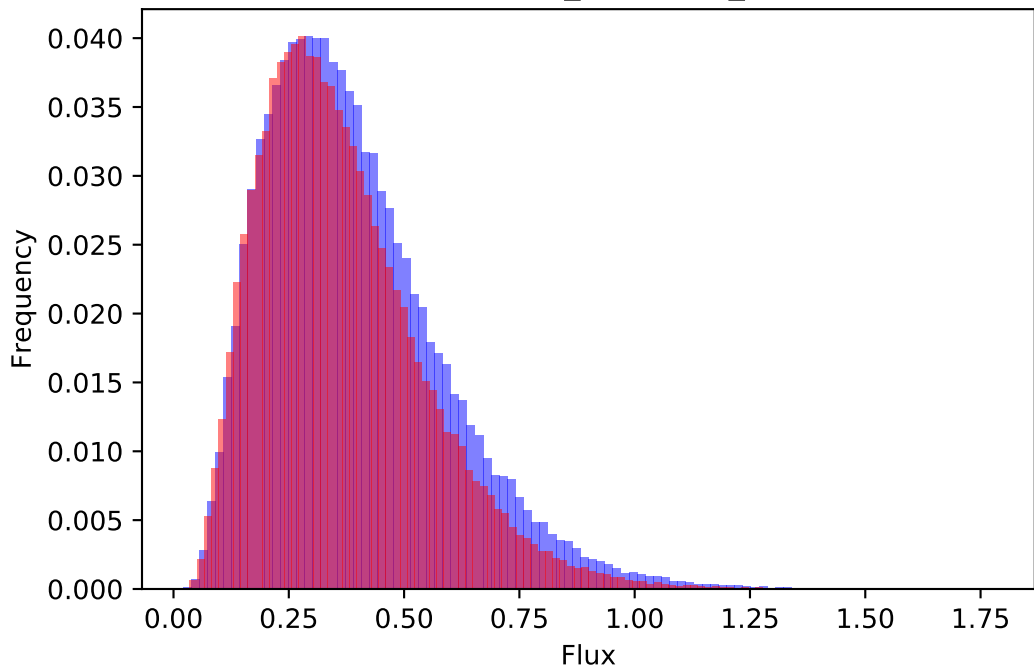
**\*\*424 : Ile\_h --> Ile\_c\*\***



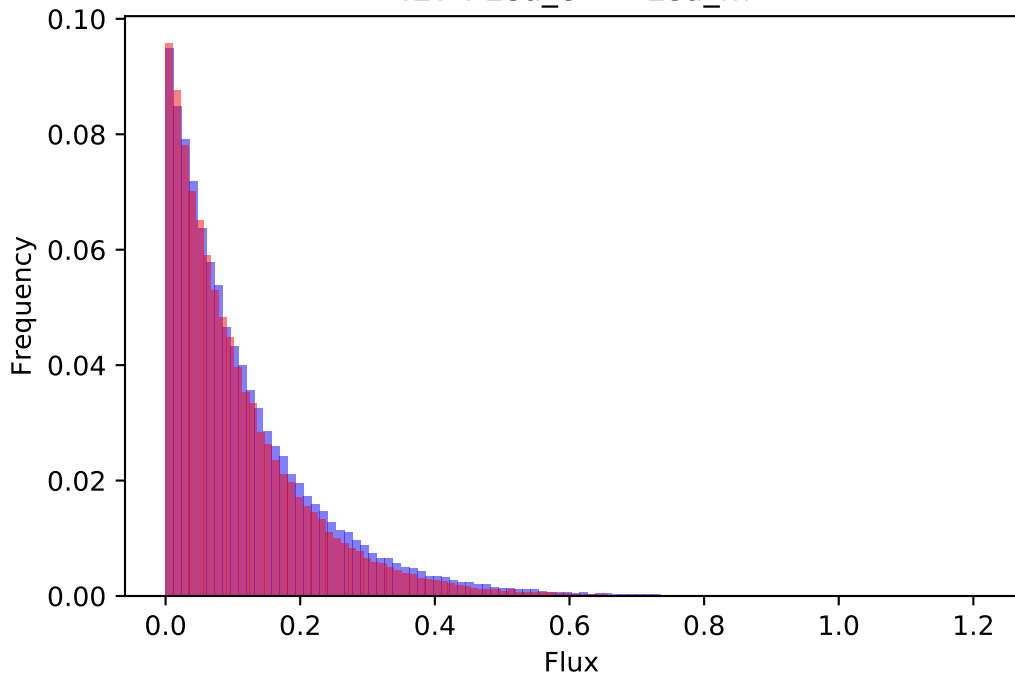
**\*\*425 : lle\_c --> lle\_m\*\***



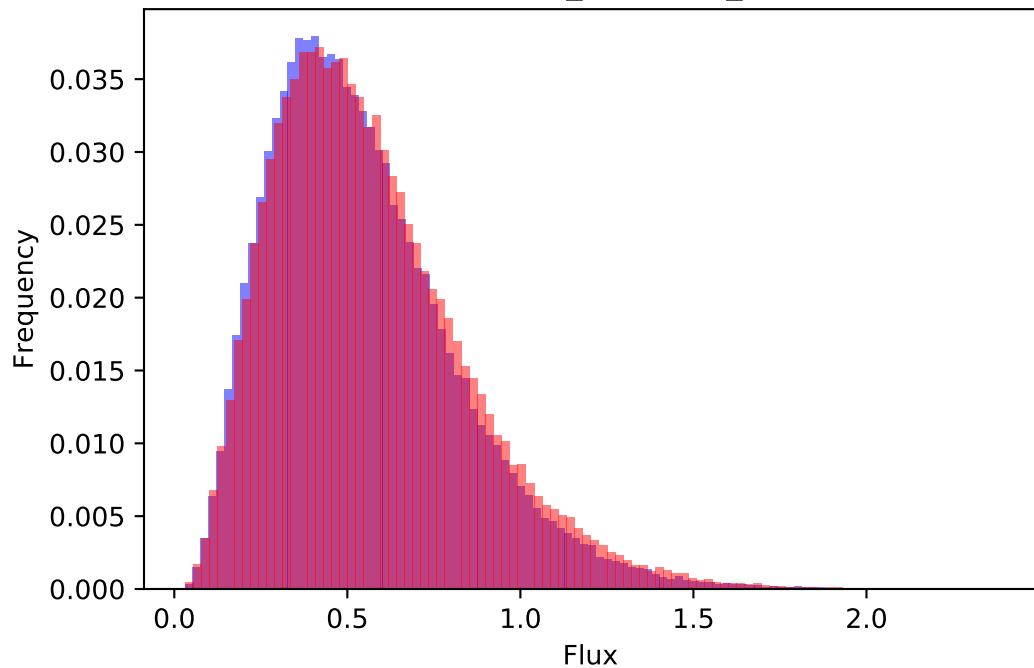
**\*\*426 : Leu\_h --> Leu\_c\*\***



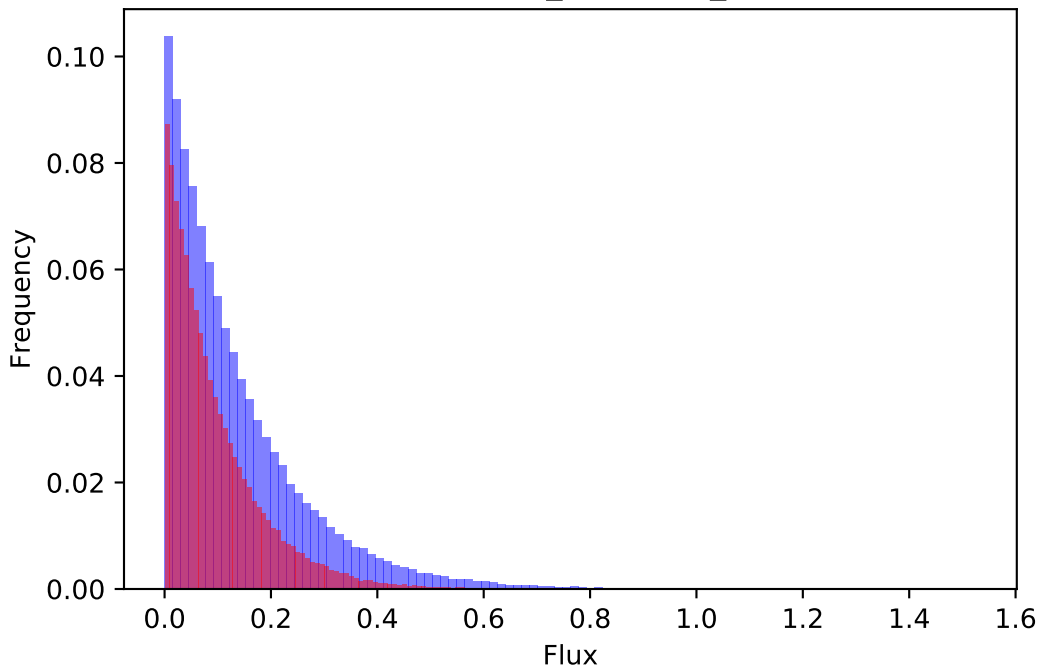
**\*\*427 : Leu\_c --> Leu\_m\*\***



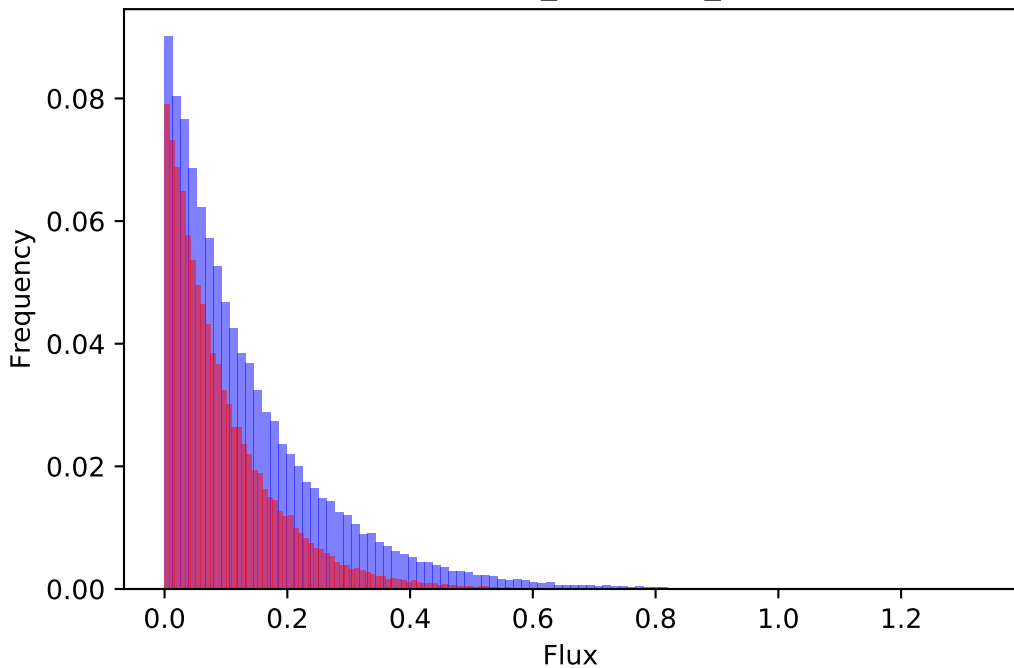
**\*\*428 : Lys\_h --> Lys\_c\*\***



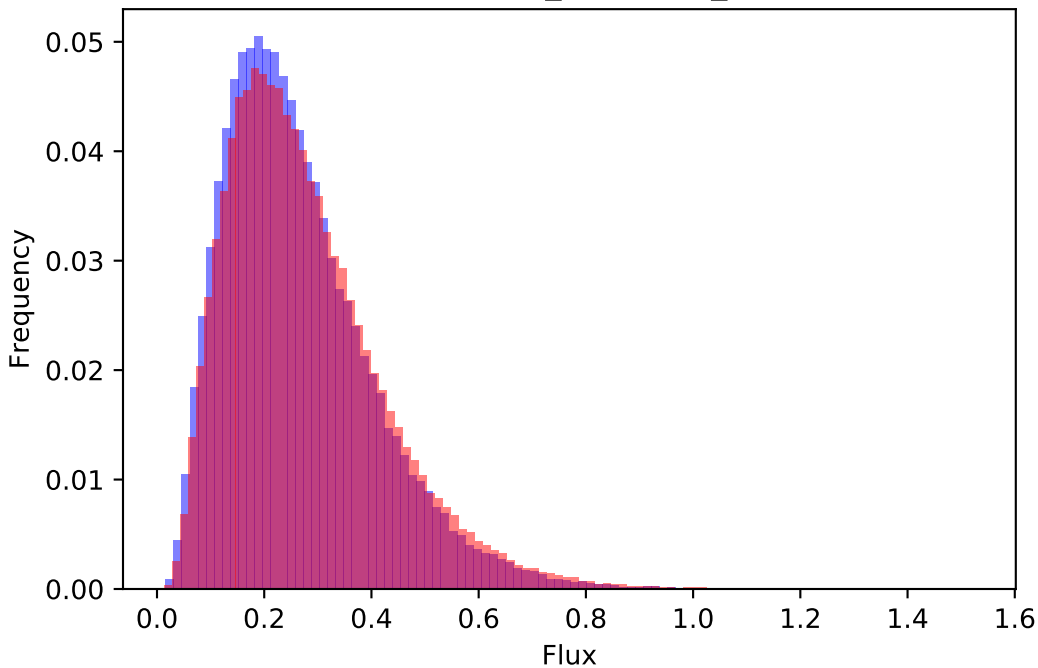
**\*\*429 : Met\_c --> Met\_h\*\***



**\*\*430 : Met\_c --> Met\_m\*\***

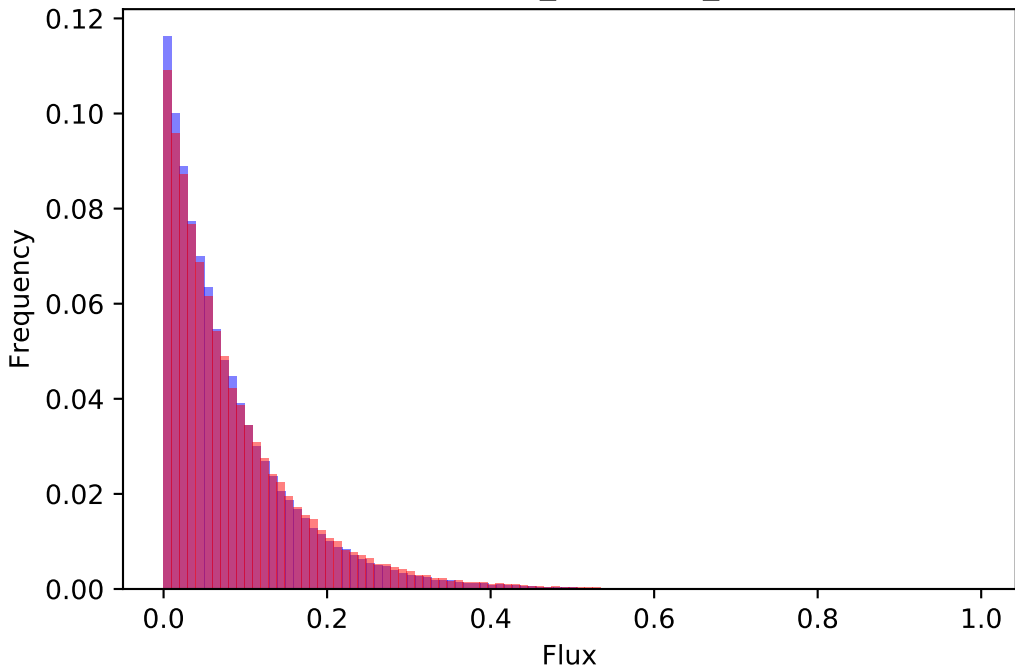


**\*\*431 : Phe\_h --> Phe\_c\*\***

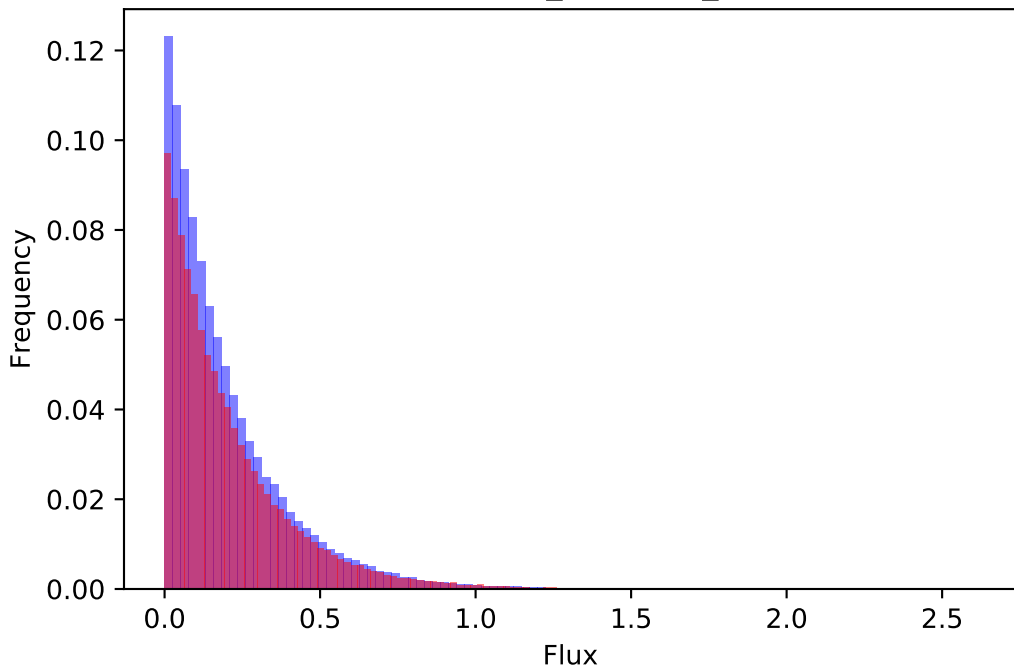




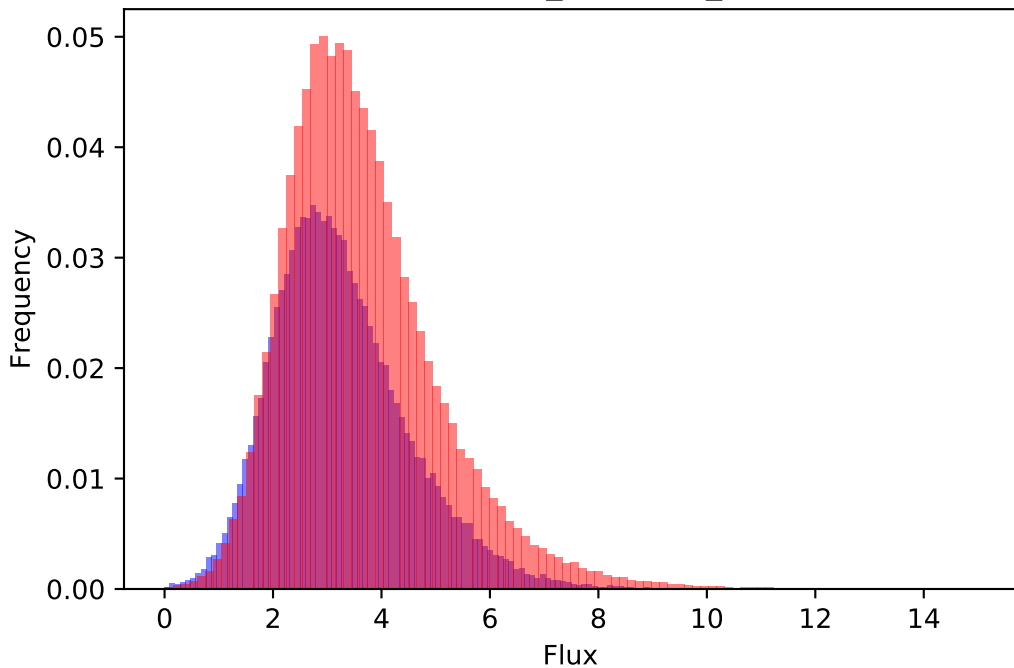
**\*\*432 : Phe\_c --> Phe\_m\*\***



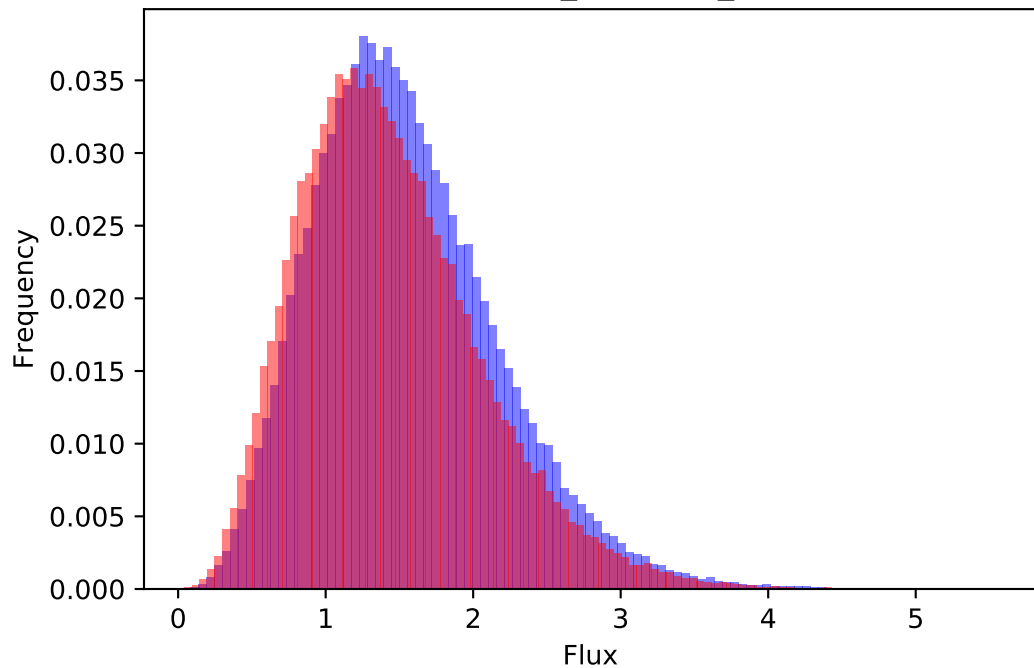
**\*\*433 : Pro\_c --> Pro\_h\*\***



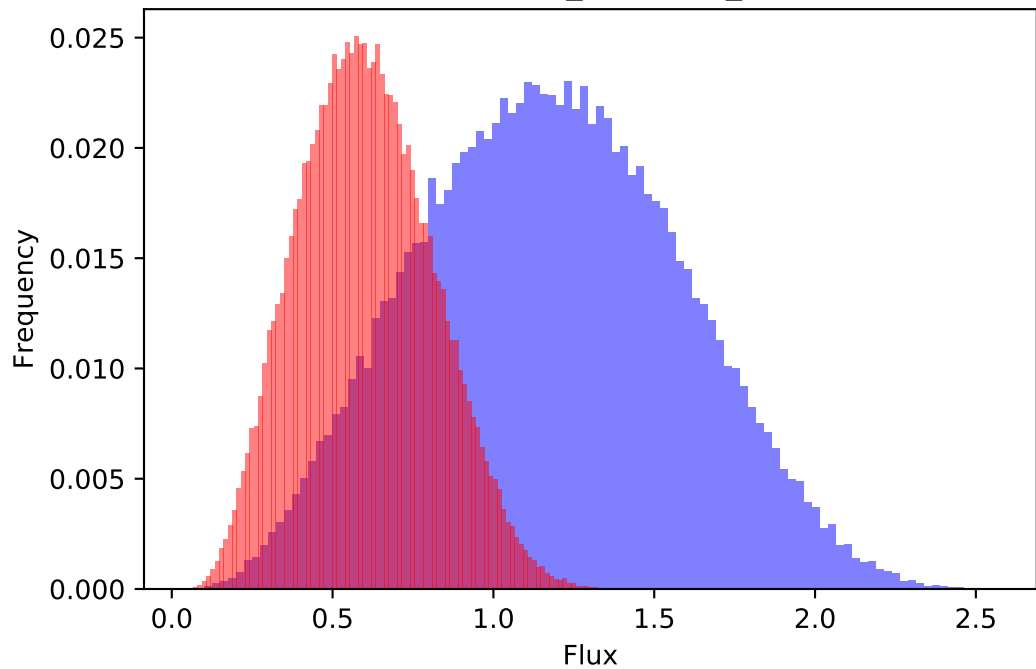
**\*\*434 : Ser\_h --> Ser\_c\*\***



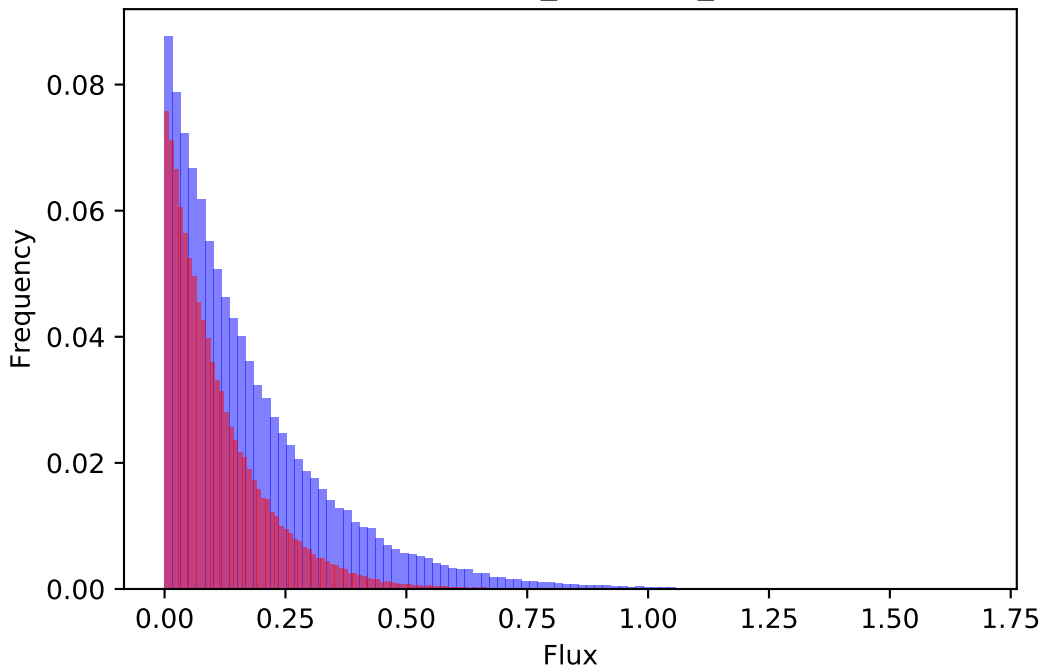
**\*\*435 : Ser\_c --> Ser\_m\*\***



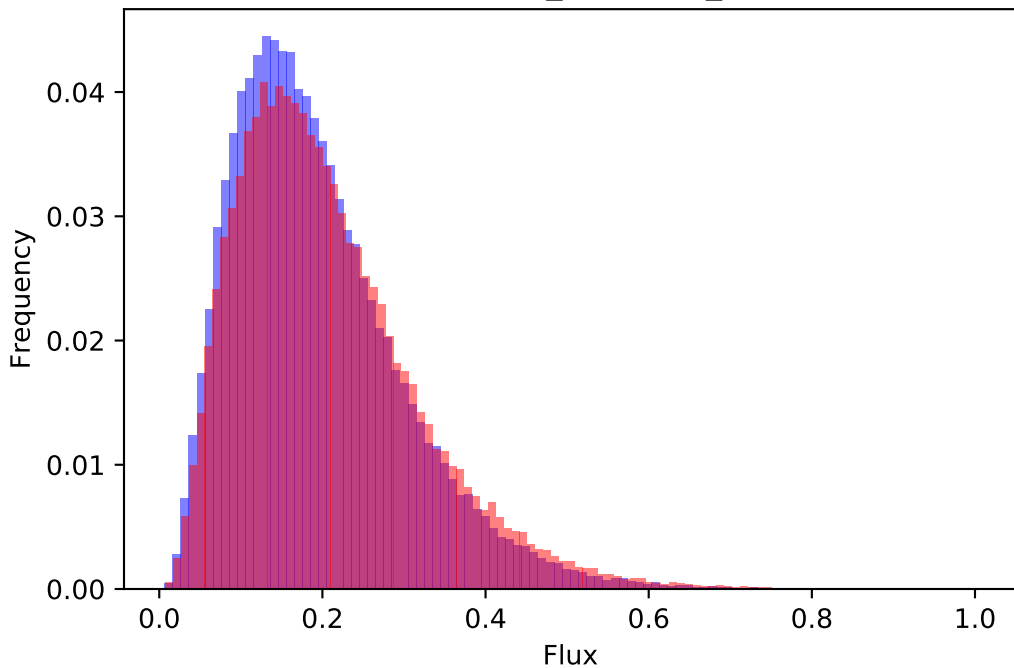
**\*\*436 : Thr\_h --> Thr\_c\*\***



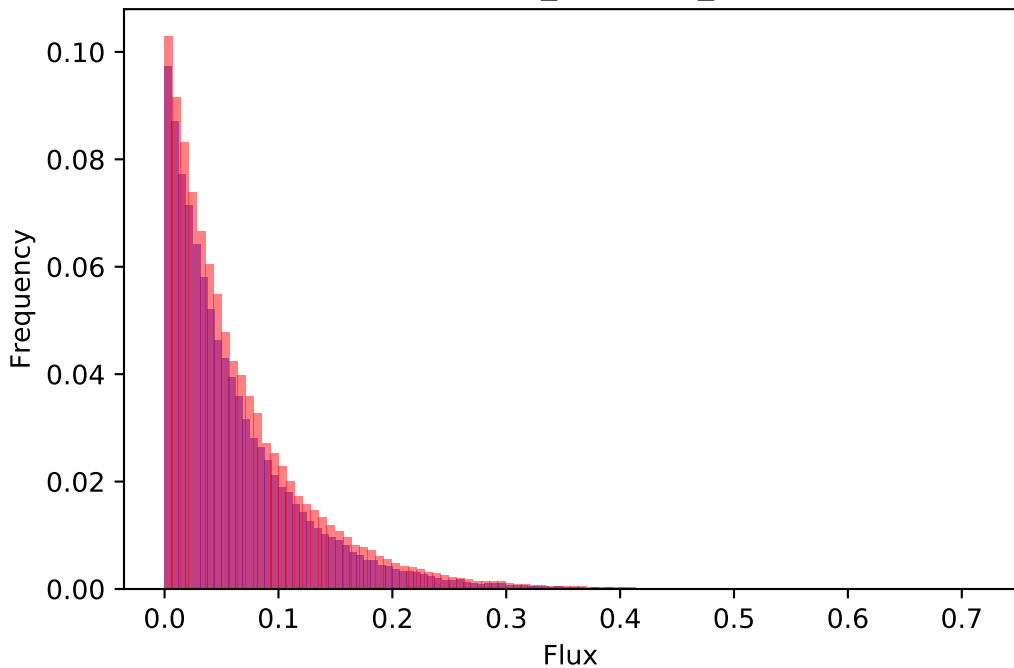
**\*\*437 : Thr\_c --> Thr\_m\*\***



**\*\*438 : Trp\_h --> Trp\_c\*\***

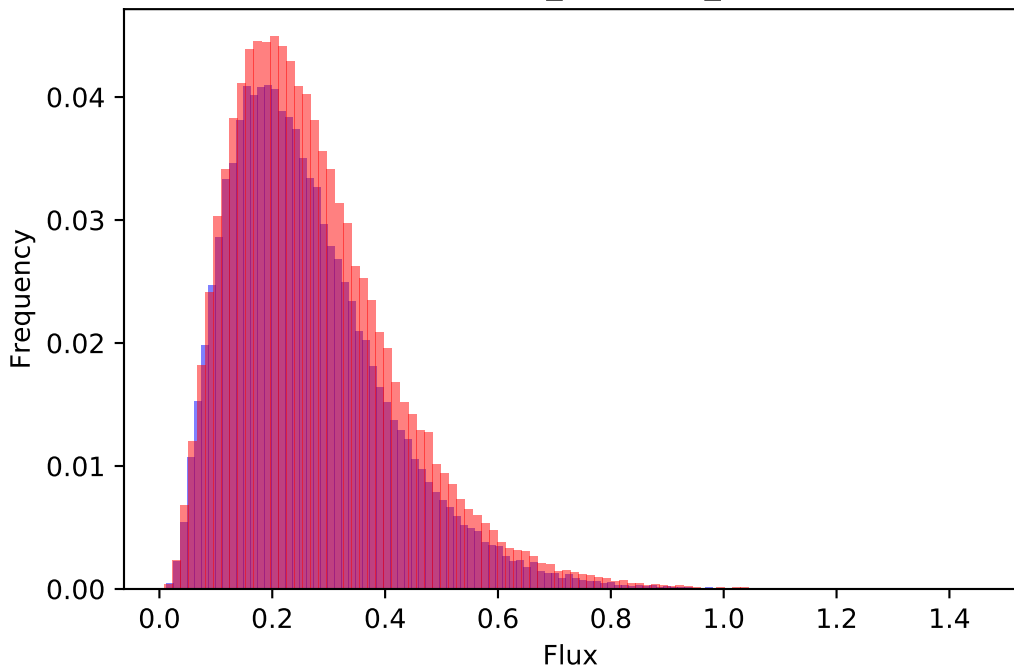


**\*\*439 : Trp\_c --> Trp\_m\*\***

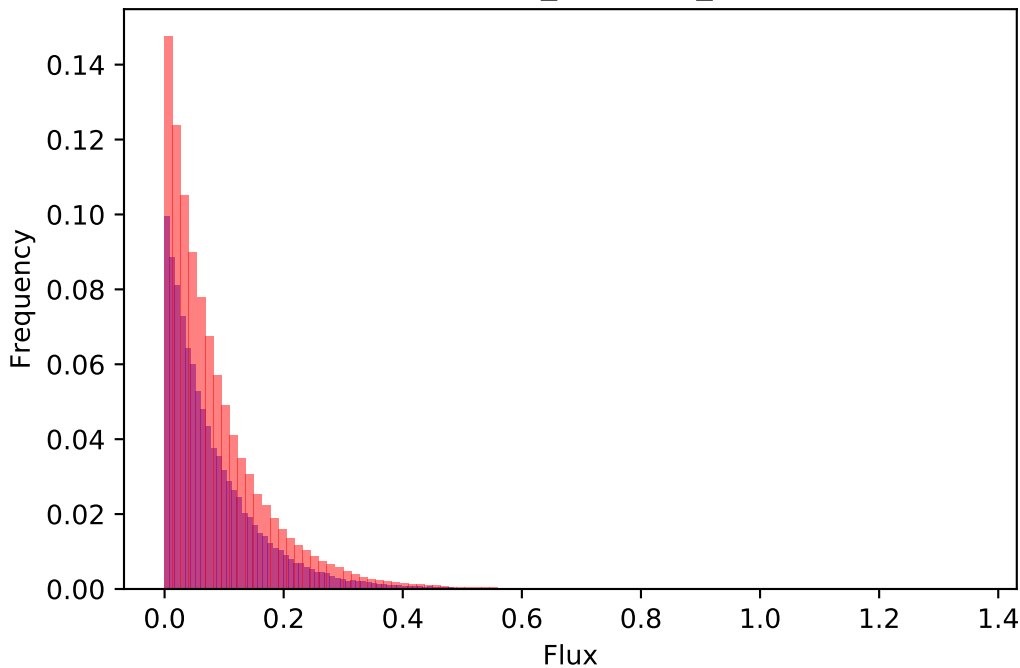




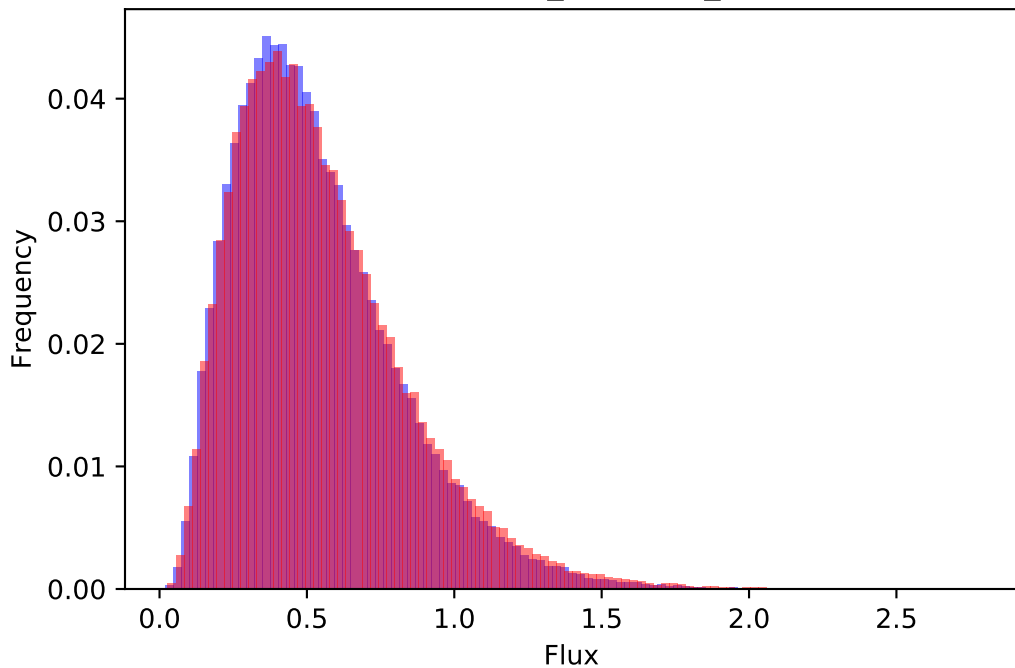
**\*\*440 : Tyr\_h --> Tyr\_c\*\***



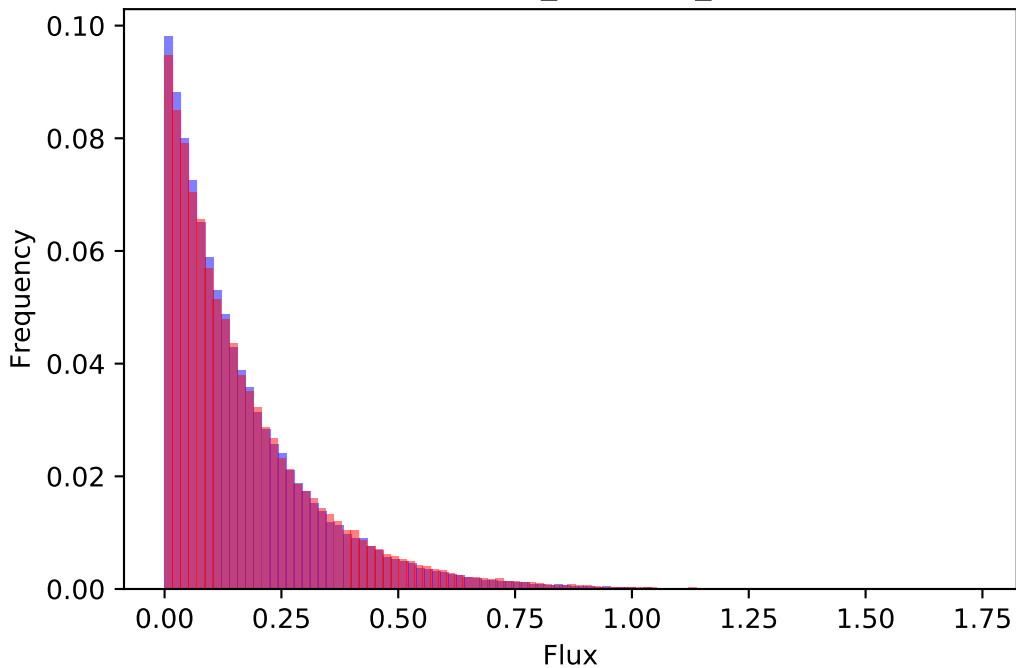
**\*\*441 : Tyr\_c --> Tyr\_m\*\***



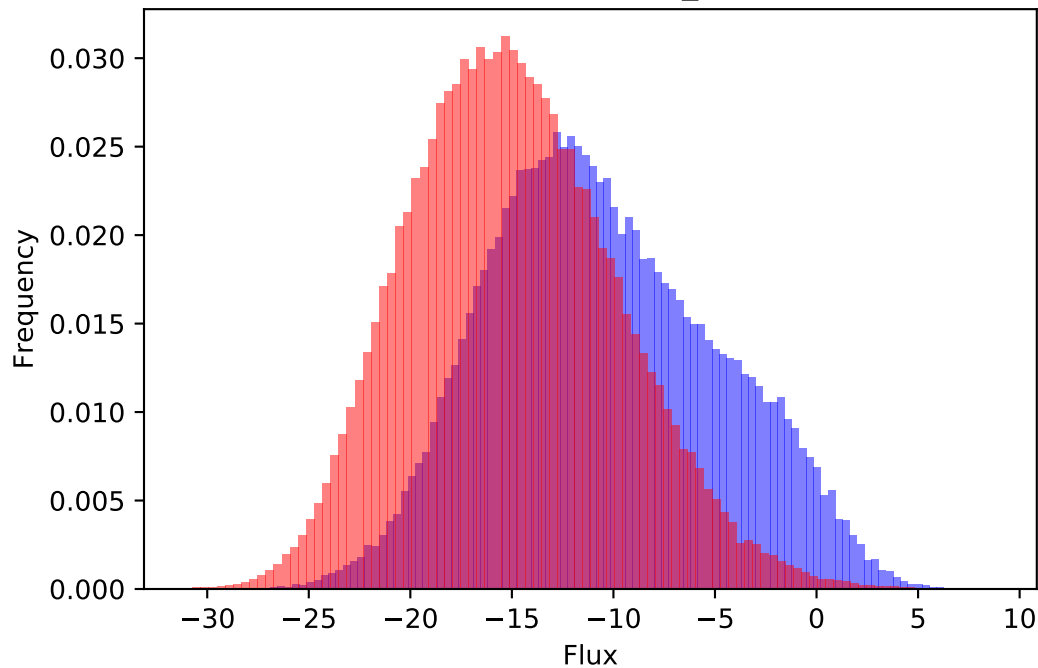
**\*\*442 : Val\_h --> Val\_c\*\***



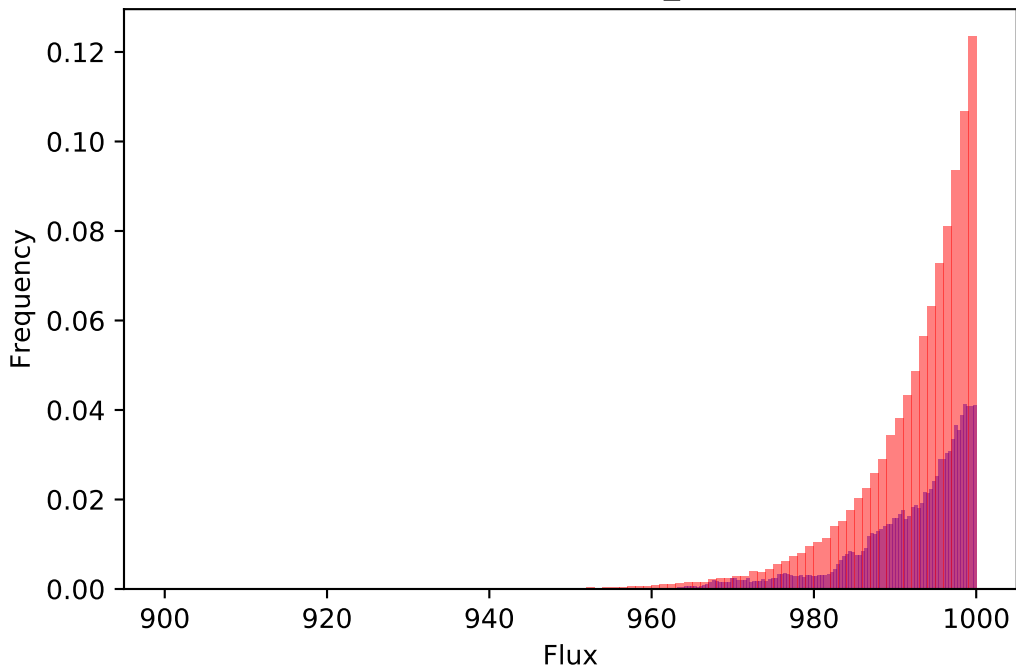
**\*\*443 : Val\_c --> Val\_m\*\***



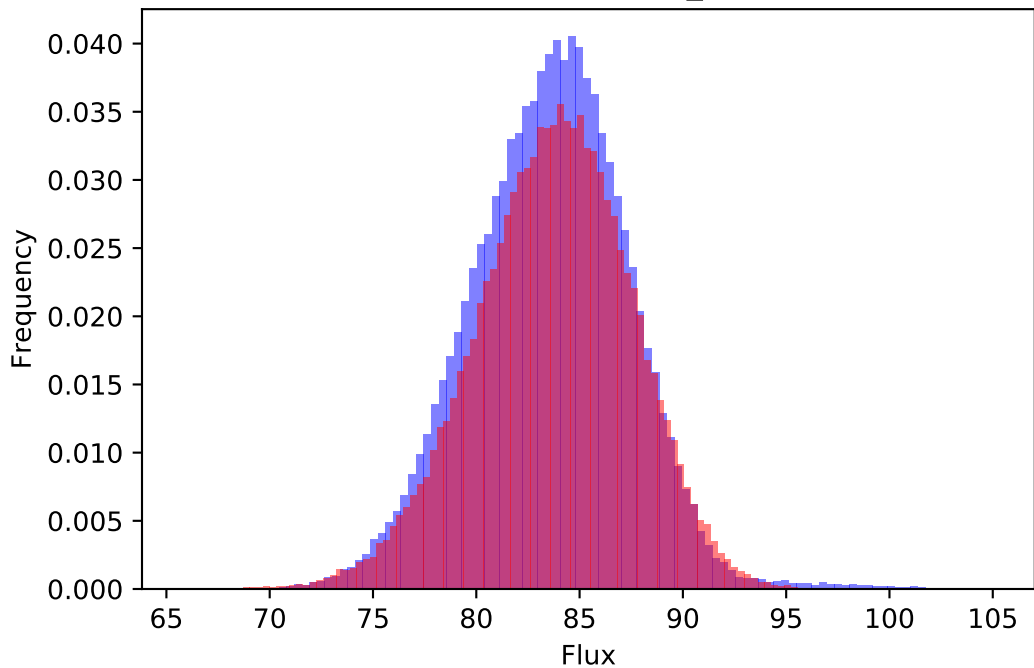
**\*\*444 :  $\leq$  H\_c\*\***



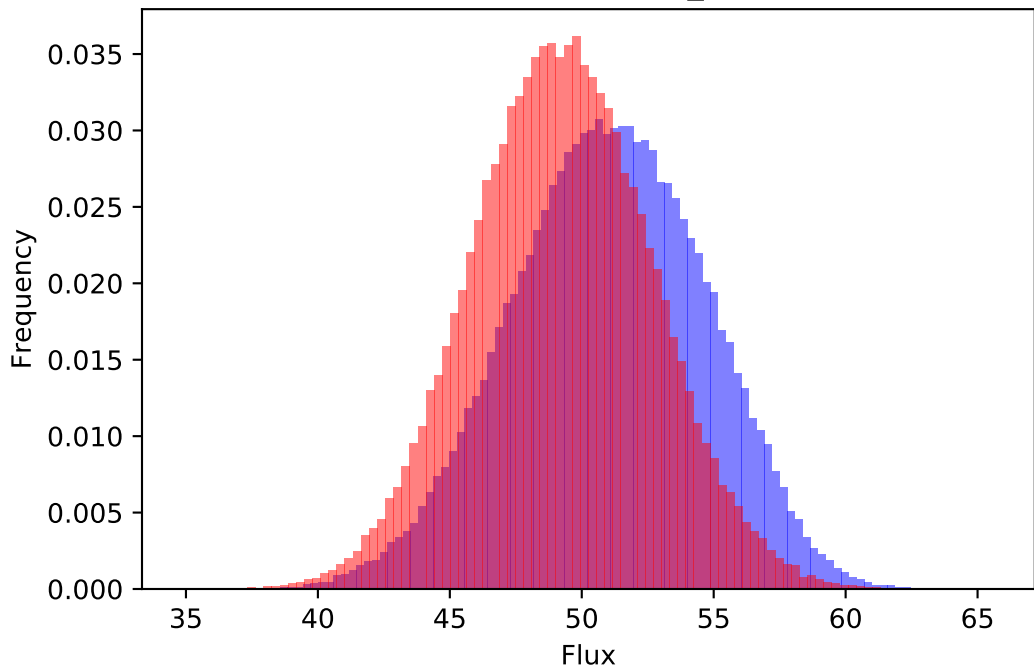
**\*\*445 : --> hnu\_h\*\***



**\*\*446 : --> CO2\_c\*\***

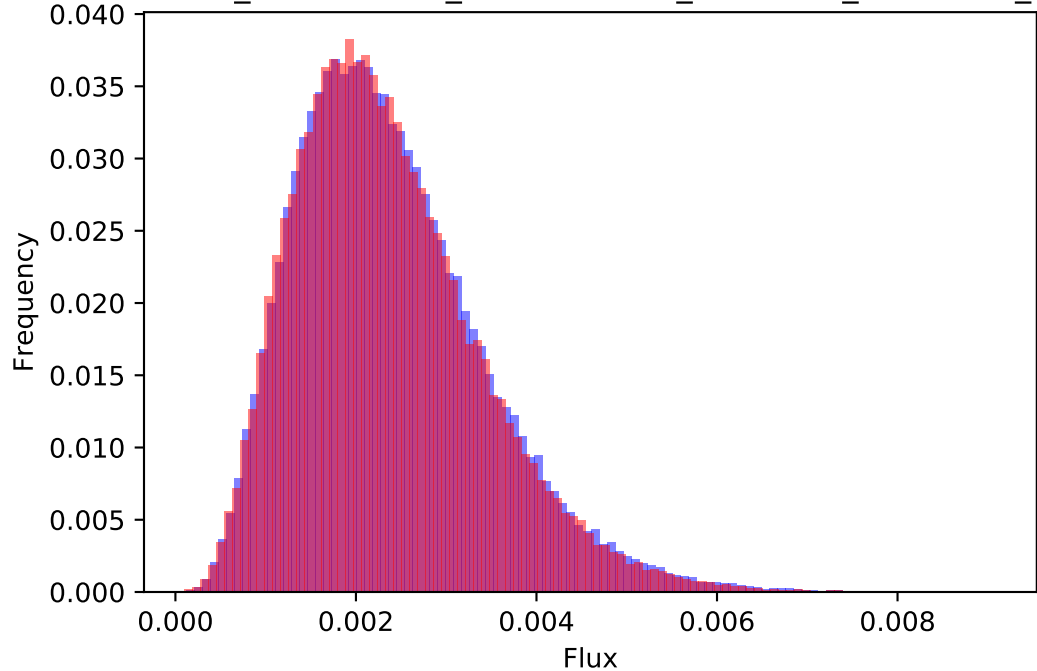


**\*\*447 : --> H2O\_c\*\***

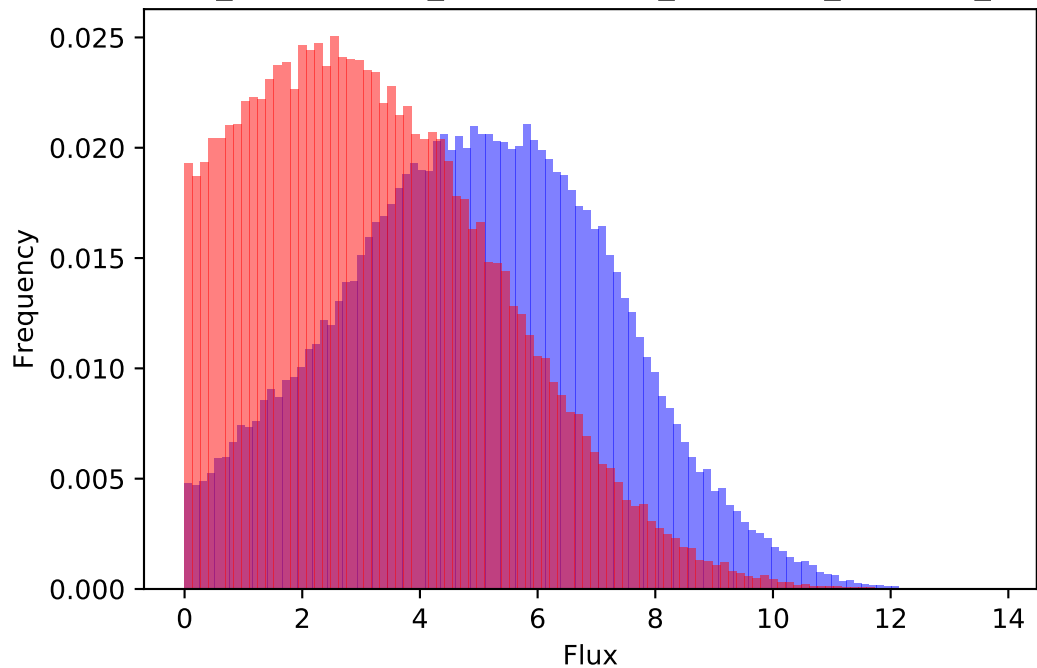




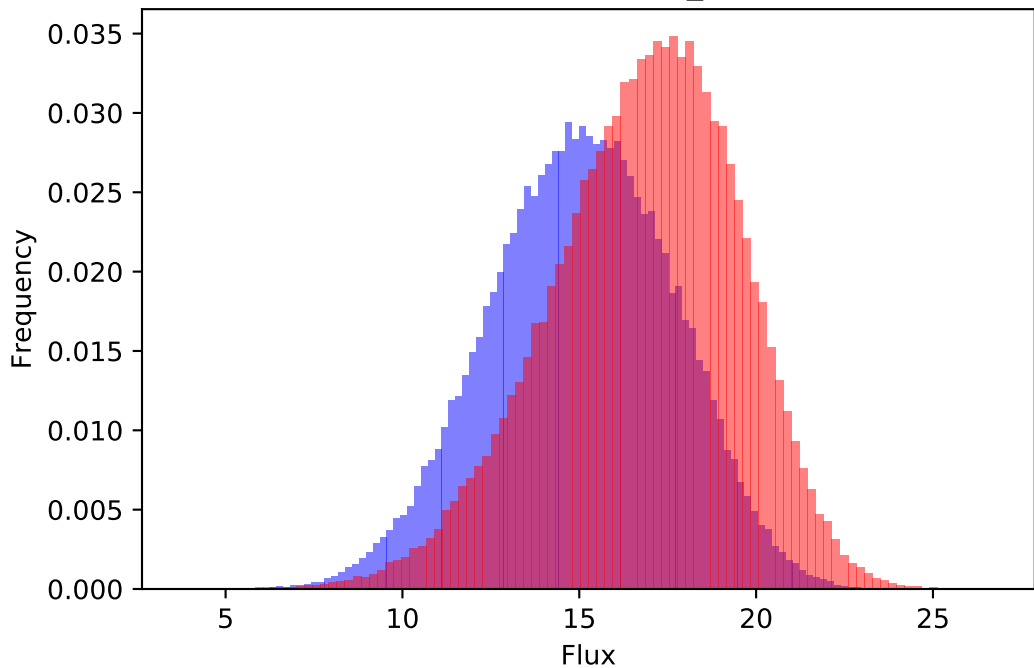
\*448 : 3.0 ATP\_c + 3.0 H2O\_c --> 3.0 ADP\_c + 2.0 H\_h + 3.0 Pi\_c + Pi\_h



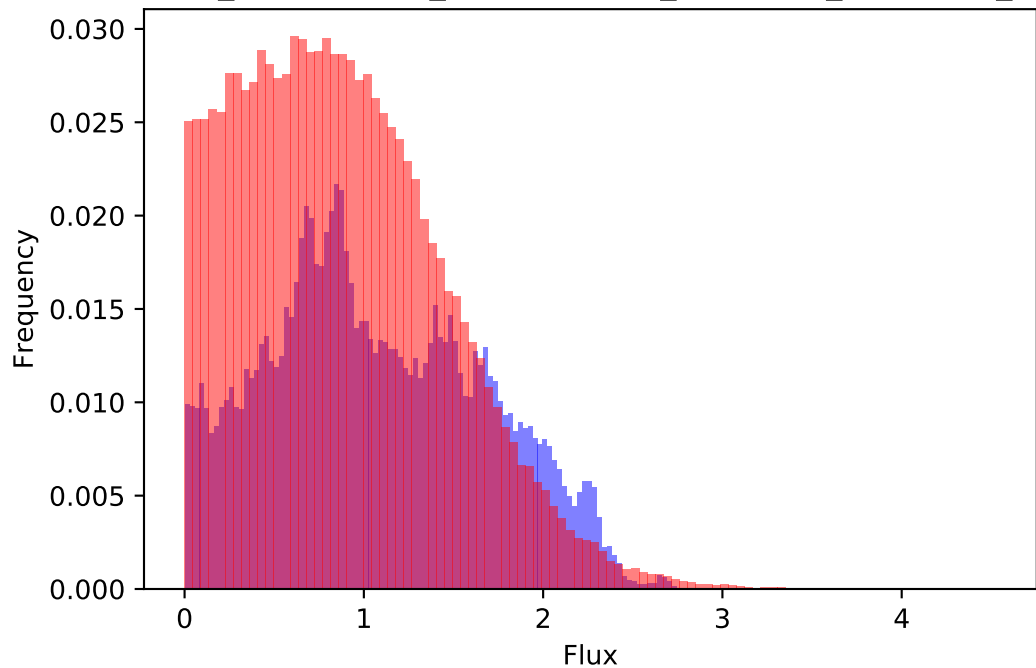
449 : 2.0 ATP\_c + 2.0 H2O\_c --> 2.0 ADP\_c + 2.0 H\_c + NO3\_c + 2.0 Pi\_c



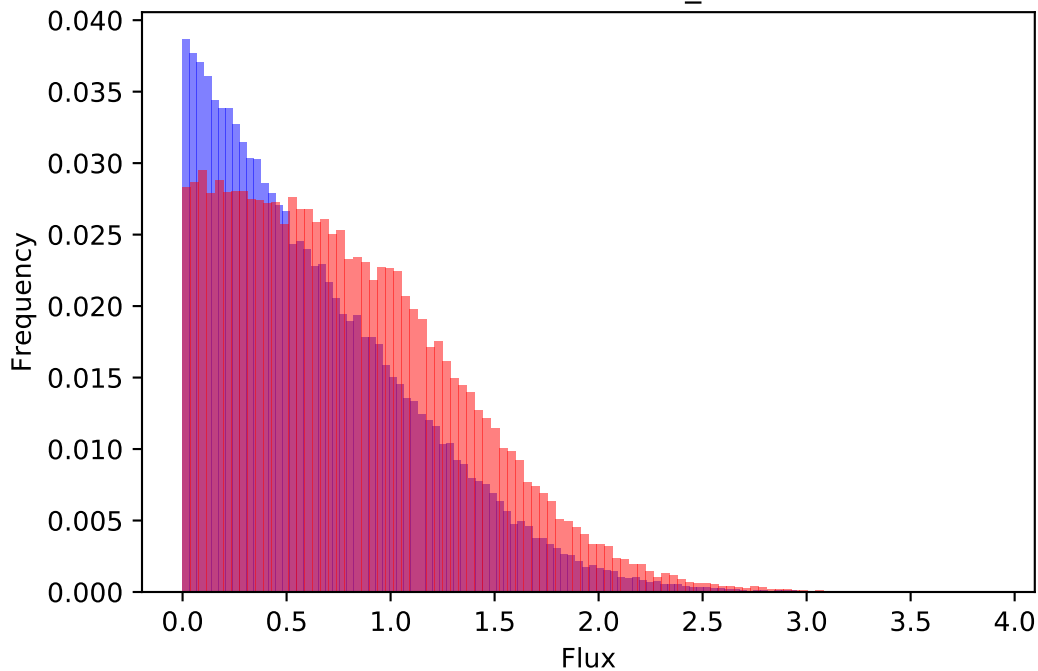
**\*\*450 : --> NH4\_c\*\***



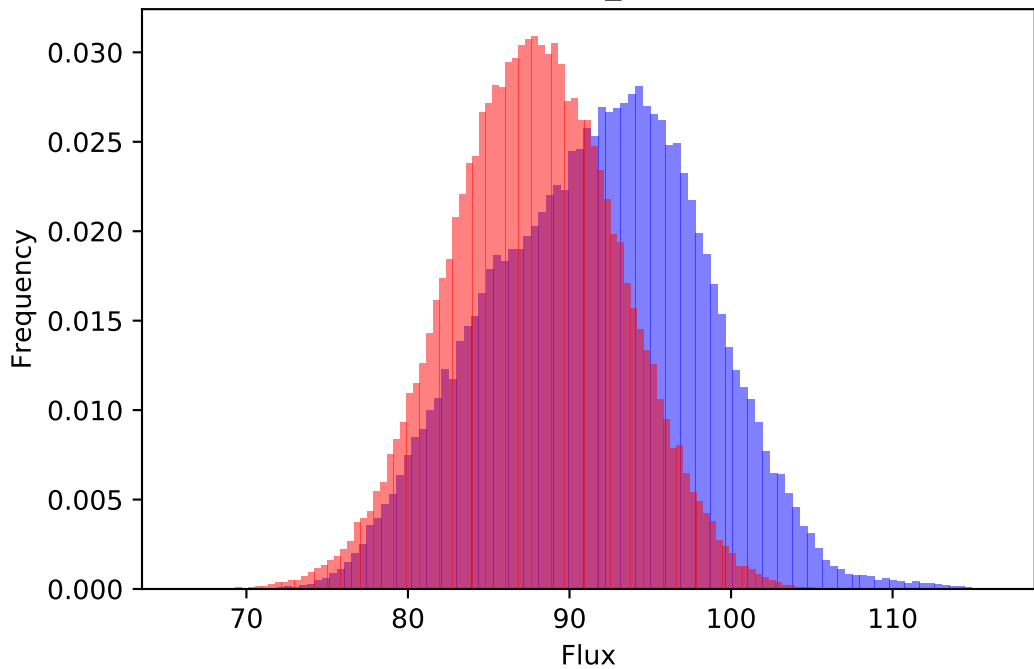
451 : 3.0 ATP\_c + 3.0 H2O\_c --> 3.0 ADP\_c + 3.0 H\_c + 3.0 Pi\_c + SO4\_c



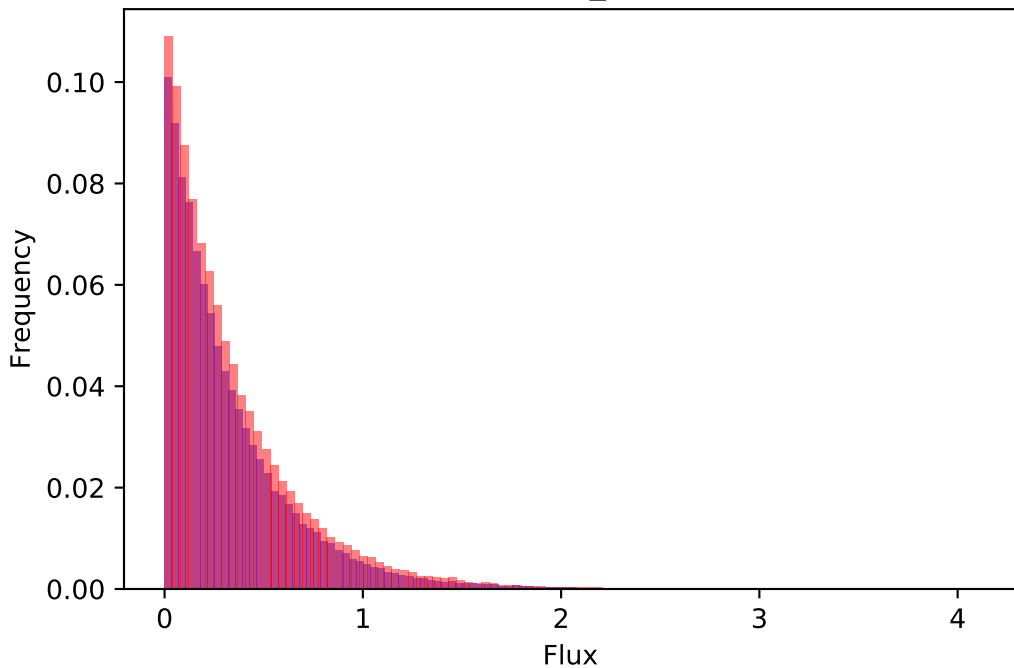
**\*\*452 : --> H2S\_c\*\***



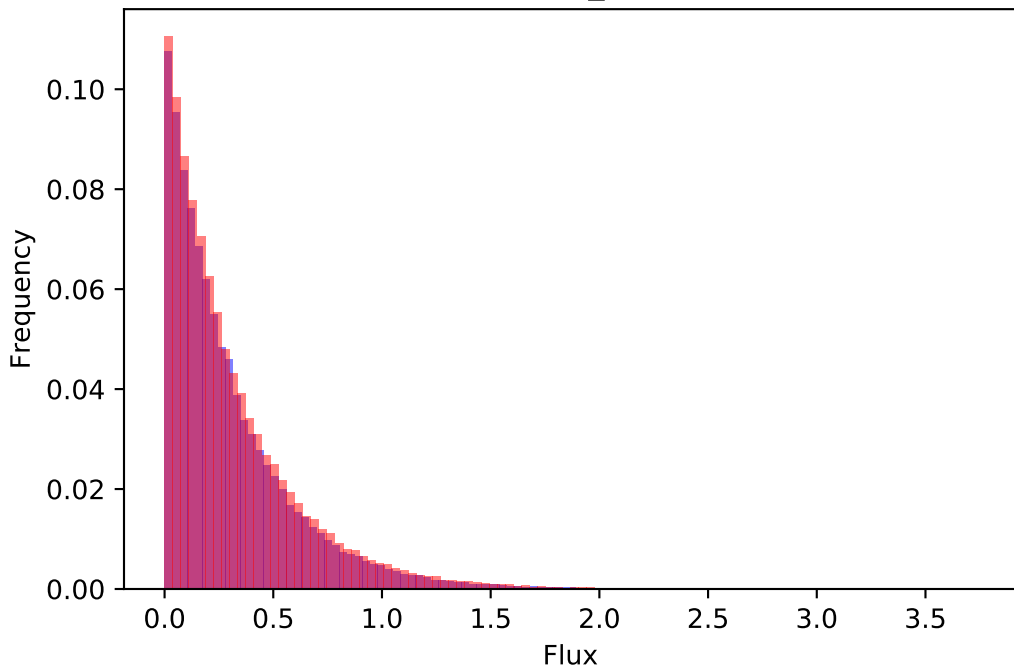
**\*\*453 : O2\_c --> \*\***



**\*\*454 : Ala\_c --> \*\***

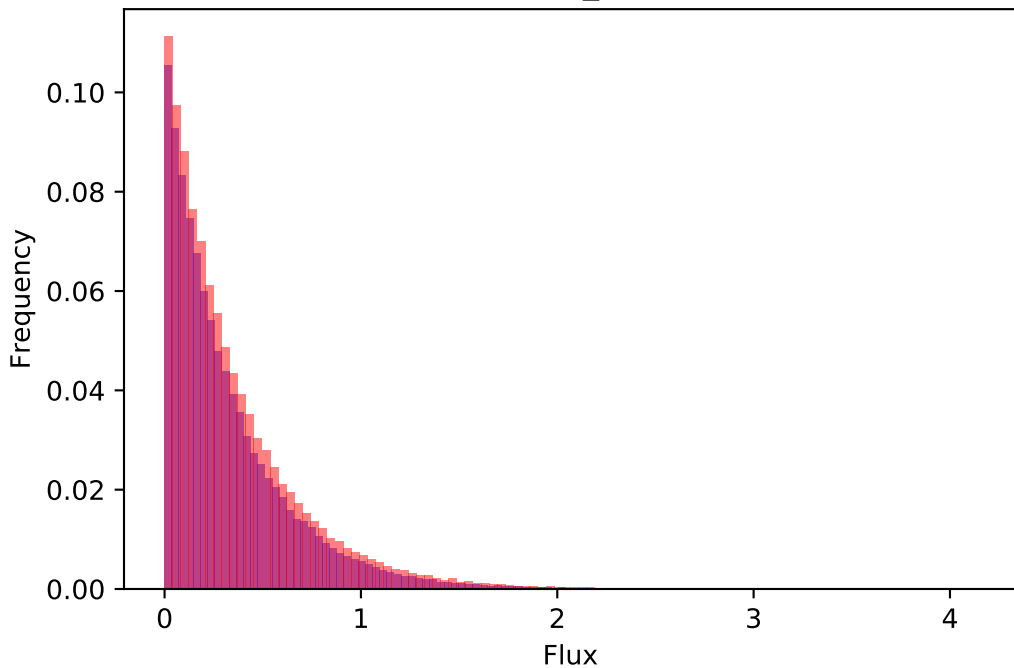


**\*\*455 : Ala\_h --> \*\***

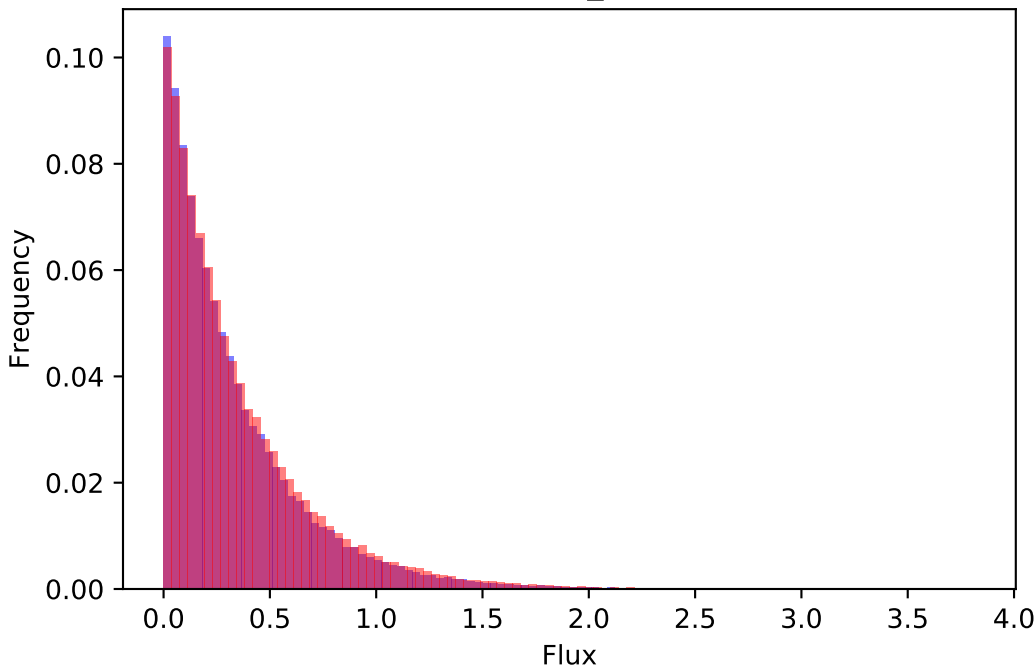




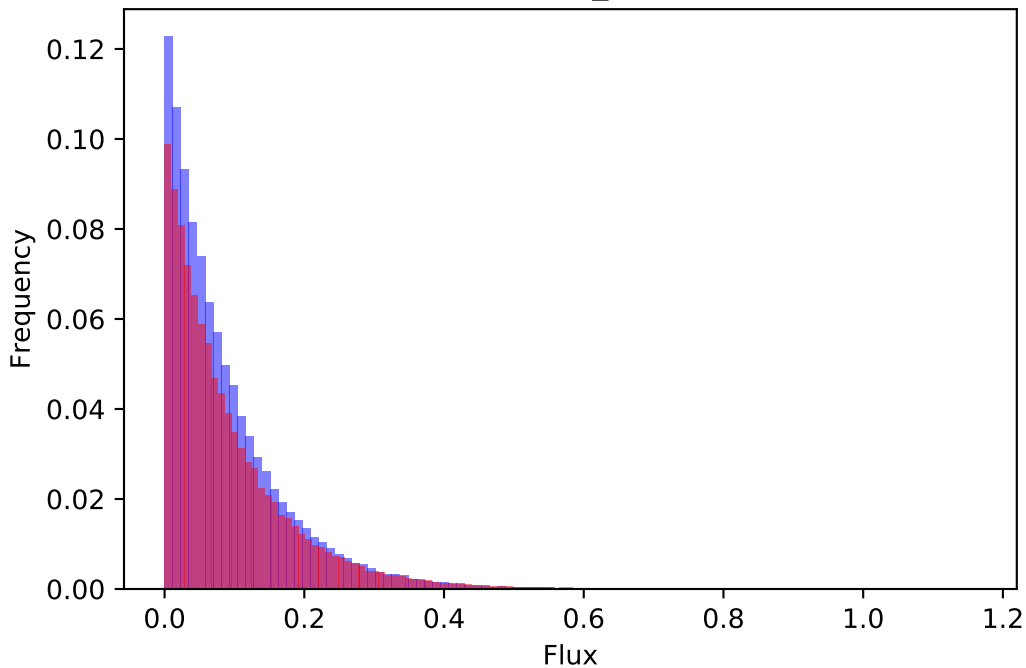
**\*\*456 : Ala\_m --> \*\***



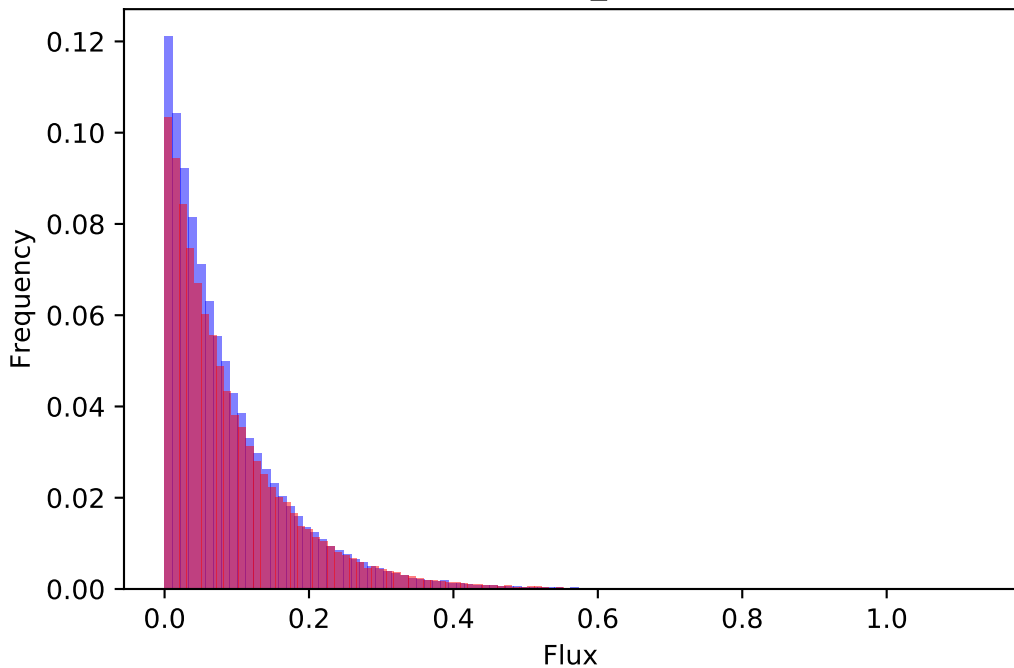
**\*\*457 : Ala\_p --> \*\***



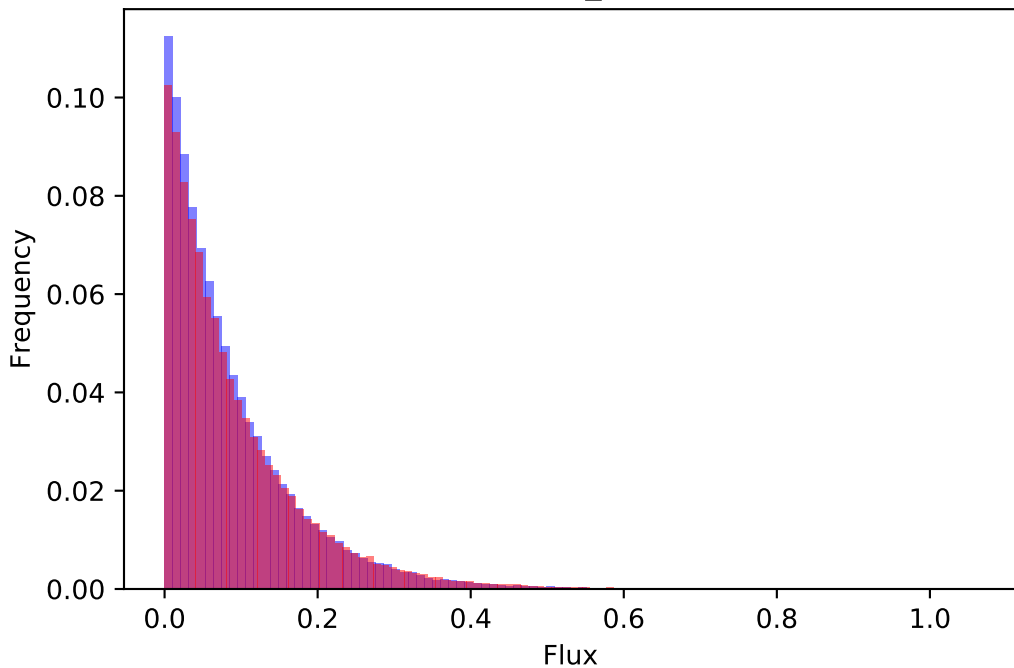
**\*\*458 : Arg\_c --> \*\***



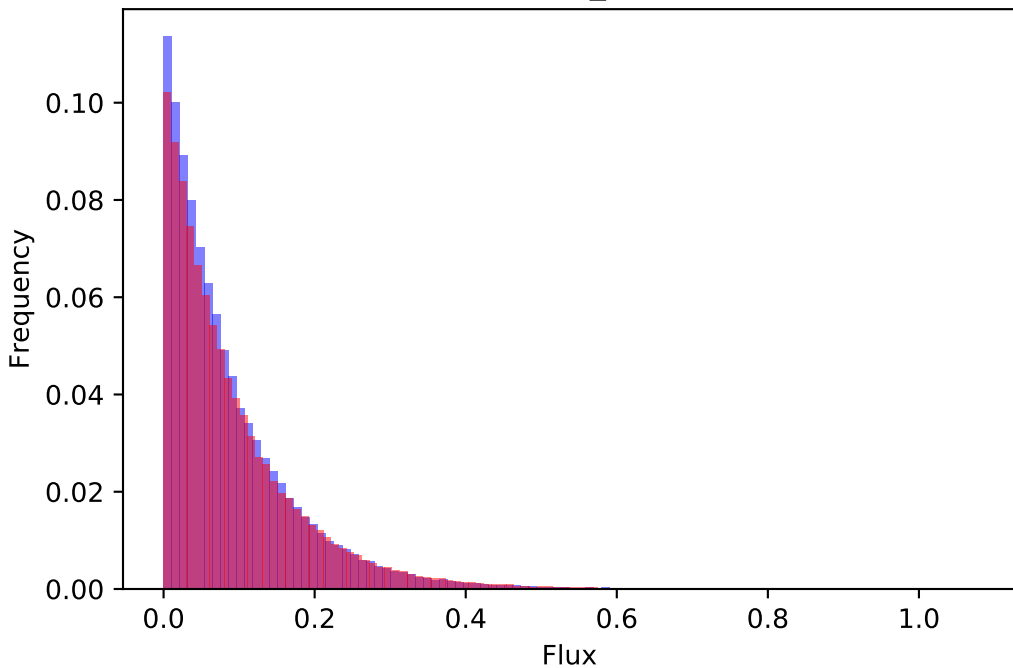
**\*\*459 : Arg\_h --> \*\***



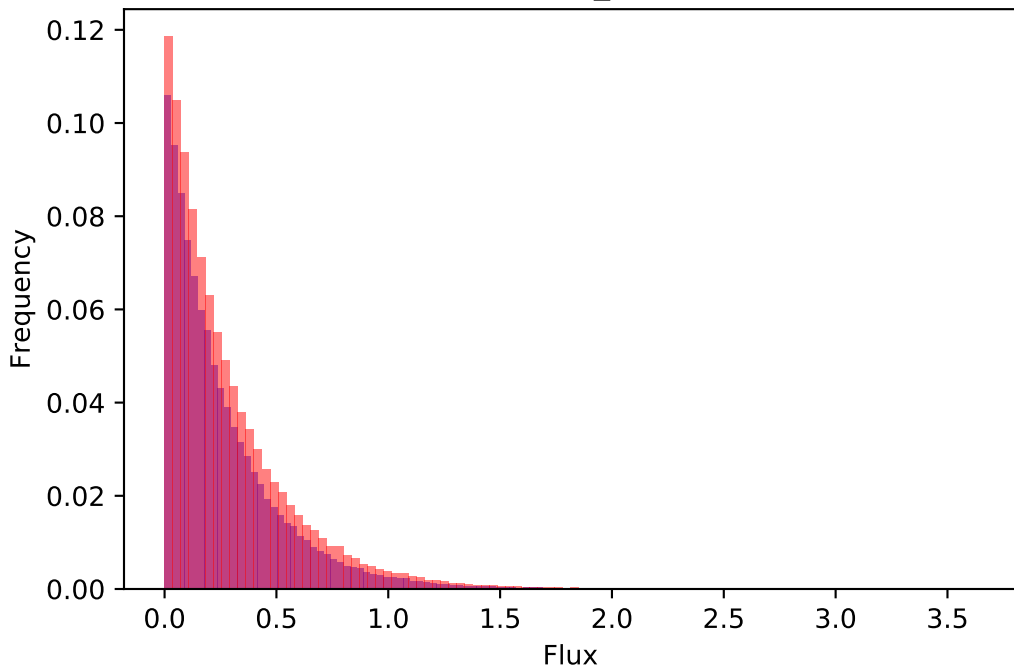
**\*\*460 : Arg\_m --> \*\***



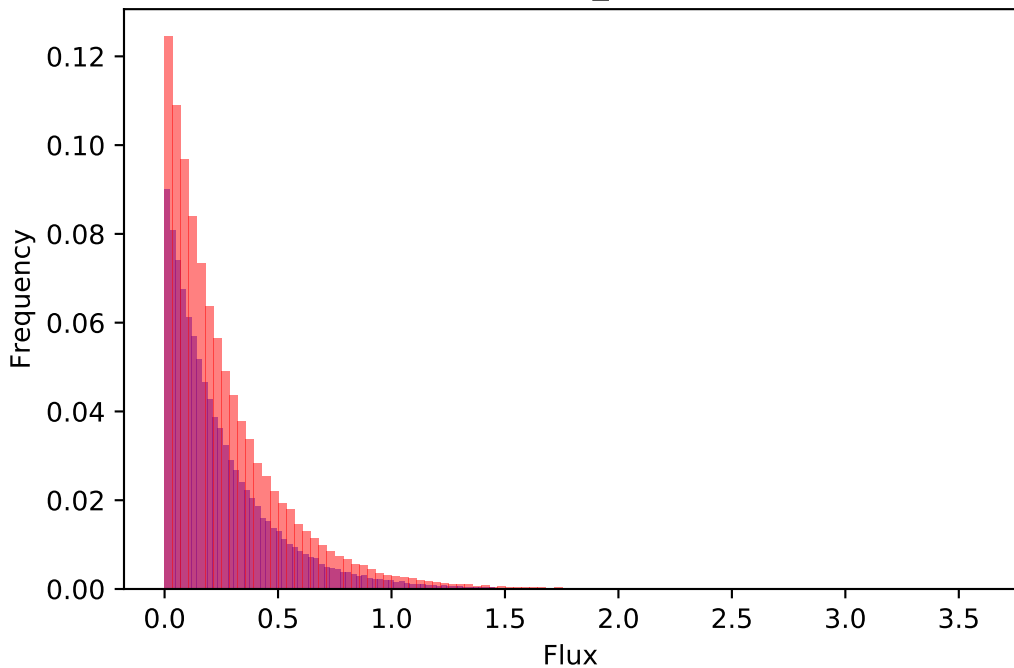
**\*\*461 : Arg\_p --> \*\***



**\*\*462 : Asn\_c --> \*\***

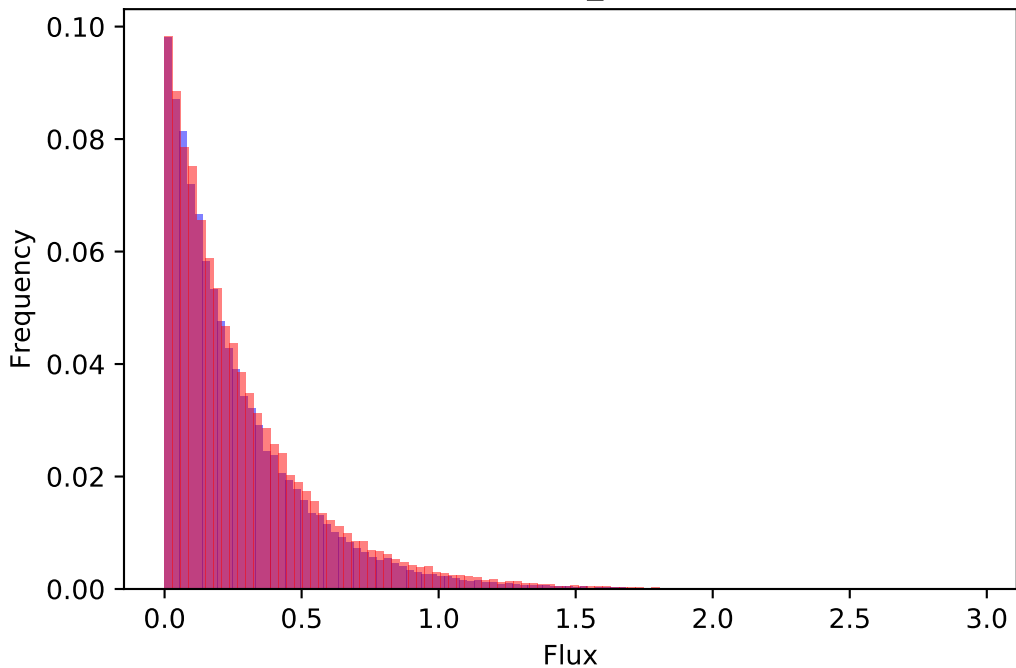


**\*\*463 : Asn\_h --> \*\***

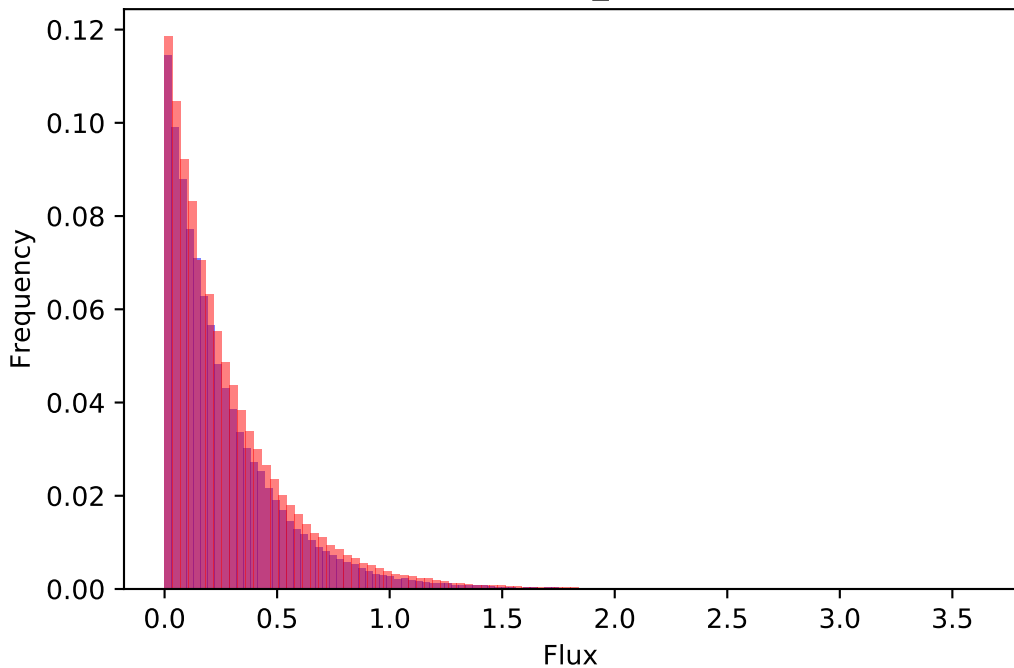




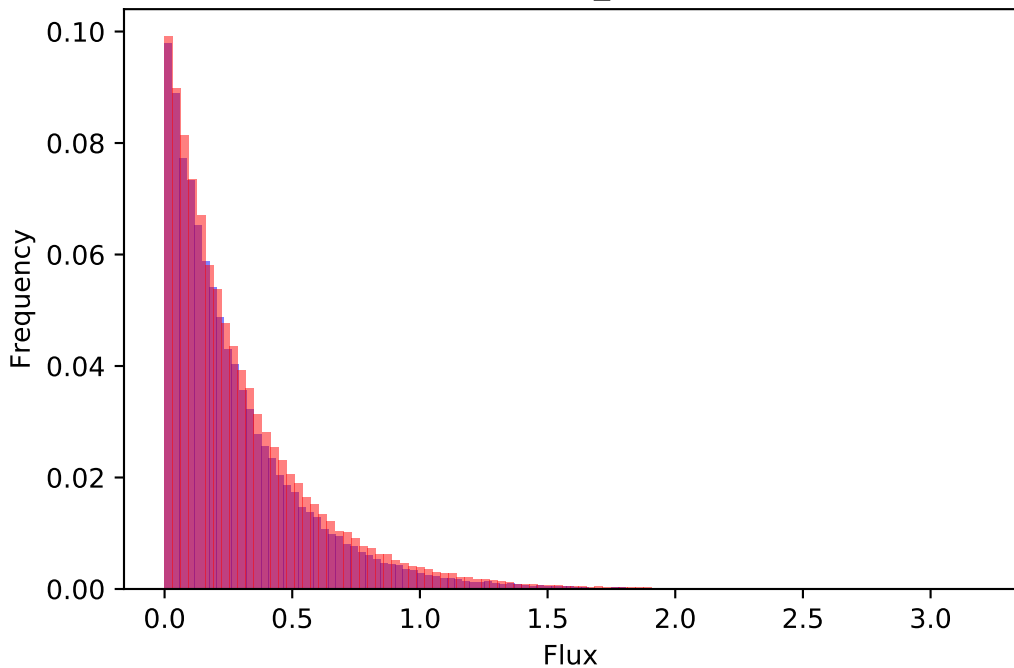
**\*\*464 : Asn\_m --> \*\***



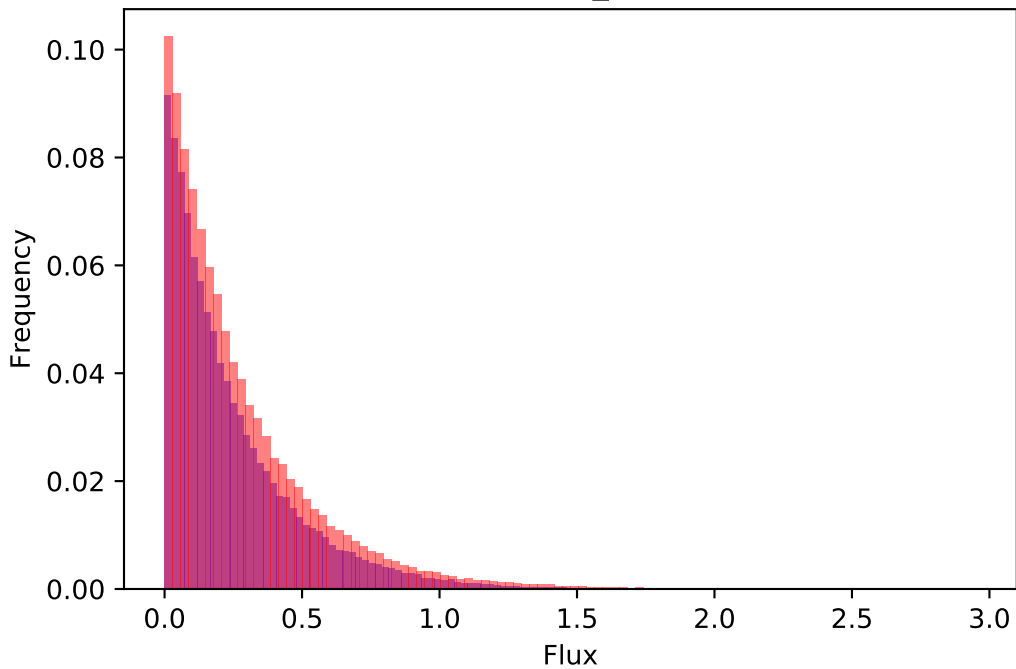
**\*\*465 : Asn\_p --> \*\***



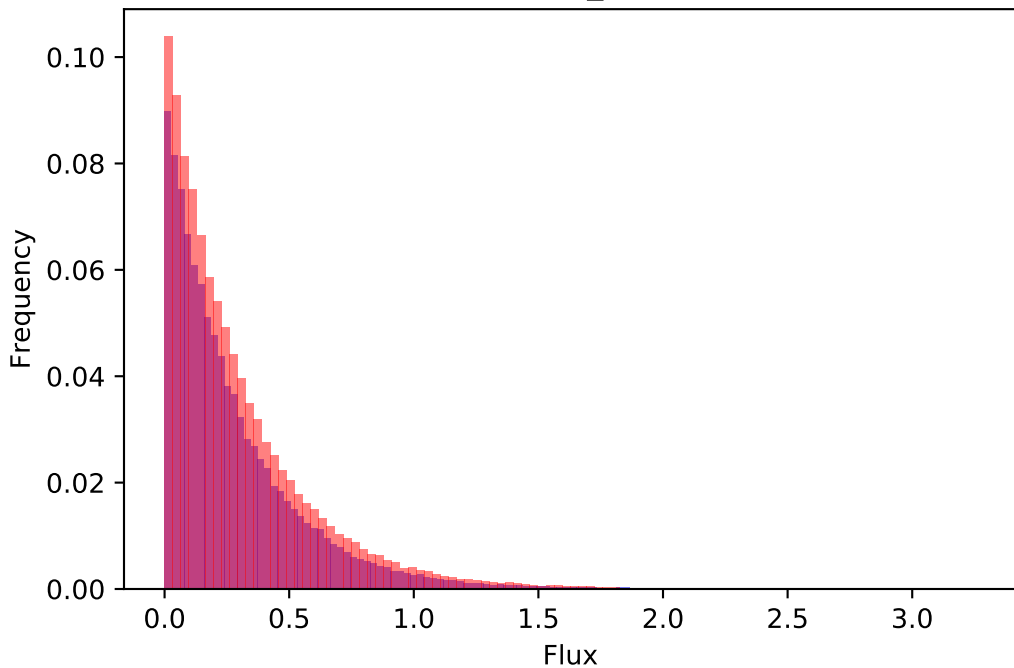
**\*\*466 : Asp\_c --> \*\***



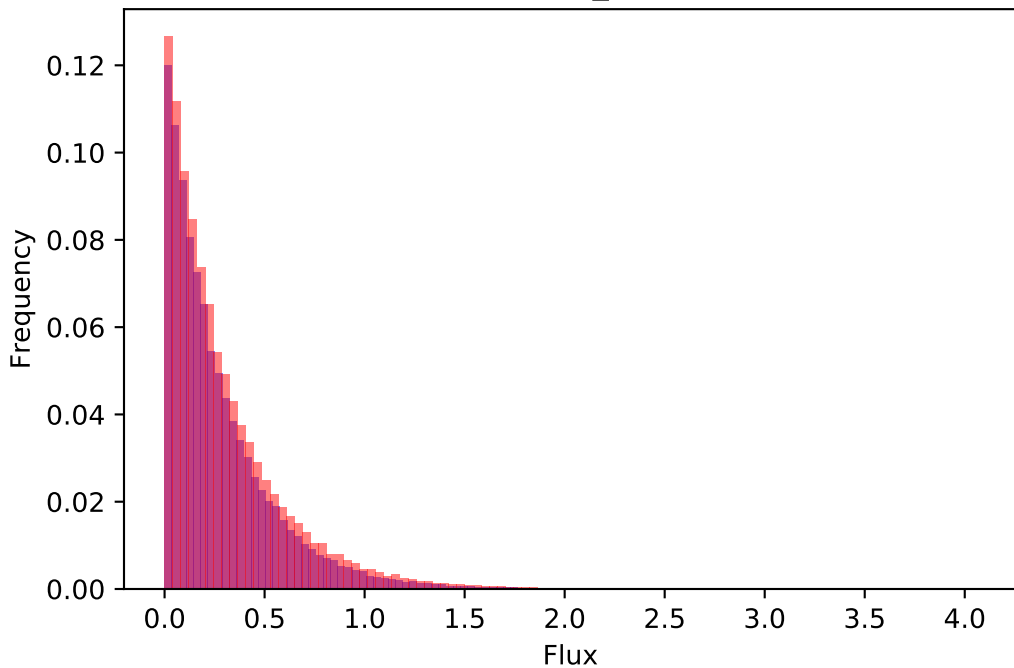
**\*\*467 : Asp\_h --> \*\***



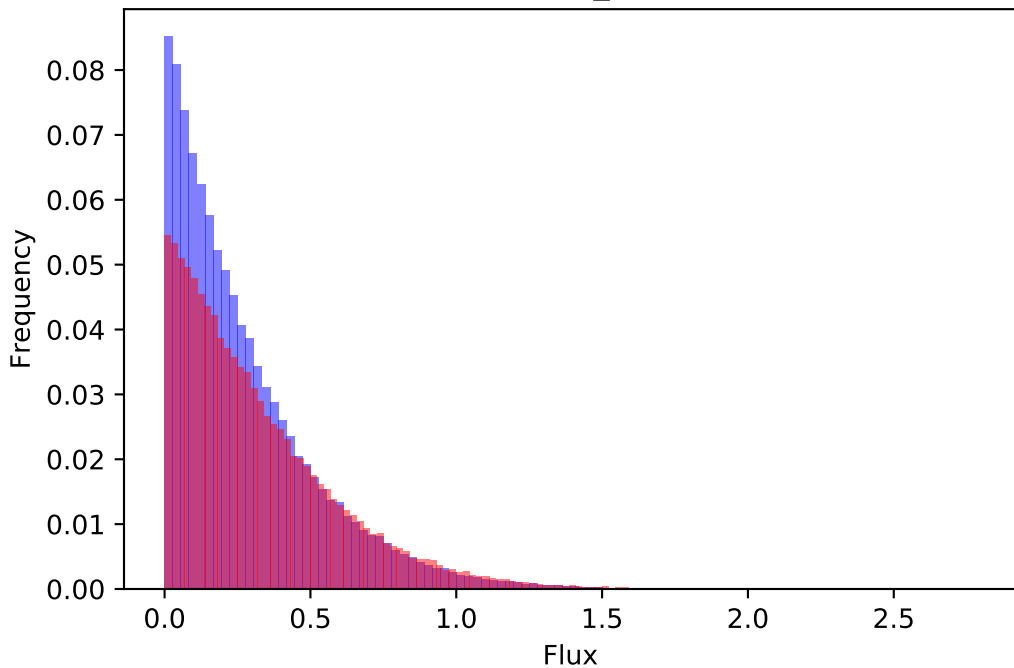
**\*\*468 : Asp\_m --> \*\***



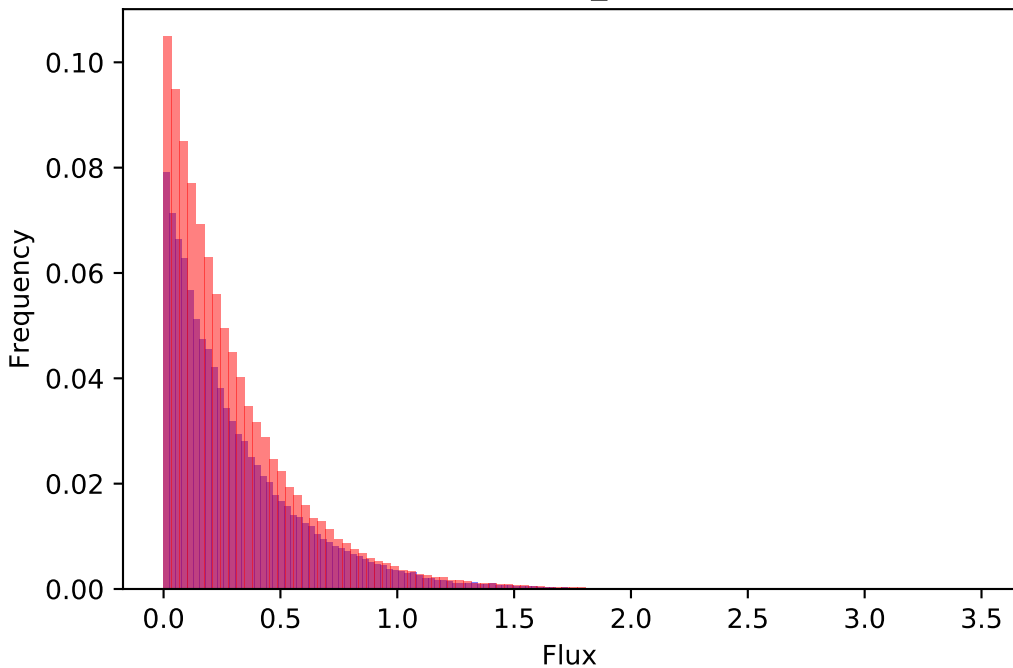
**\*\*469 : Asp\_p --> \*\***



**\*\*470 : Cys\_c --> \*\***

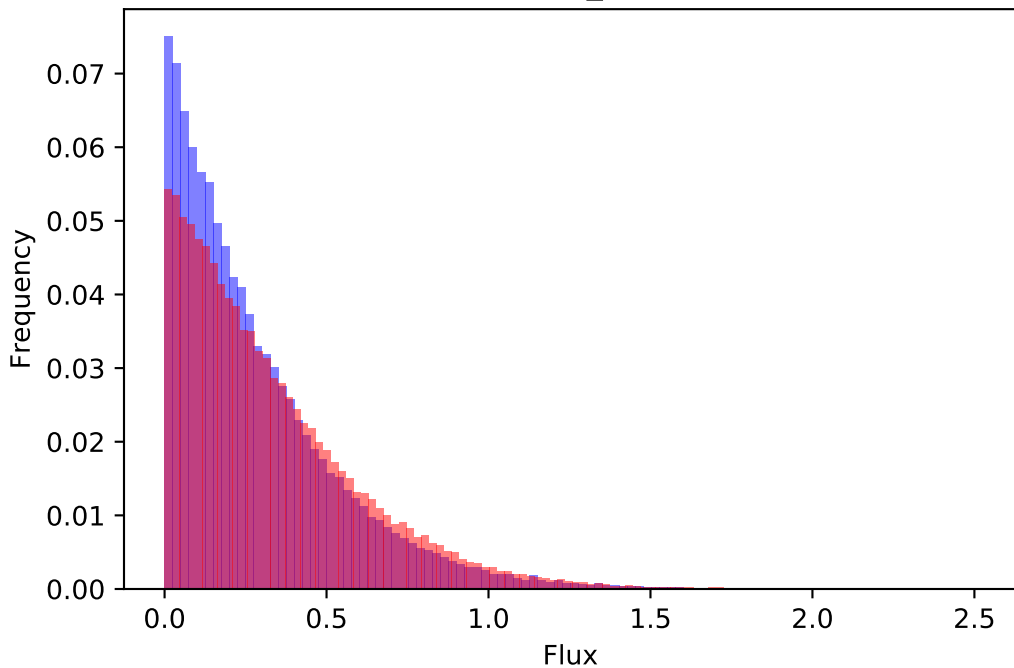


**\*\*471 : Cys\_h --> \*\***

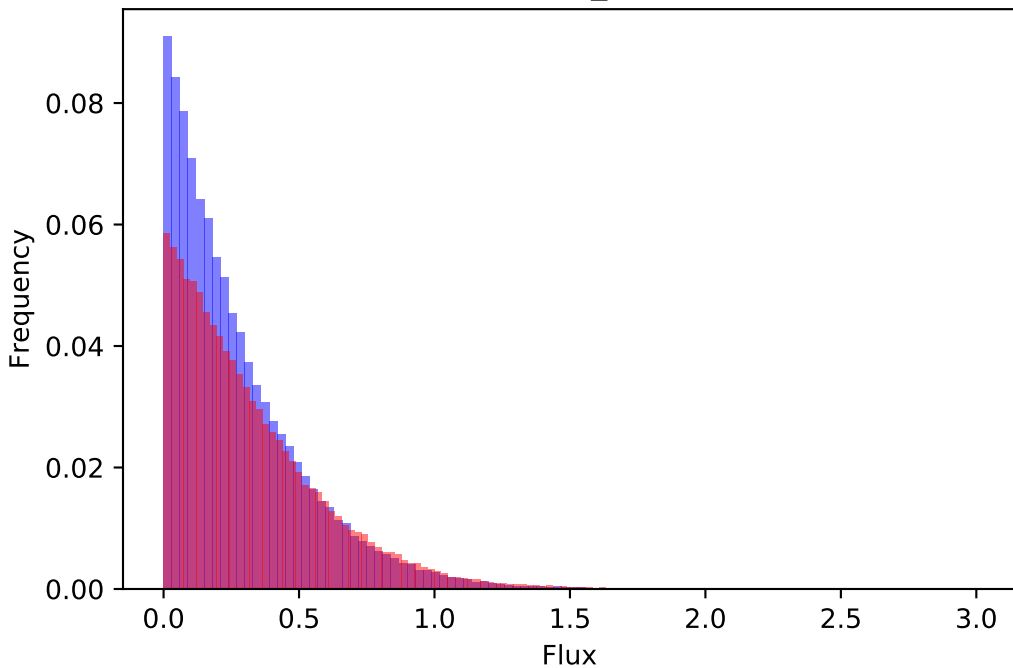




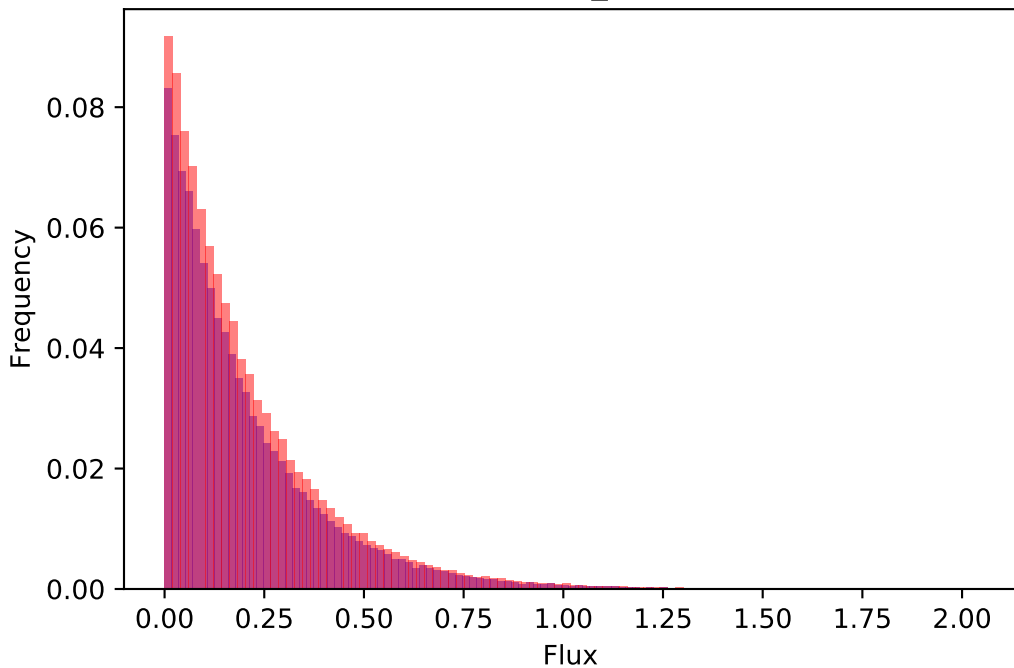
**\*\*472 : Cys\_m --> \*\***



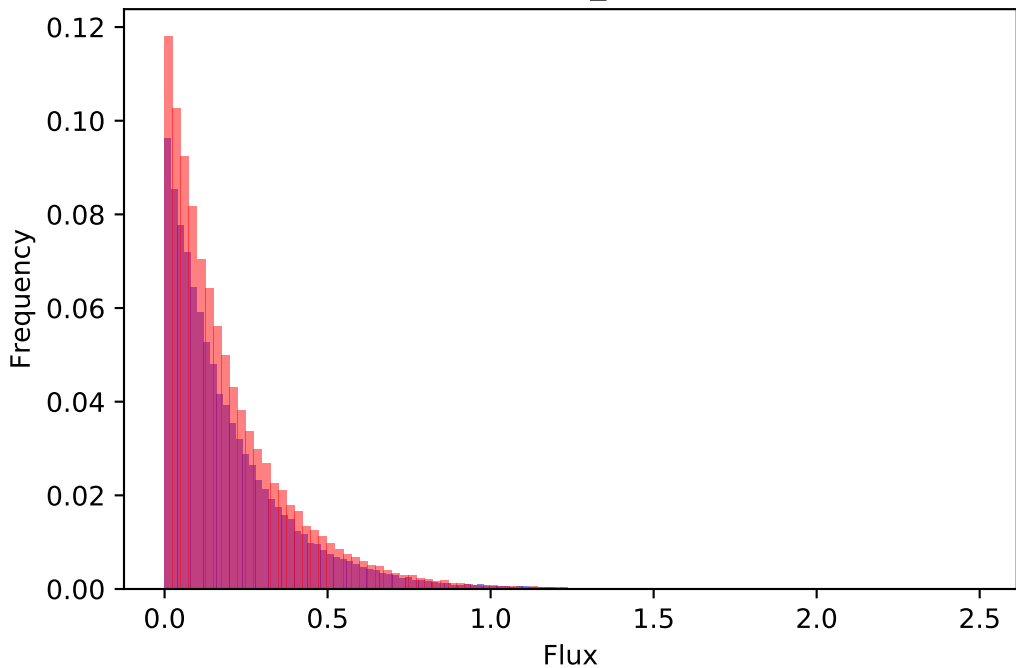
**\*\*473 : Cys\_p --> \*\***



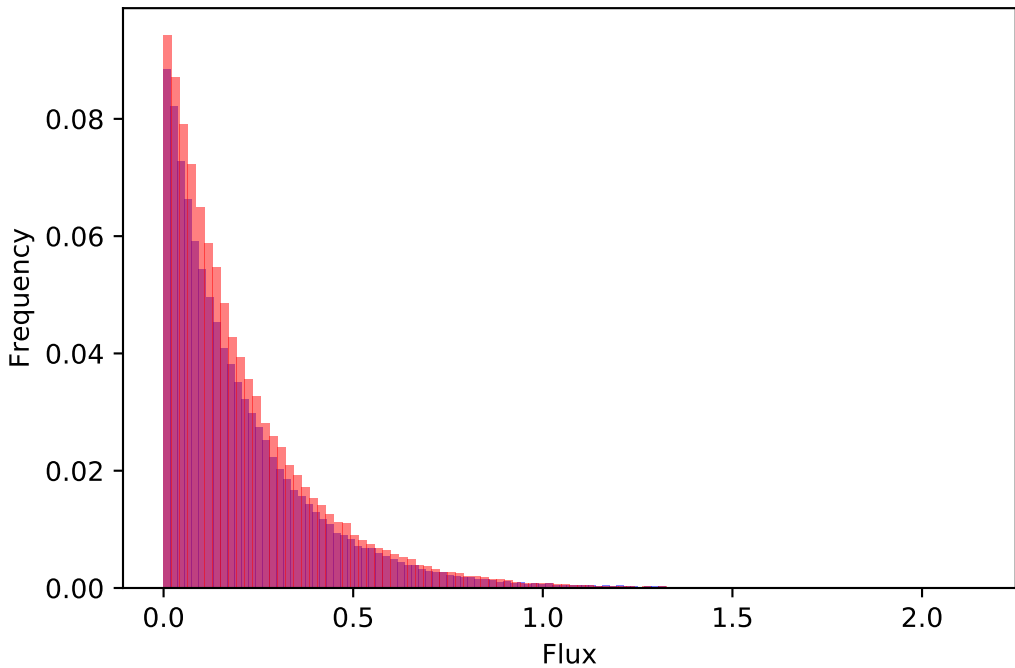
**\*\*474 : Gln\_c --> \*\***



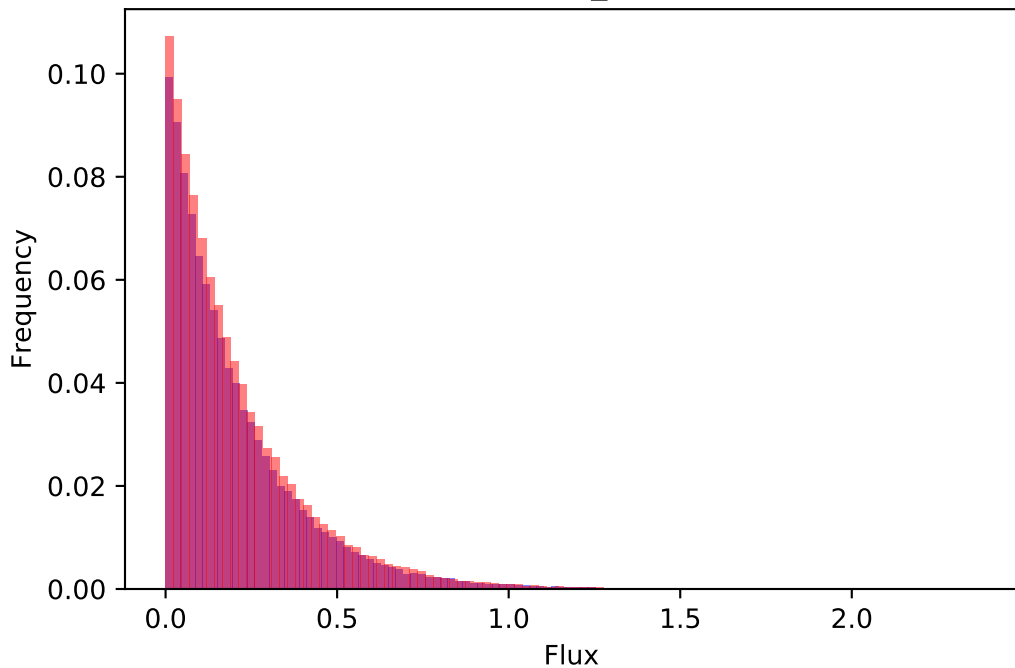
475 : Gln\_h -->



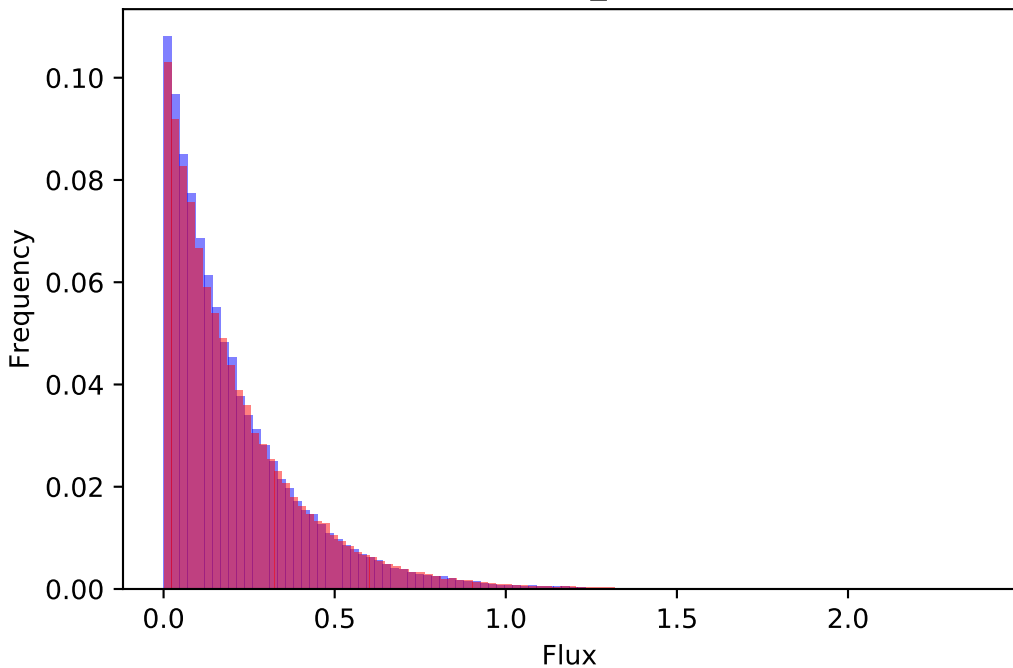
**\*\*476 : Gln\_m --> \*\***



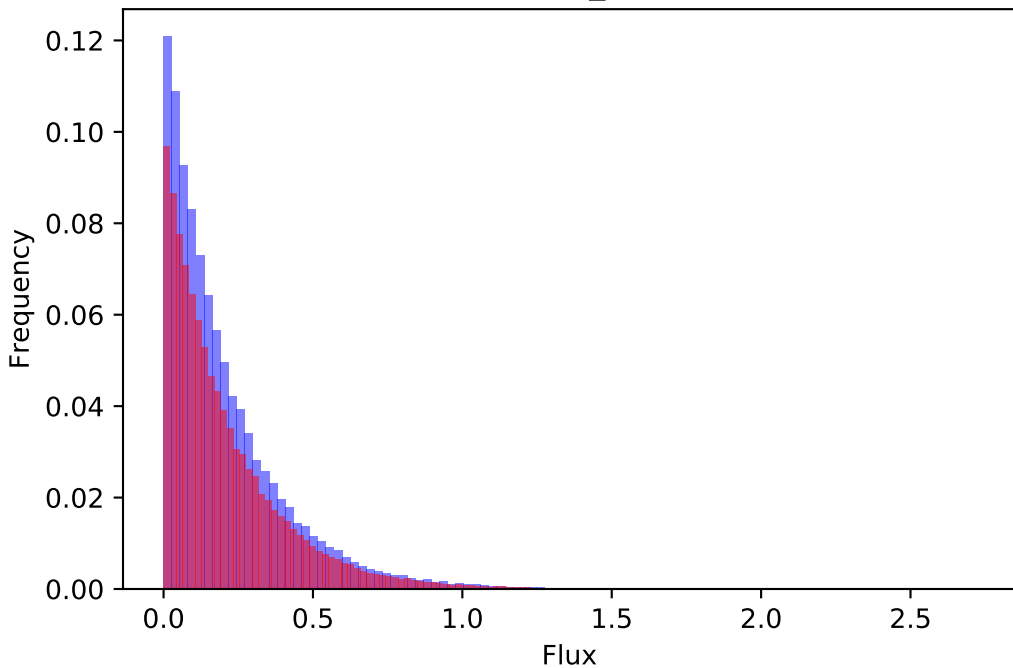
477 : Gln\_p -->



**\*\*478 : Glu\_c --> \*\***

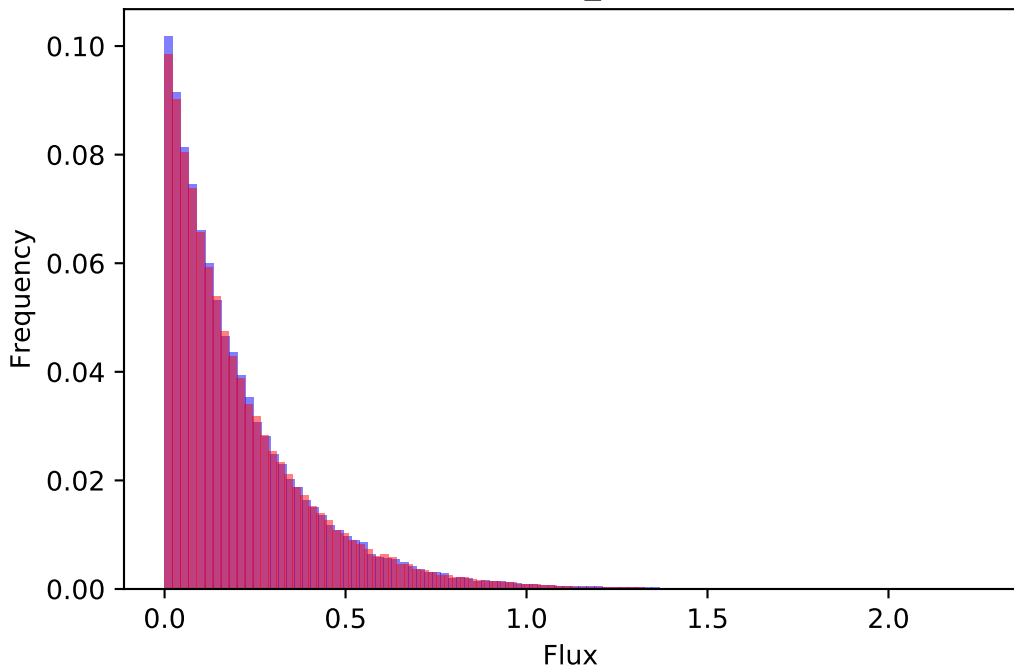


479 : Glu\_h -->

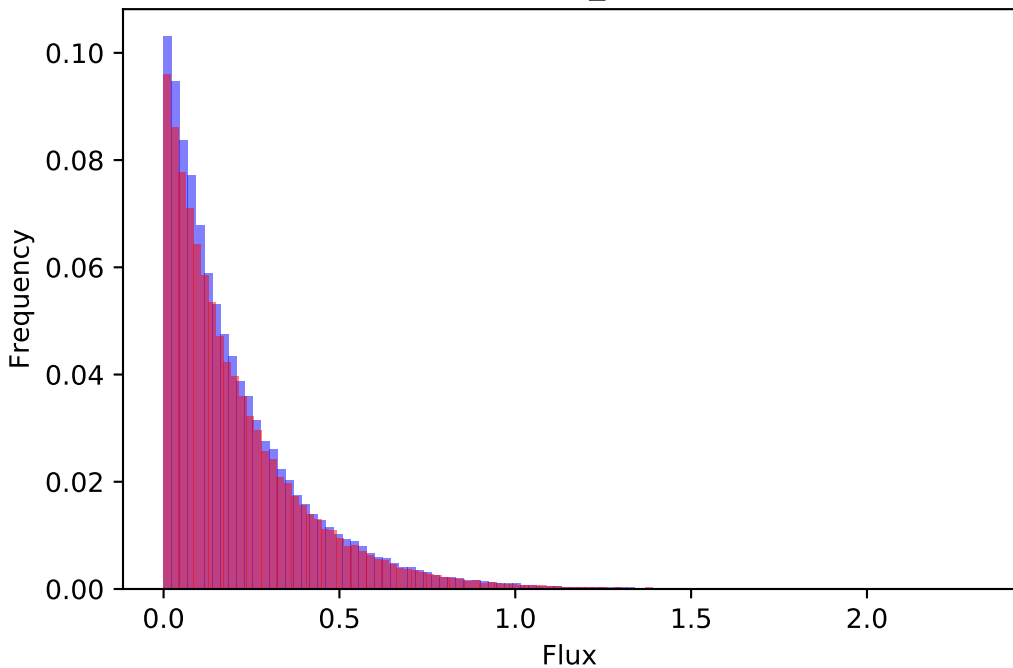




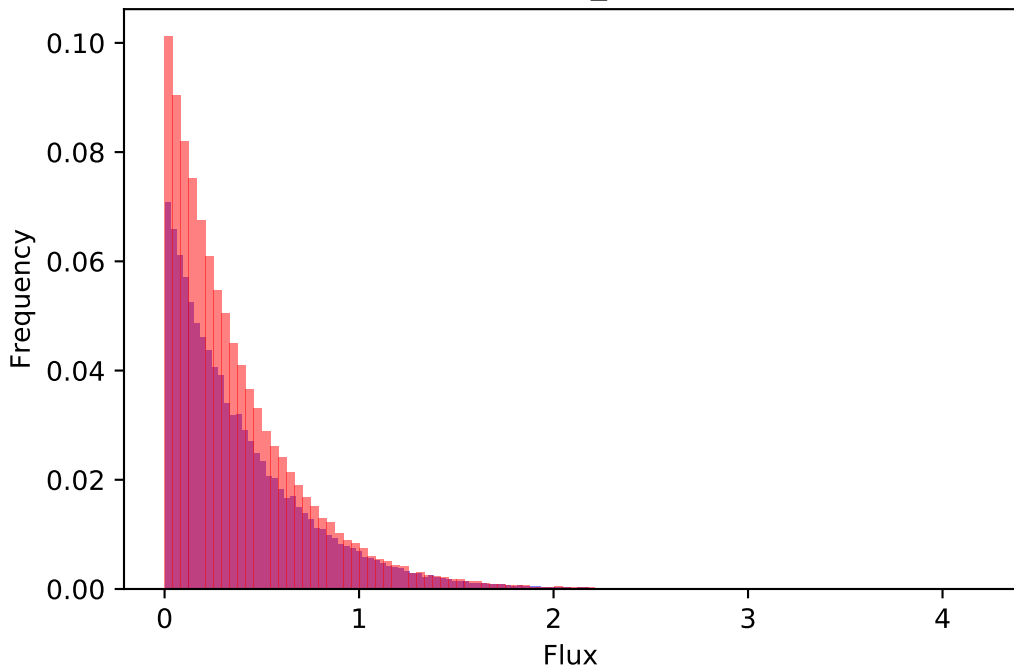
480 : Glu\_m -->



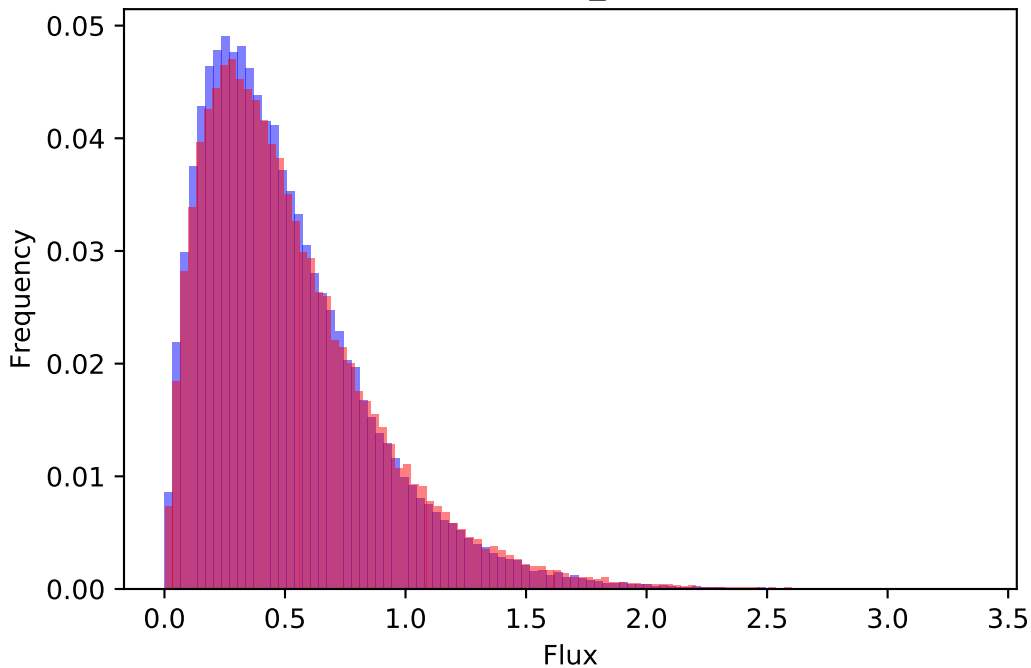
481 : Glu\_p -->



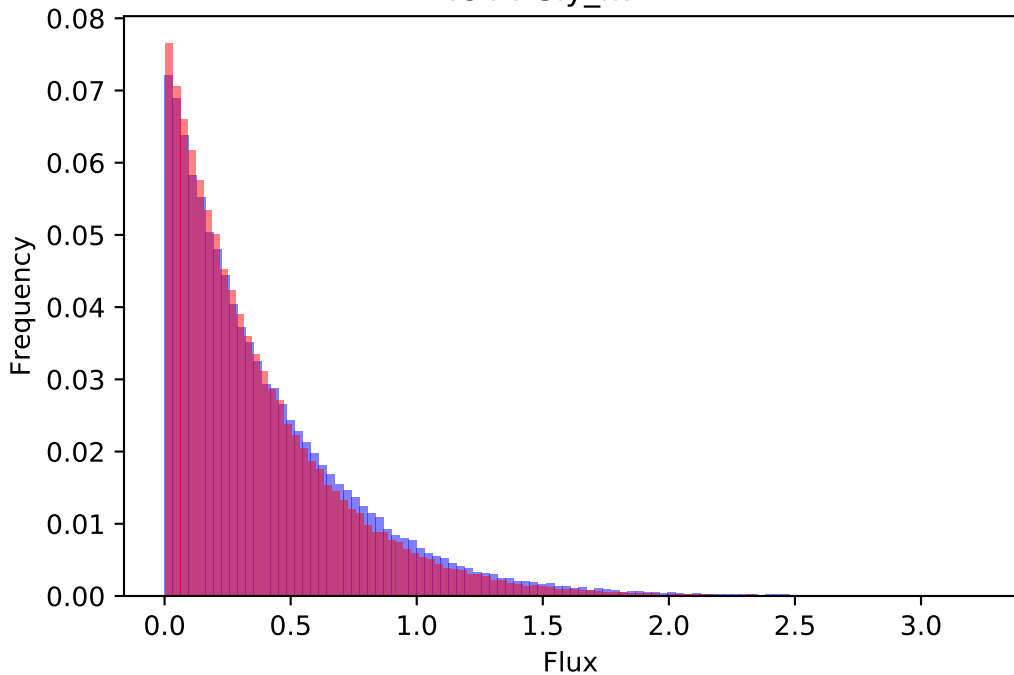
**\*\*482 : Gly\_c --> \*\***



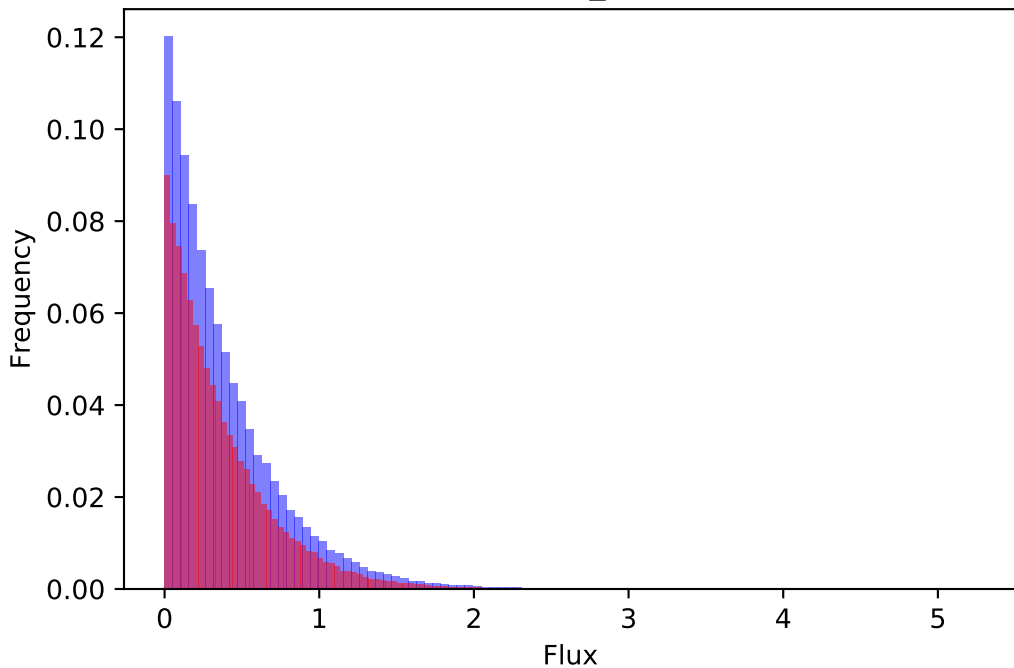
**\*\*483 : Gly\_h --> \*\***



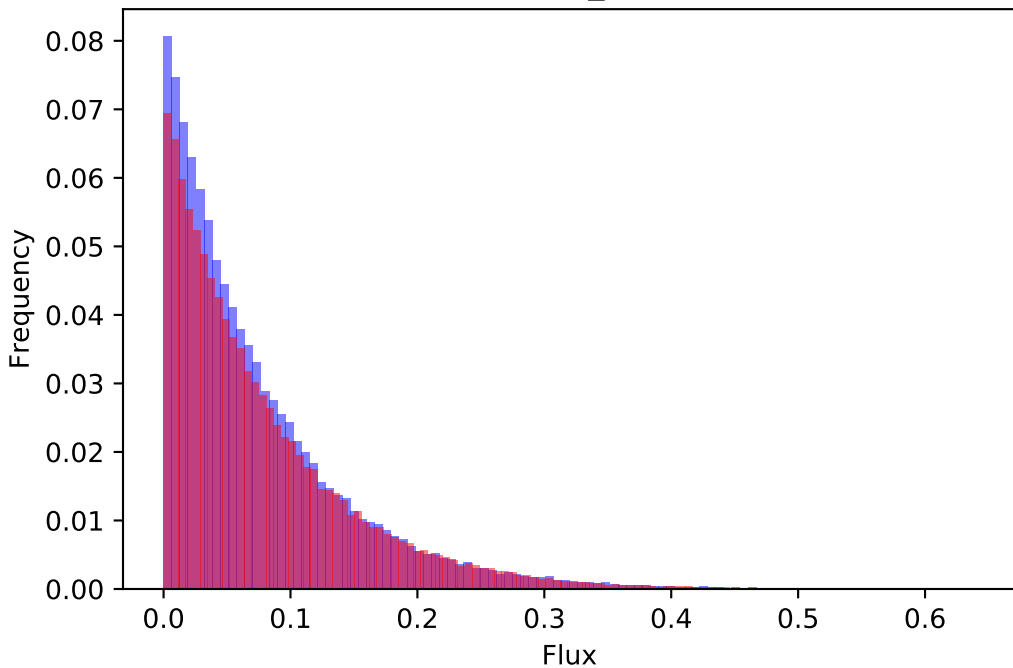
**\*\*484 : Gly\_m --> \*\***



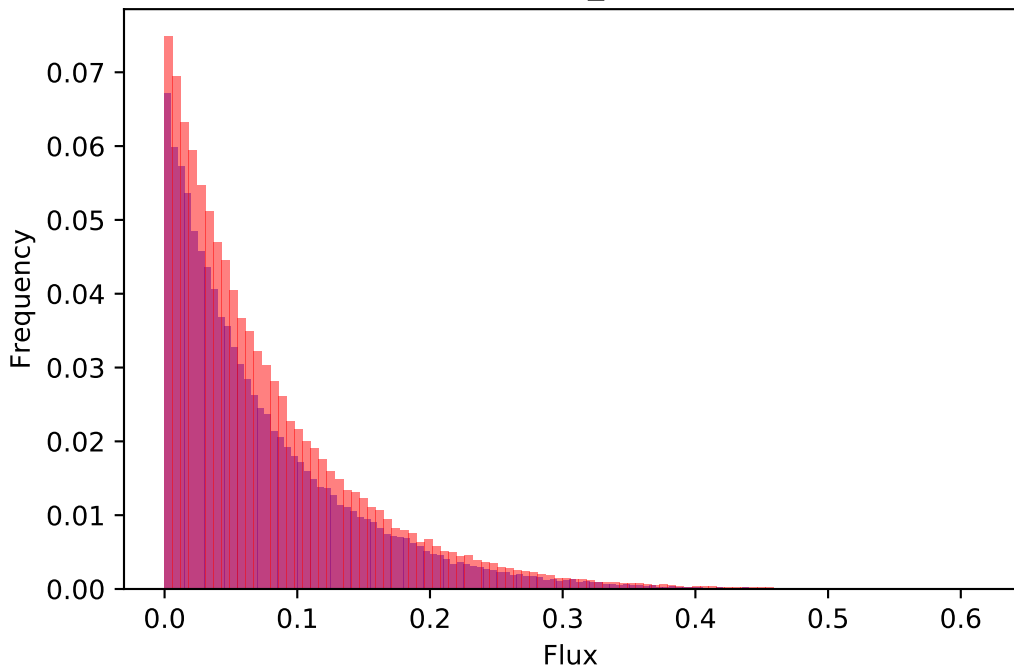
**\*\*485 : Gly\_p --> \*\***



**\*\*486 : His\_c --> \*\***

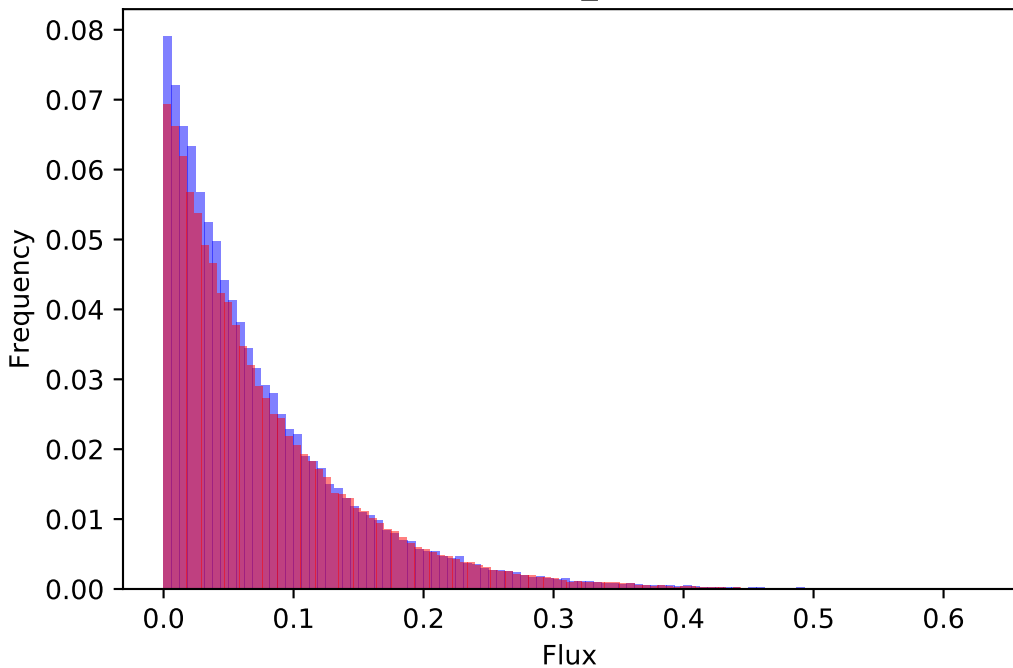


**\*\*487 : His\_h --> \*\***

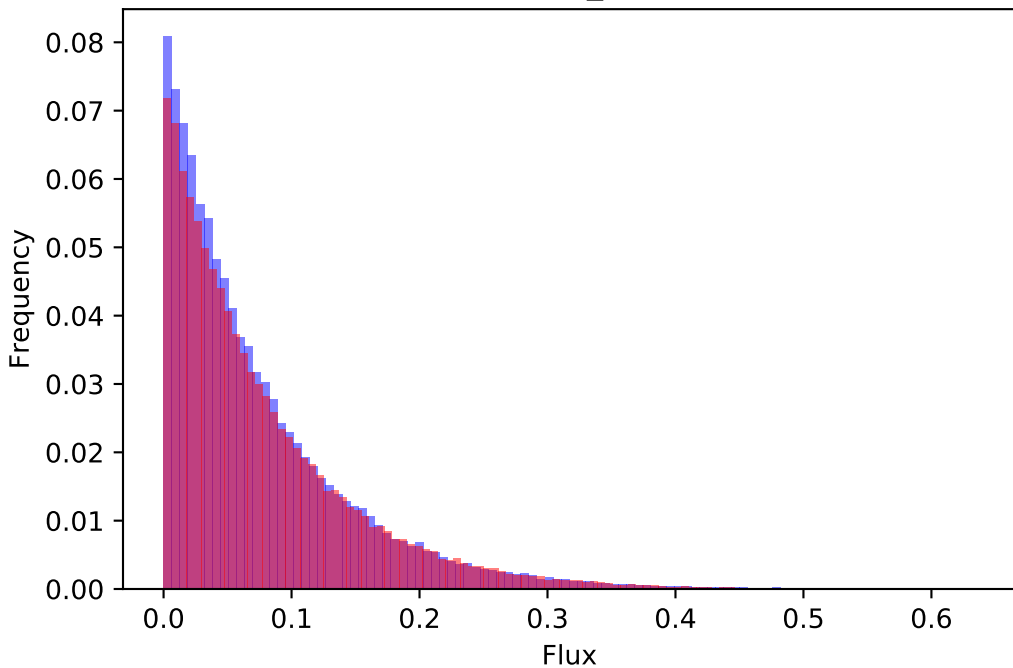




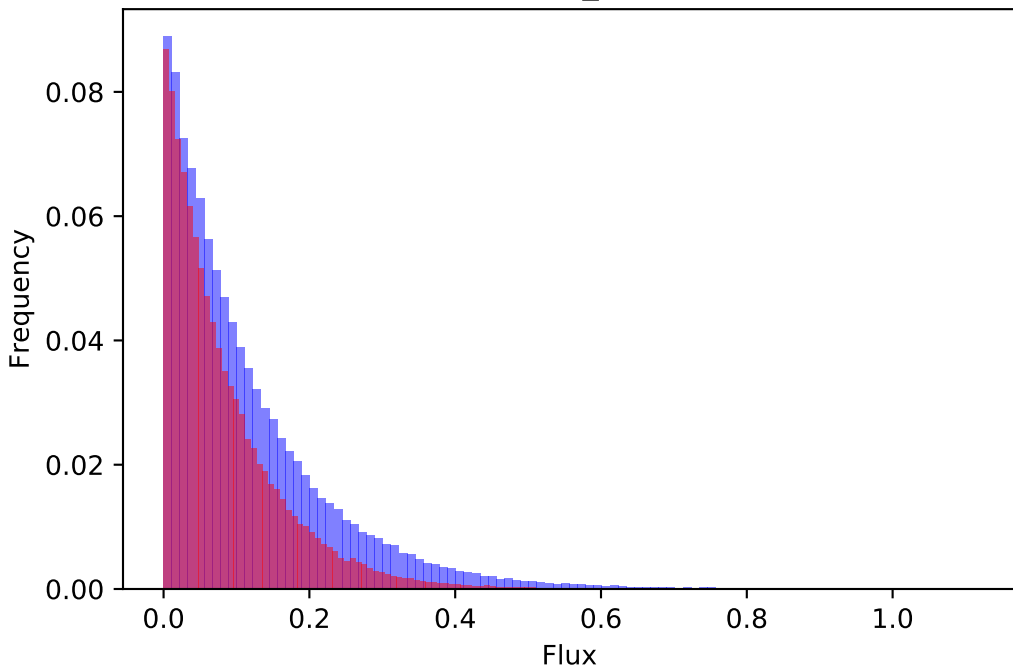
**\*\*488 : His\_m --> \*\***



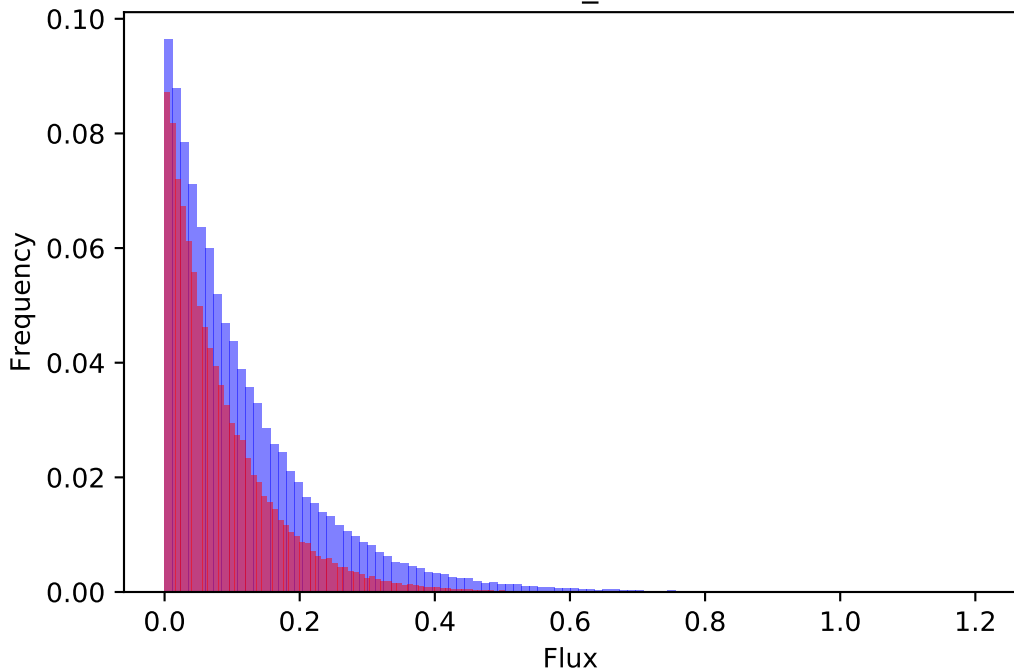
**\*\*489 : His\_p --> \*\***



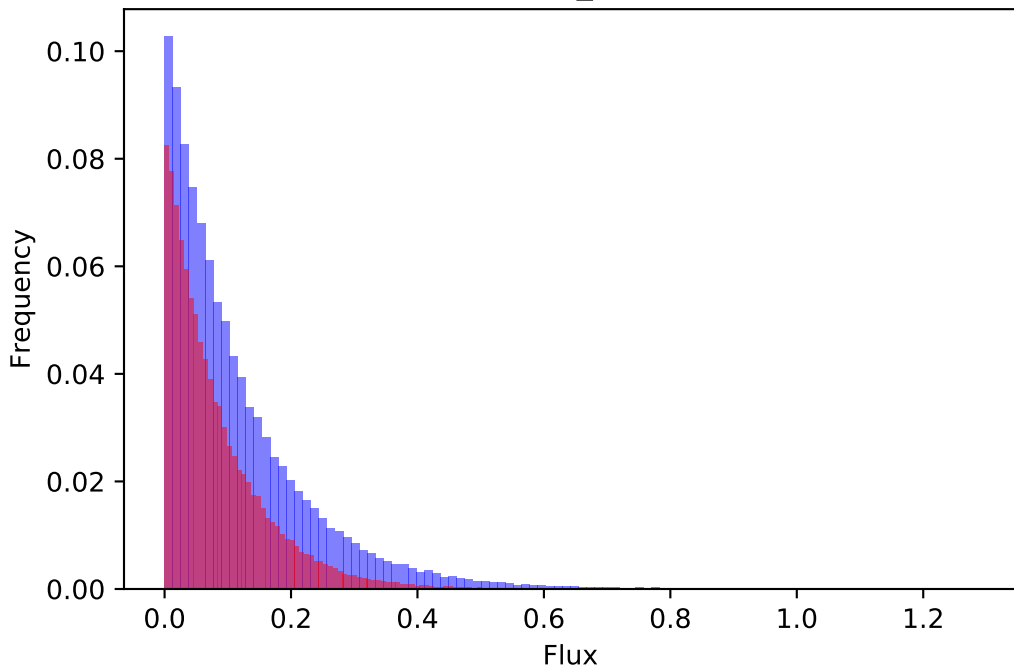
**\*\*490 : lle\_c --> \*\***



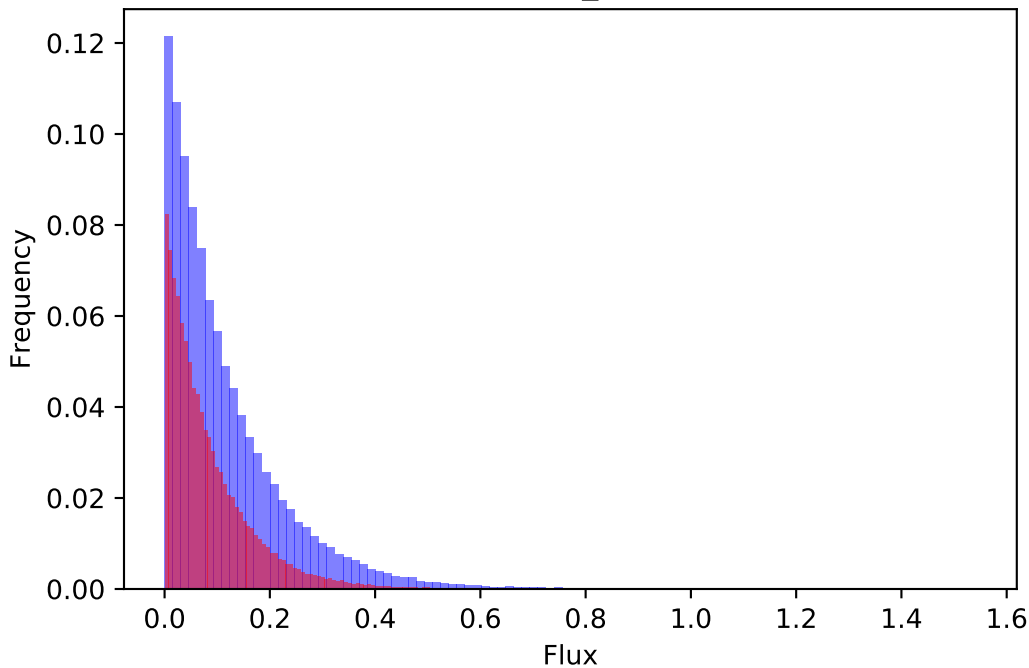
**\*\*491 : lle\_h --> \*\***



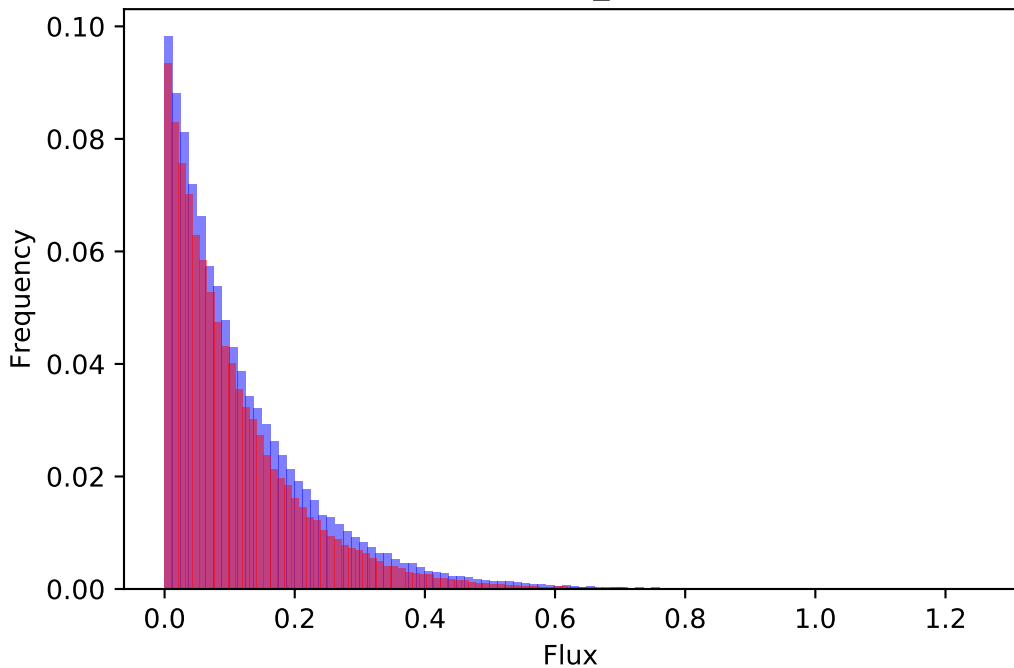
**\*\*492 : lle\_m --> \*\***



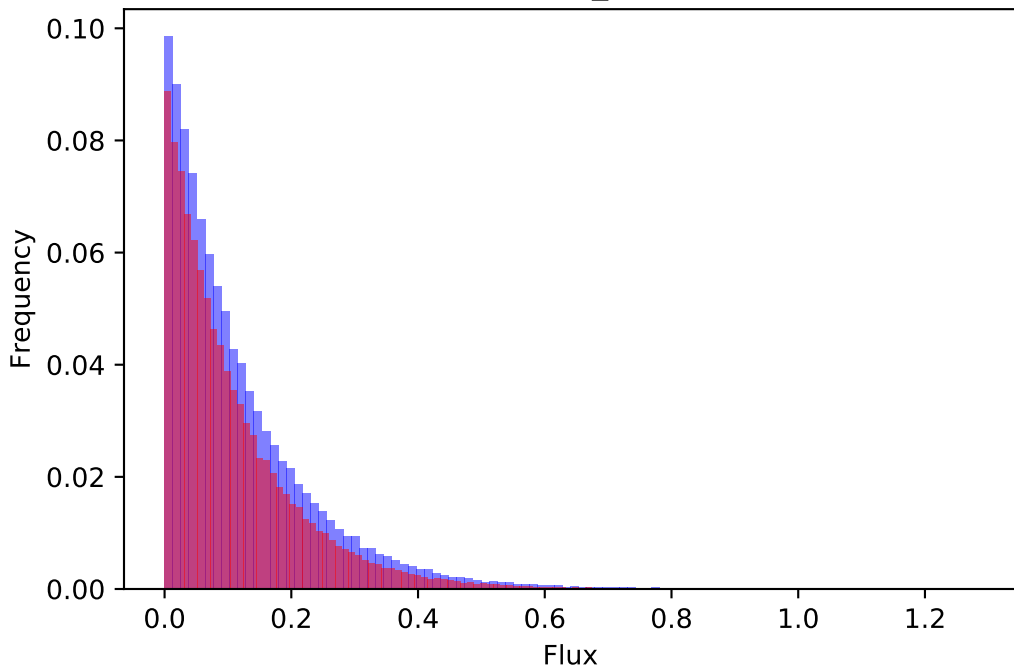
**\*\*493 : Ile\_p --> \*\***



**\*\*494 : Leu\_c --> \*\***

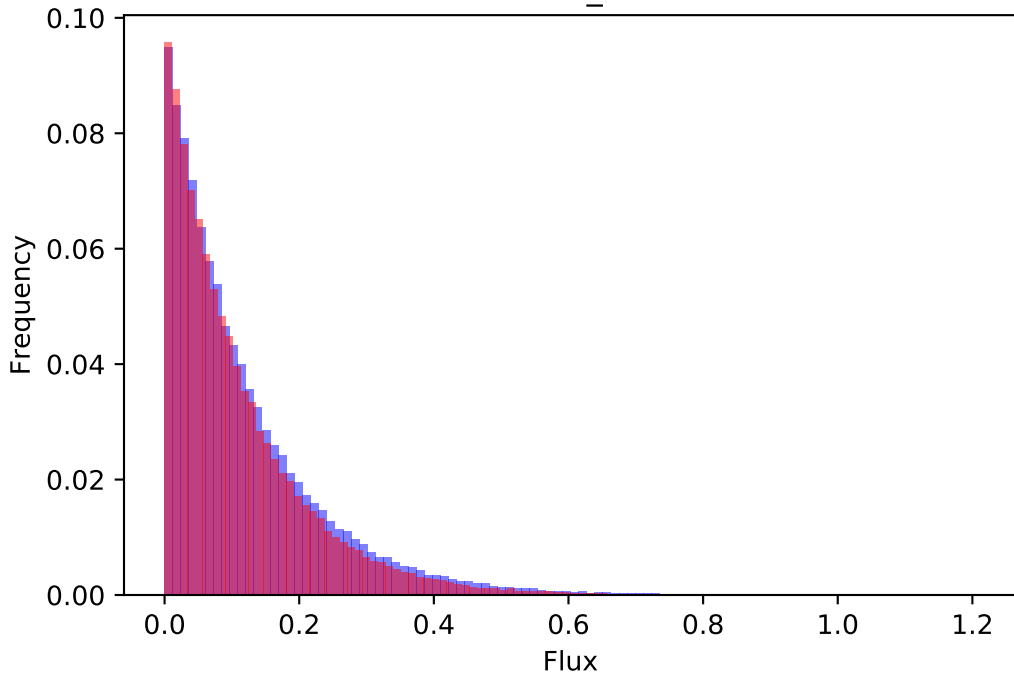


**\*\*495 : Leu\_h --> \*\***

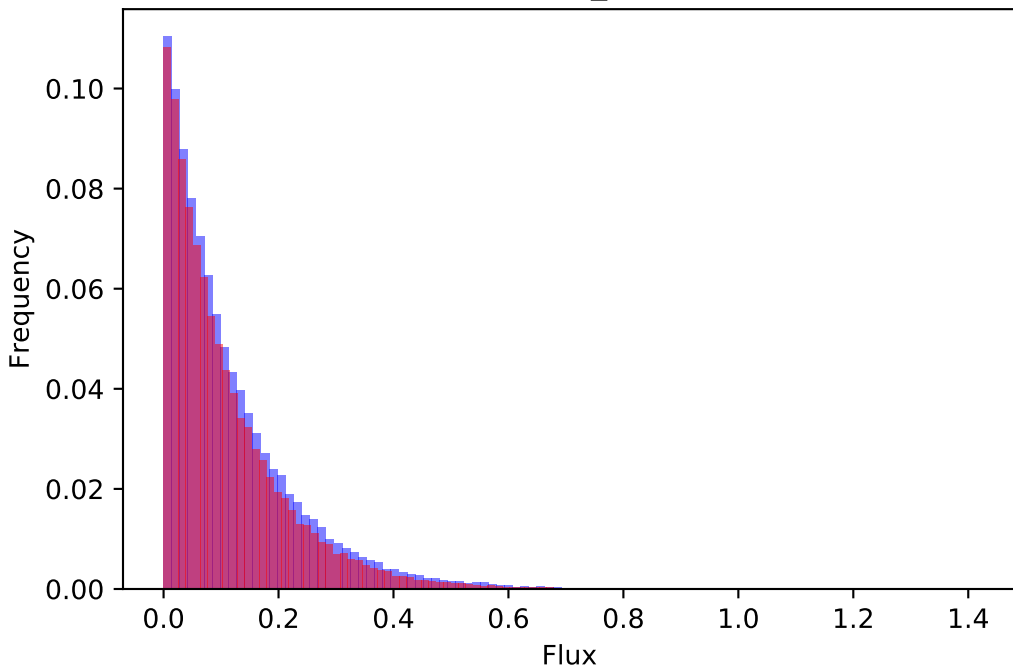




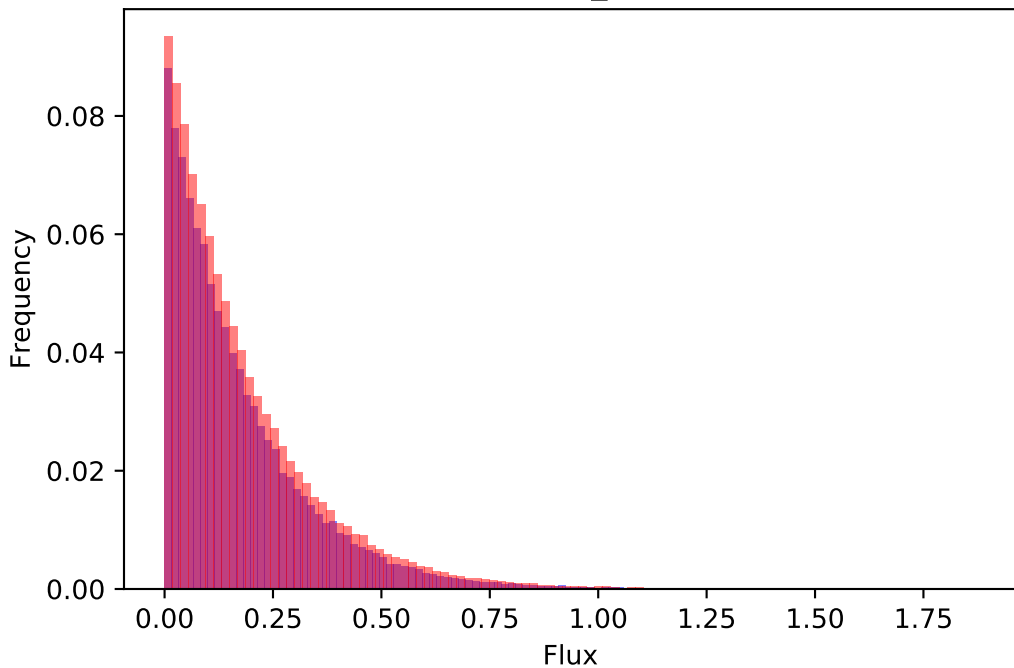
**\*\*496 : Leu\_m --> \*\***



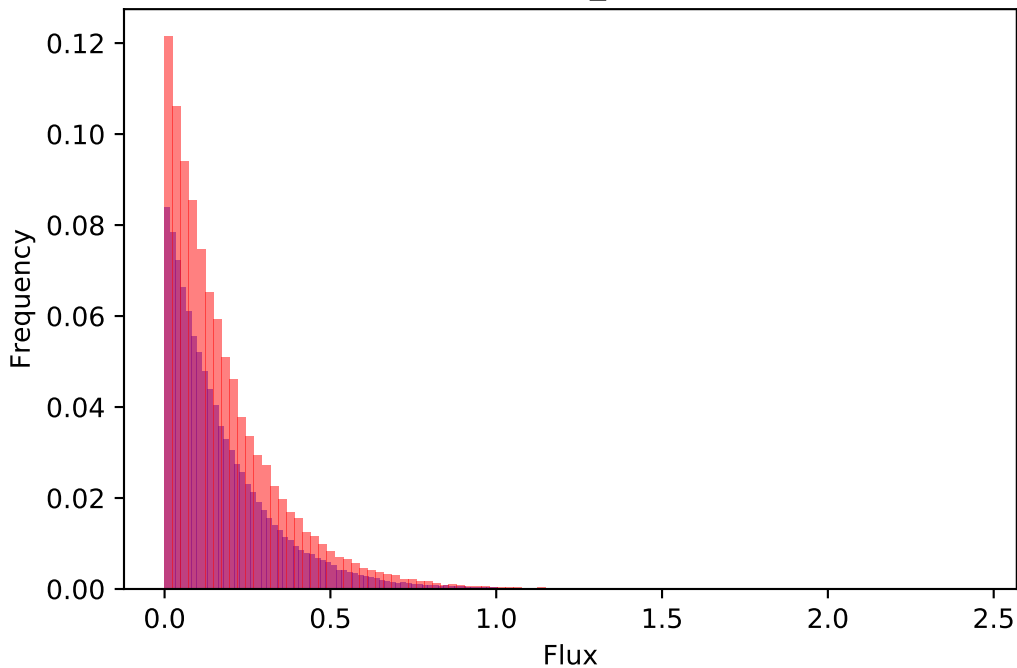
**\*\*497 : Leu\_p --> \*\***



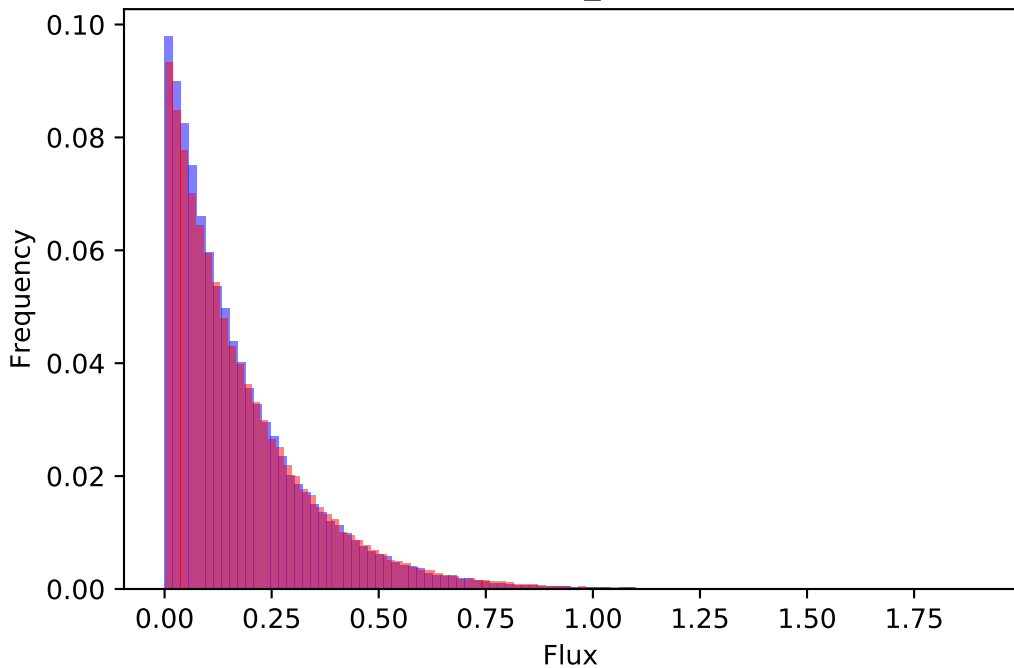
**\*\*498 : Lys\_c --> \*\***



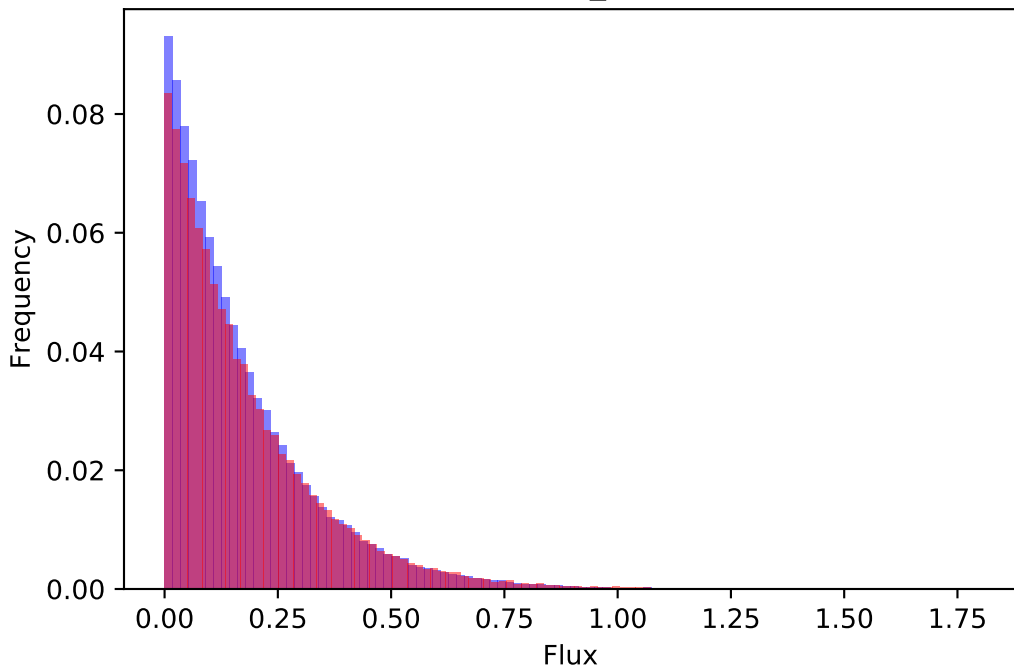
**\*\*499 : Lys\_h --> \*\***



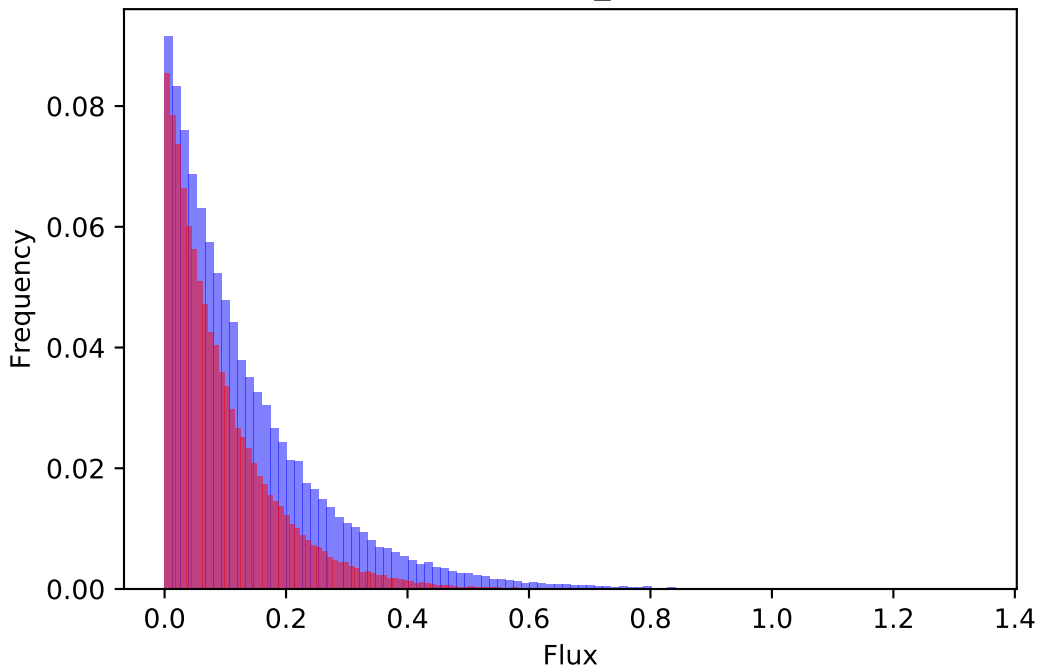
**\*\*500 : Lys\_m --> \*\***



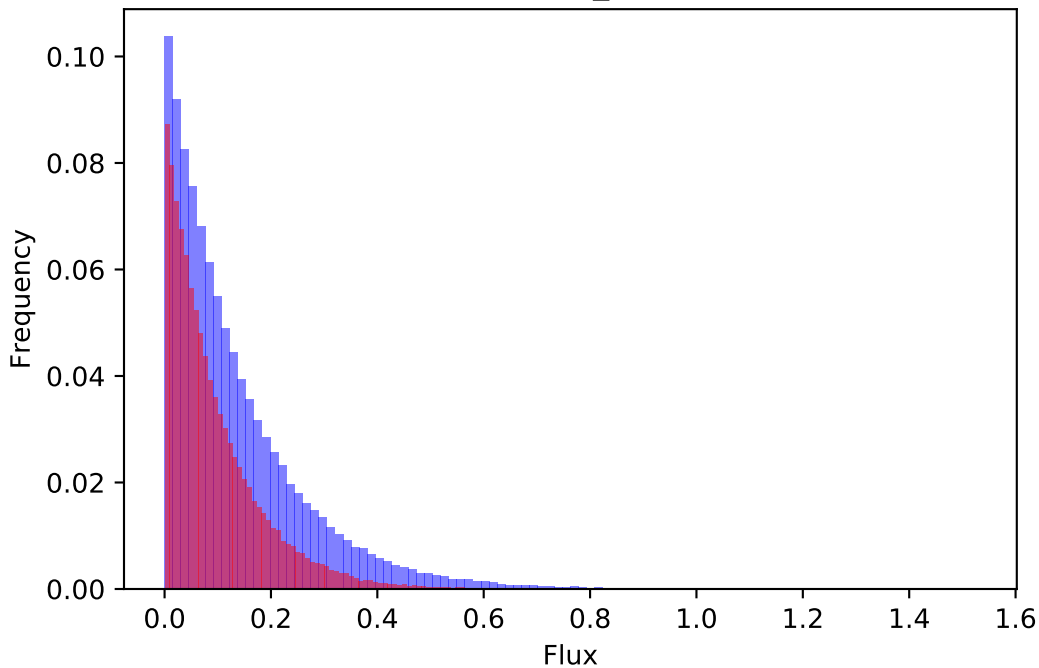
**\*\*501 : Lys\_p --> \*\***



**\*\*502 : Met\_c --> \*\***

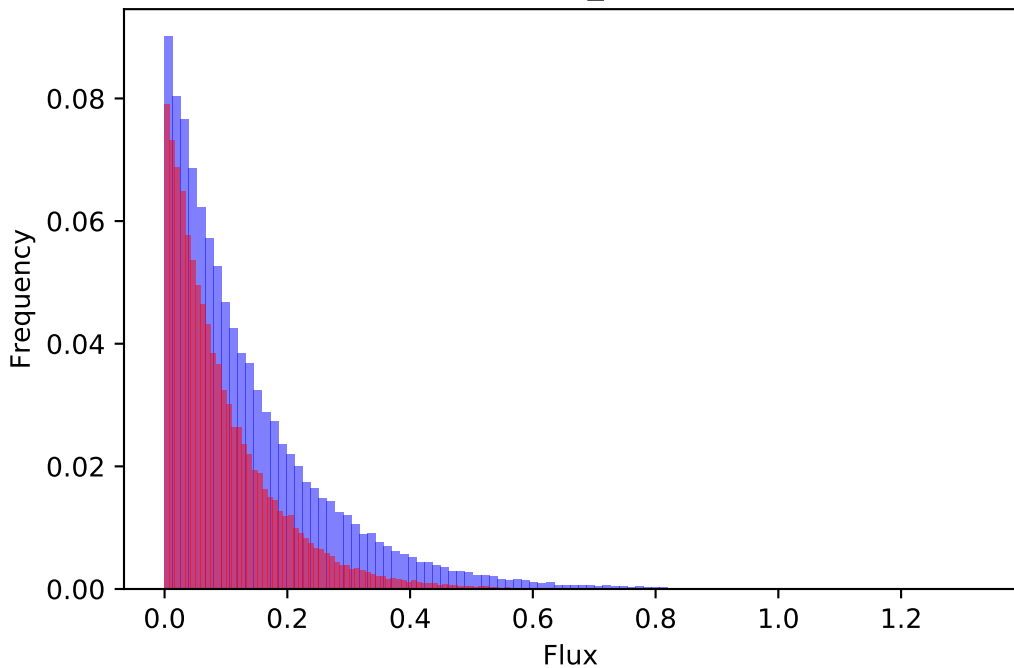


**\*\*503 : Met\_h --> \*\***

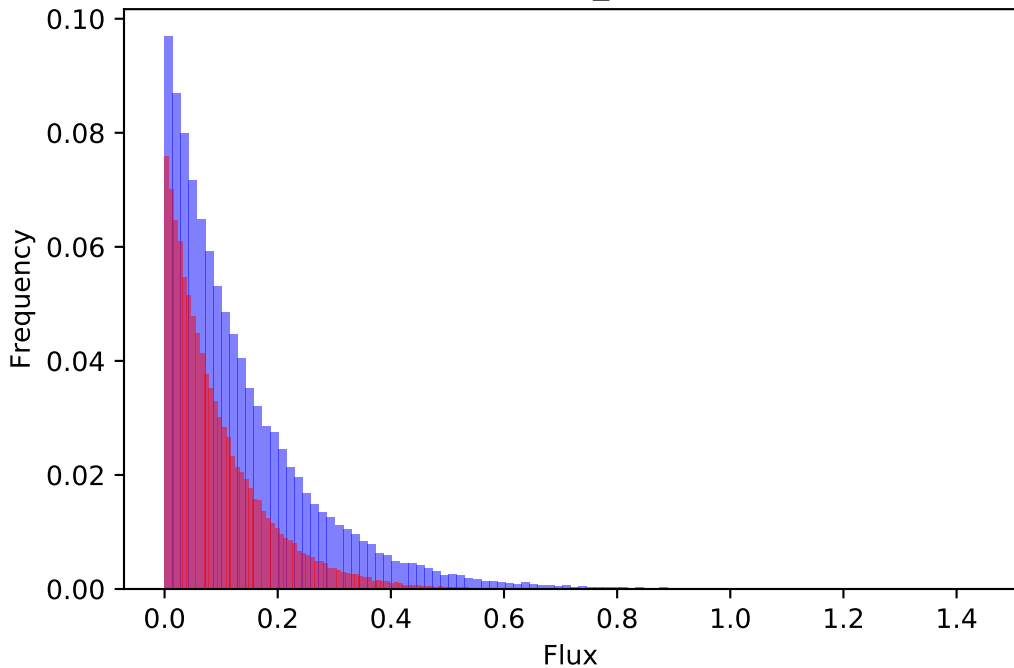




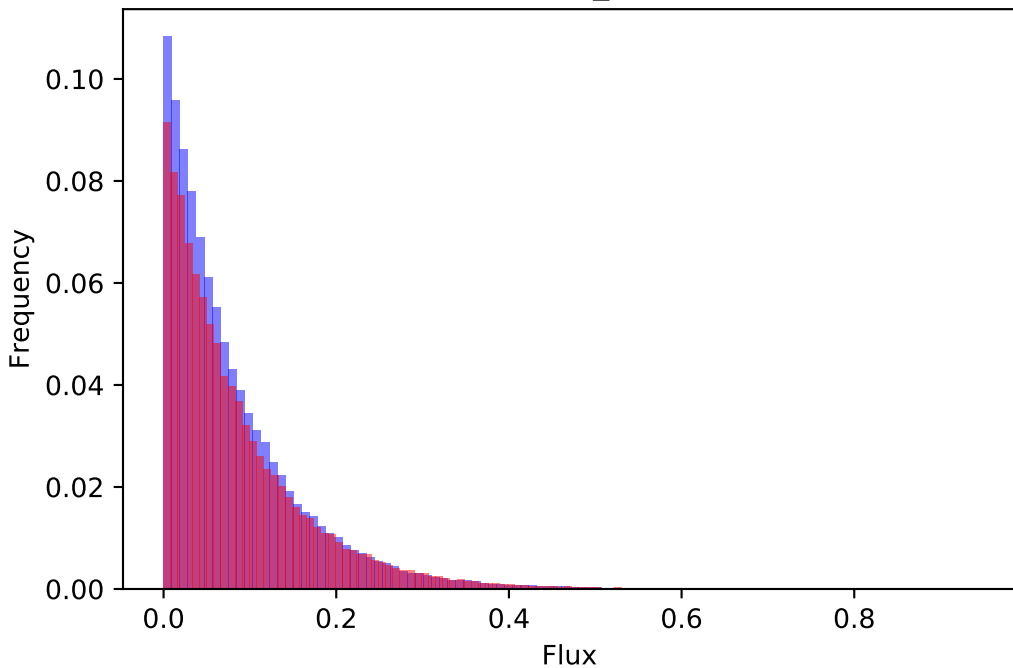
**\*\*504 : Met\_m --> \*\***



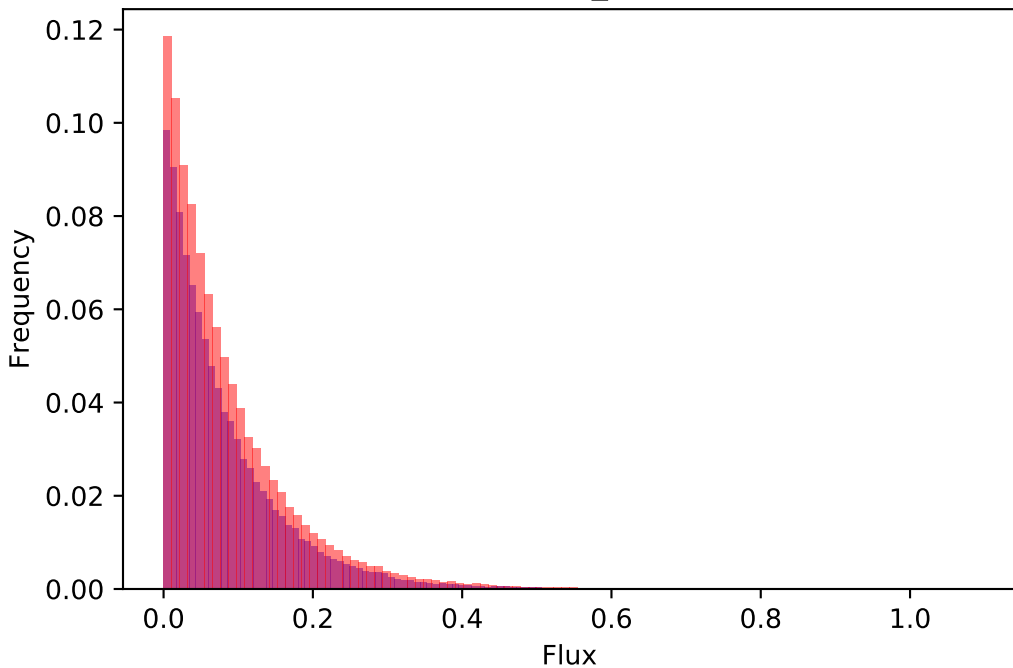
**\*\*505 : Met\_p --> \*\***



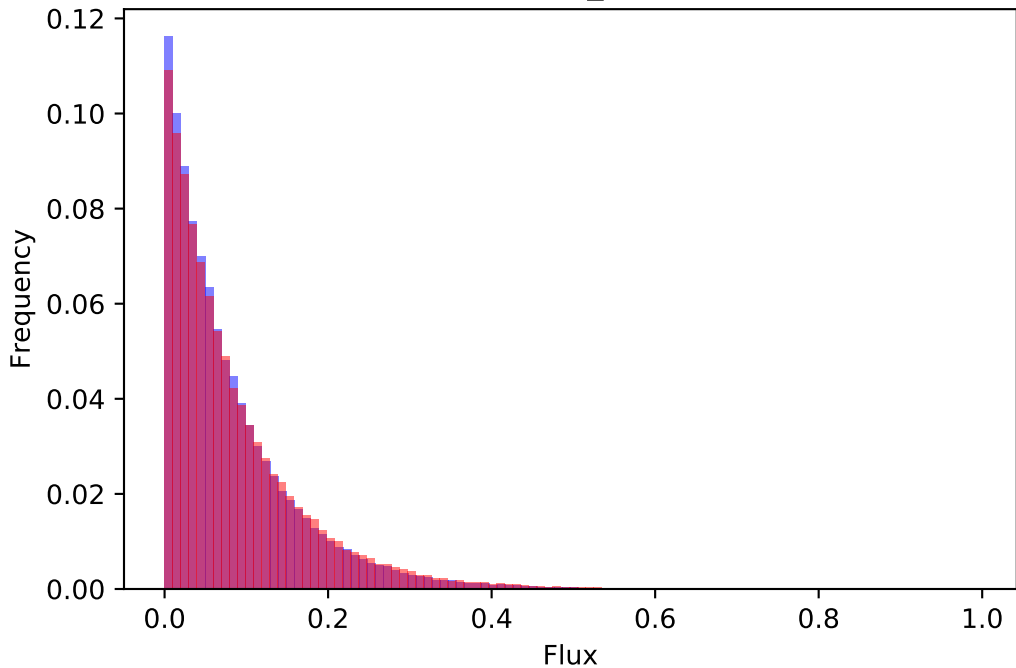
**\*\*506 : Phe\_c --> \*\***



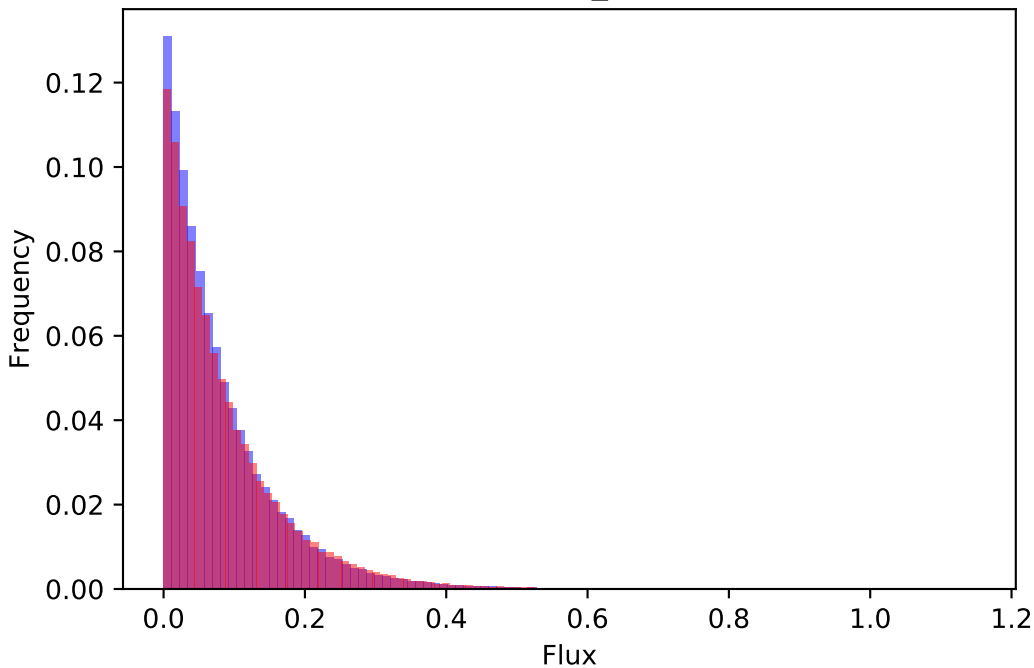
**\*\*507 : Phe\_h --> \*\***



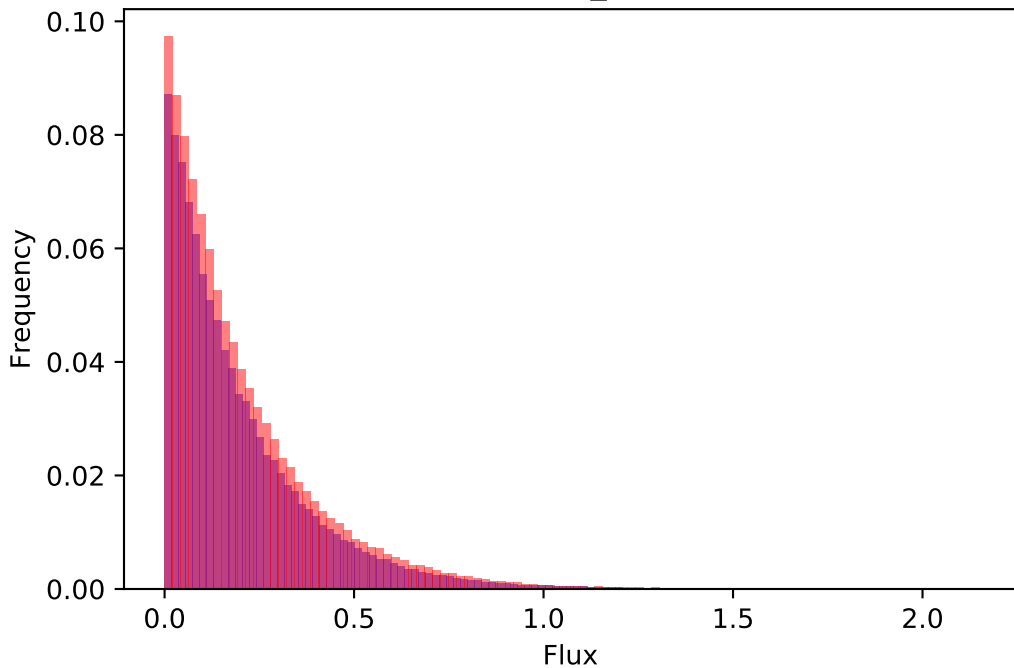
**\*\*508 : Phe\_m --> \*\***



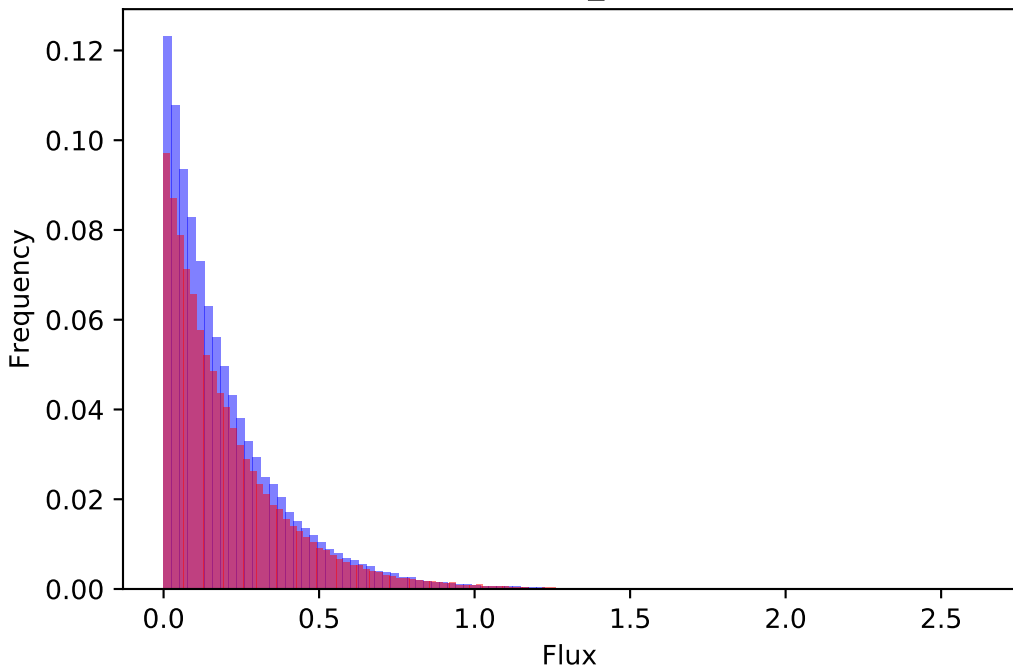
**\*\*509 : Phe\_p --> \*\***



**\*\*510 : Pro\_c --> \*\***

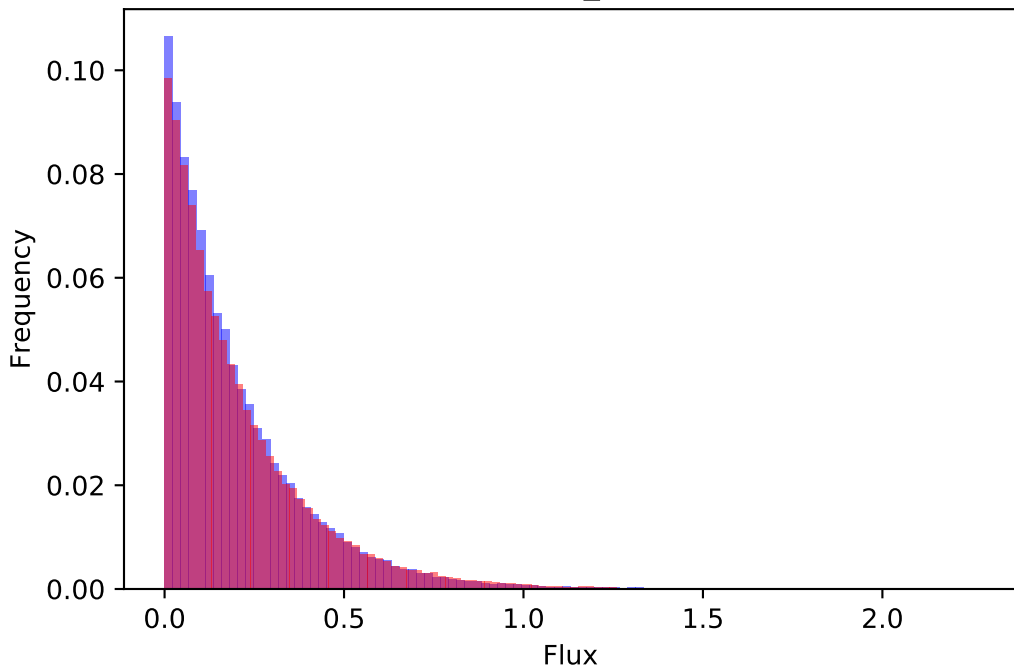


**\*\*511 : Pro\_h --> \*\***

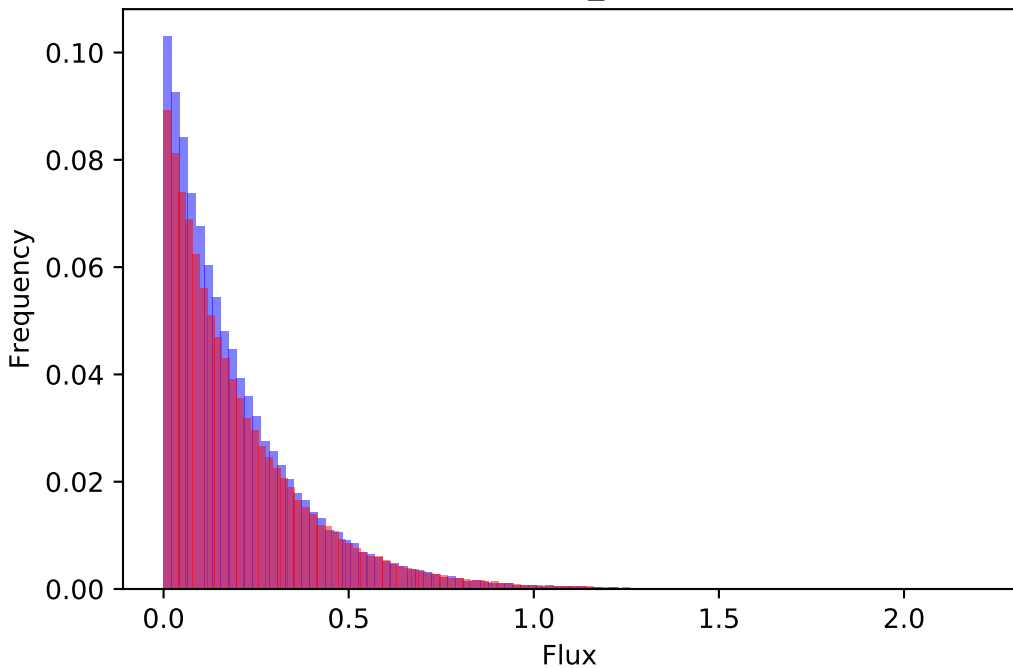




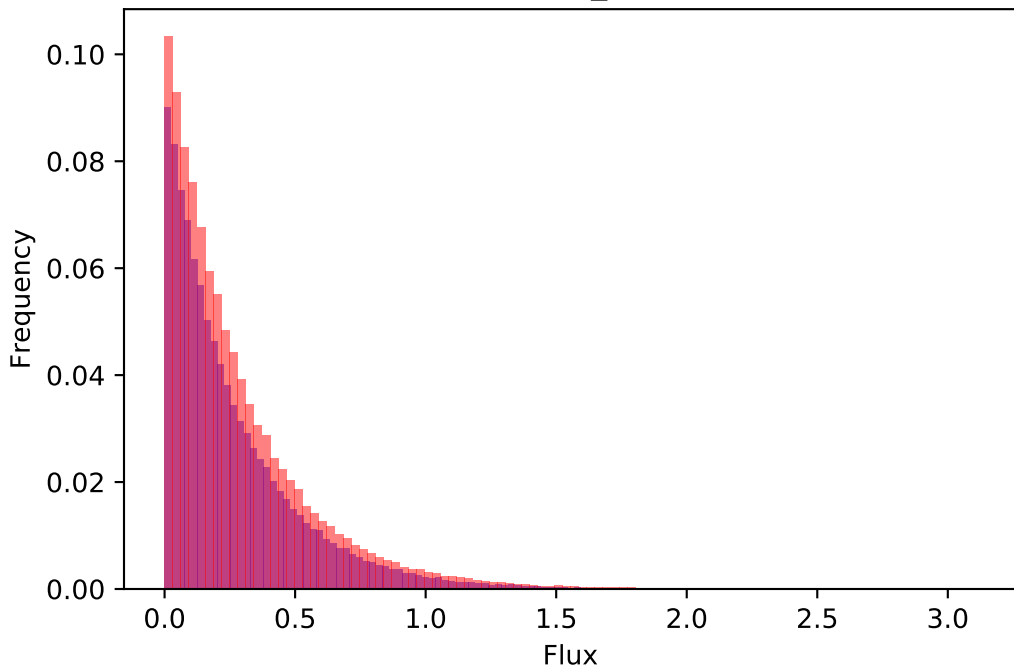
**\*\*512 : Pro\_m --> \*\***



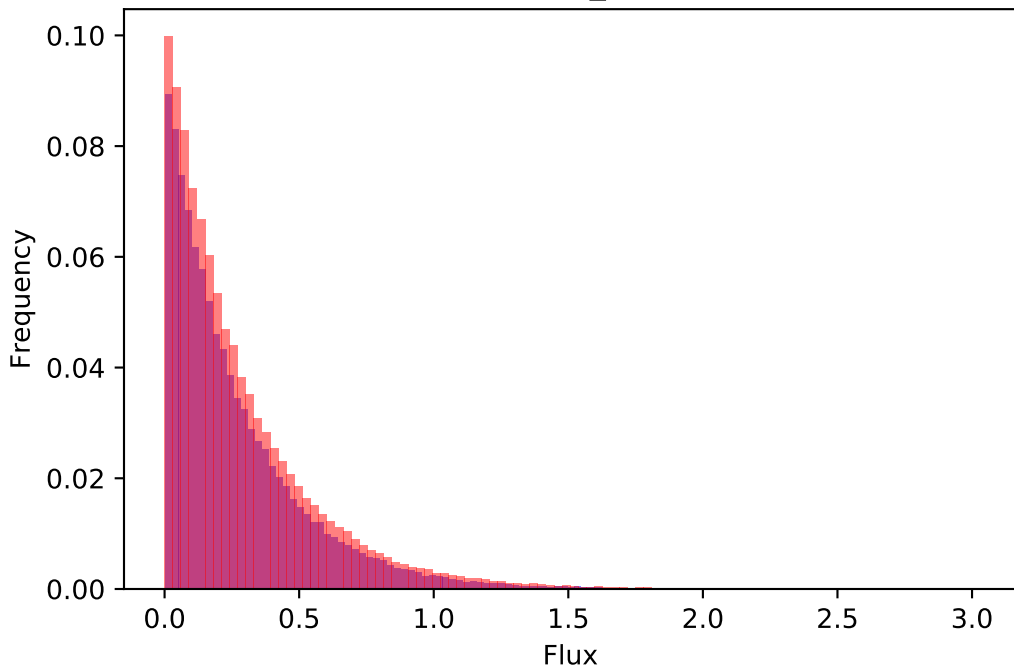
**\*\*513 : Pro\_p --> \*\***



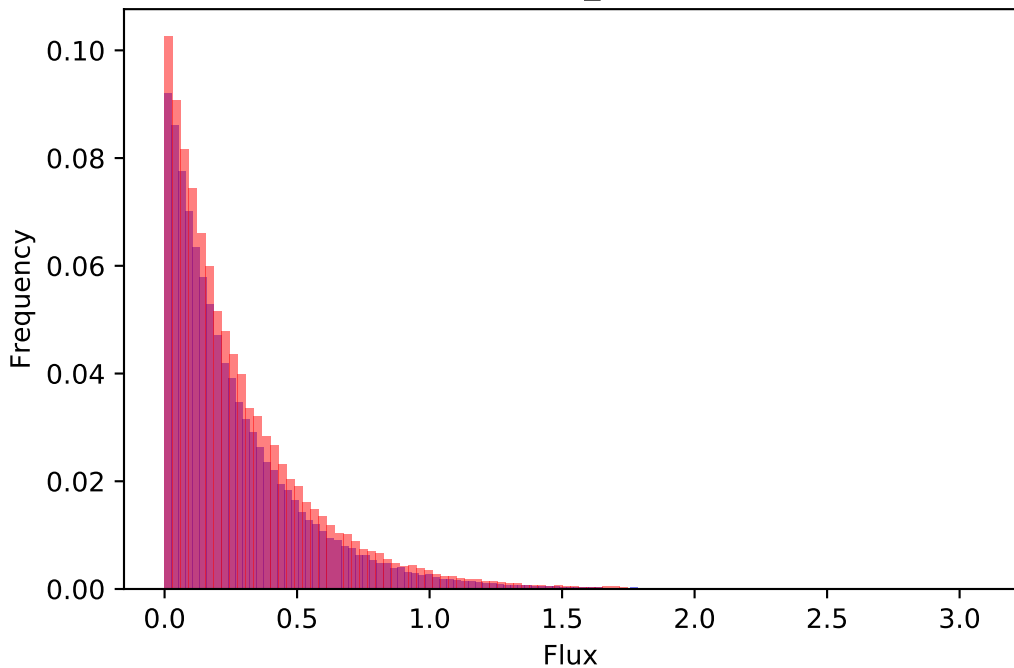
**\*\*514 : Ser\_c --> \*\***



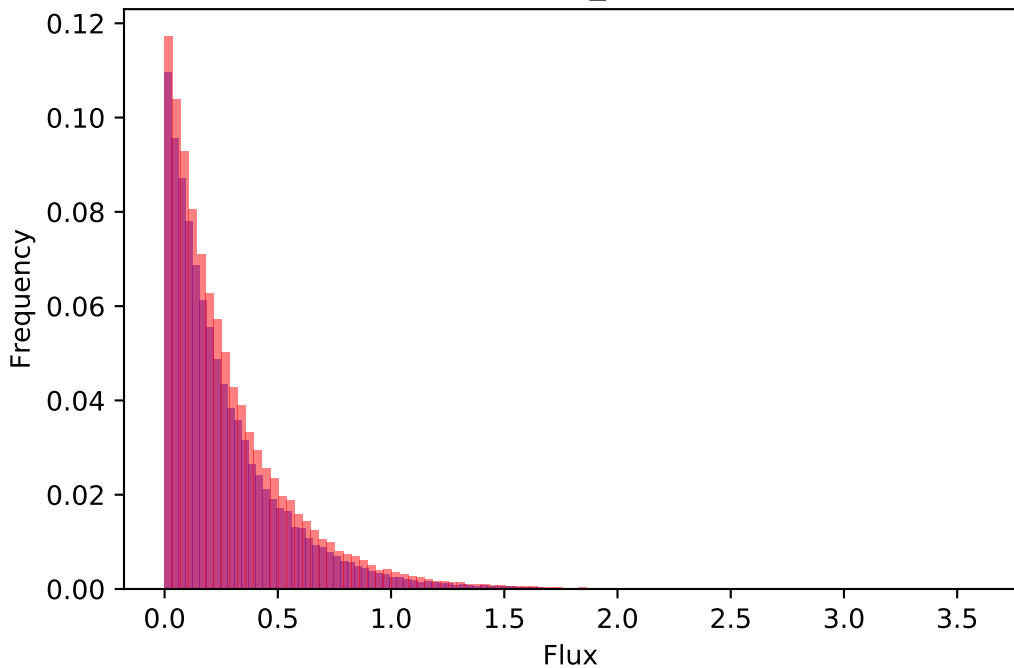
**\*\*515 : Ser\_h --> \*\***



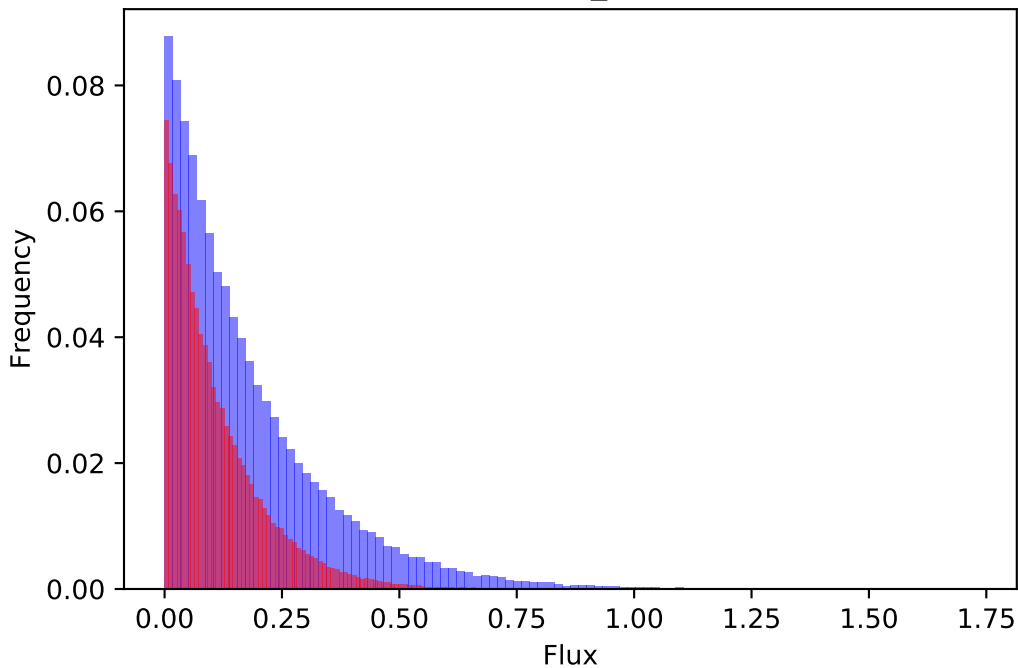
**\*\*516 : Ser\_m --> \*\***



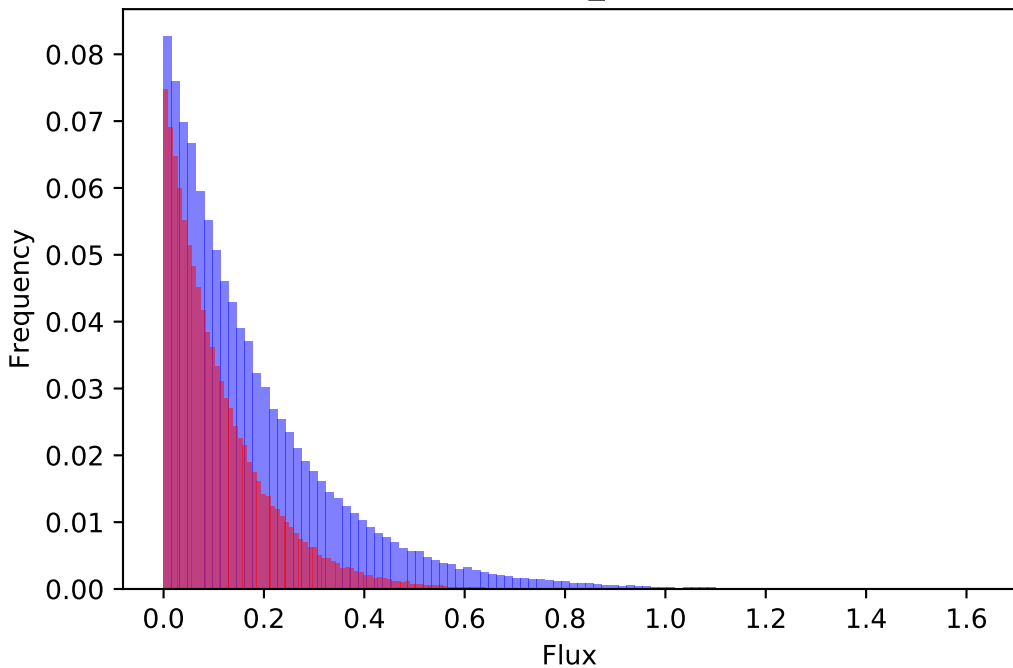
**\*\*517 : Ser\_p --> \*\***



**\*\*518 : Thr\_c --> \*\***

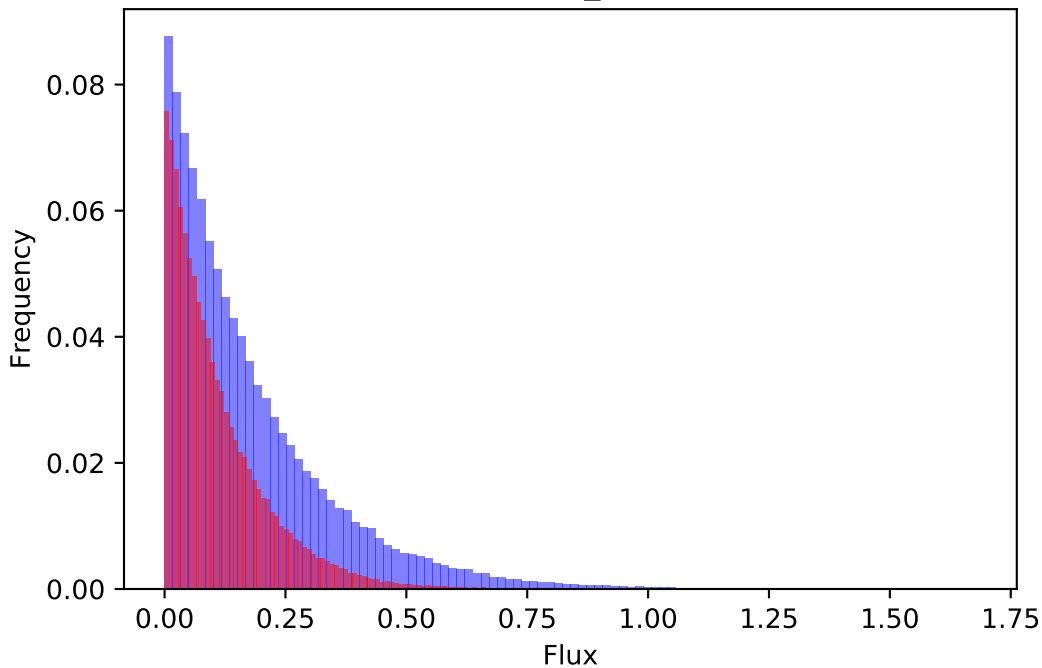


**\*\*519 : Thr\_h --> \*\***

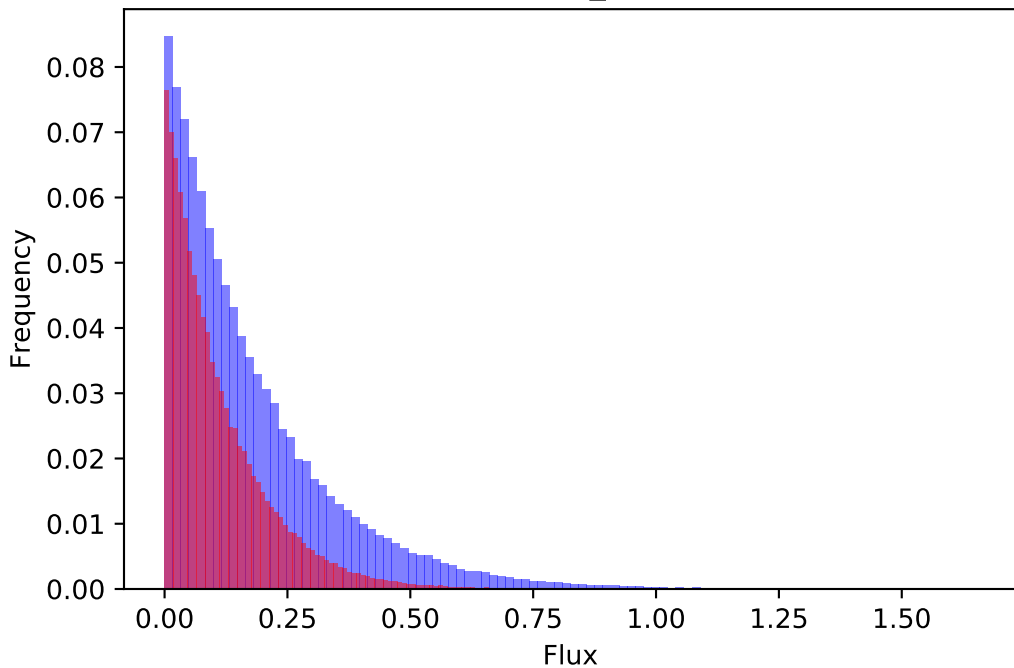




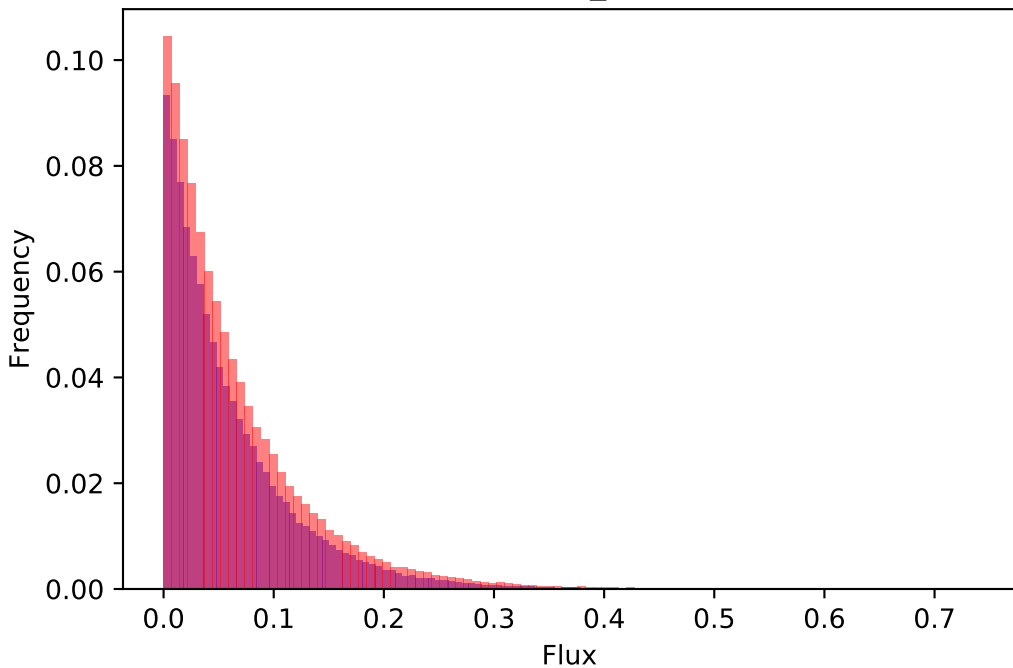
**\*\*520 : Thr\_m --> \*\***



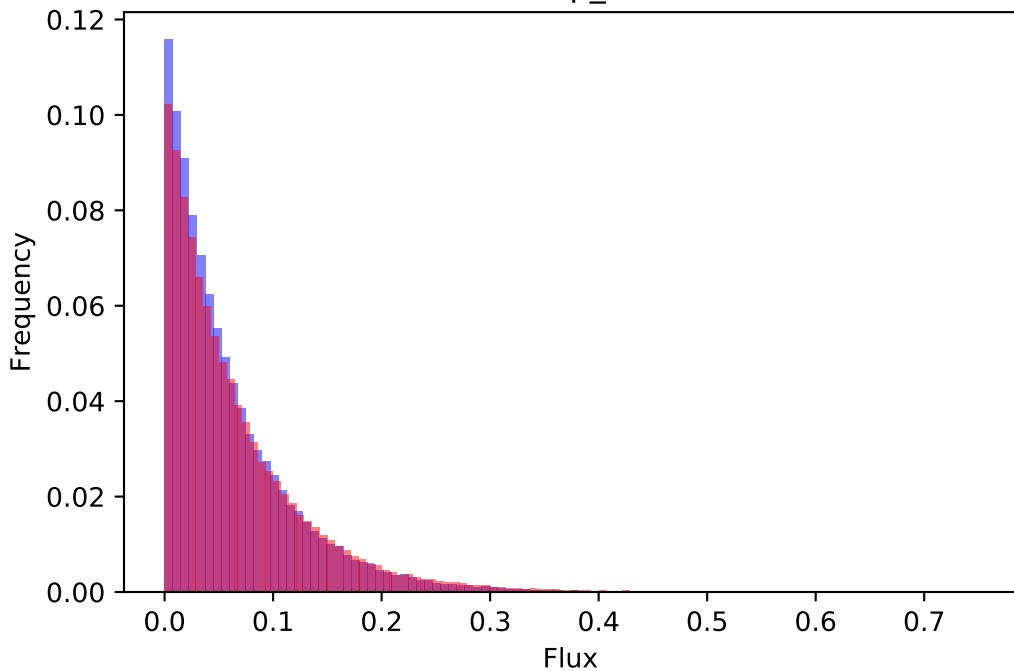
**\*\*521 : Thr\_p --> \*\***



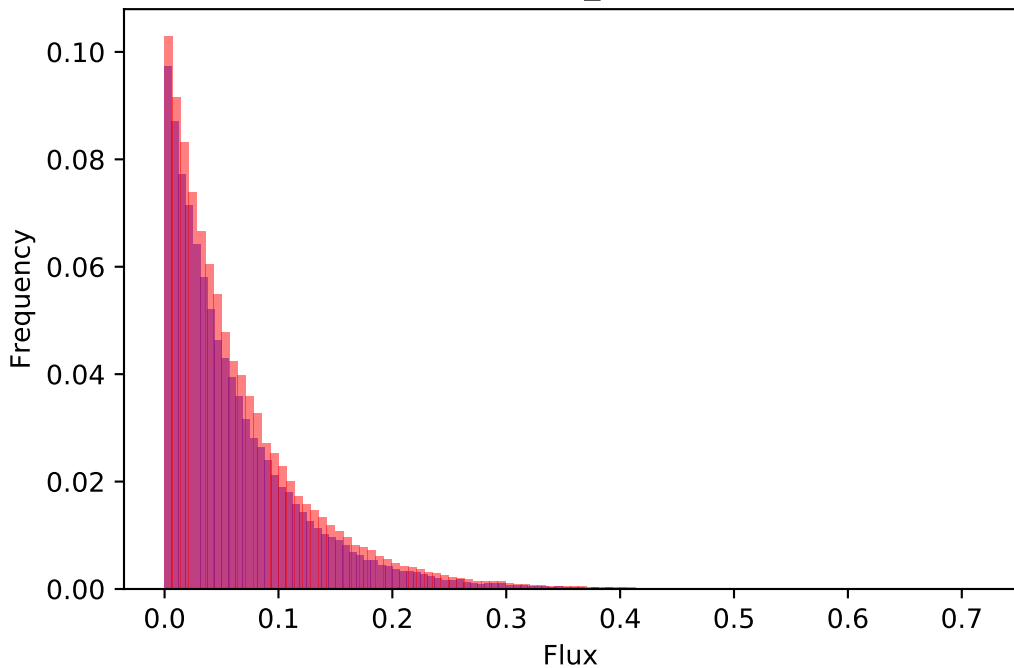
**\*\*522 : Trp\_c --> \*\***



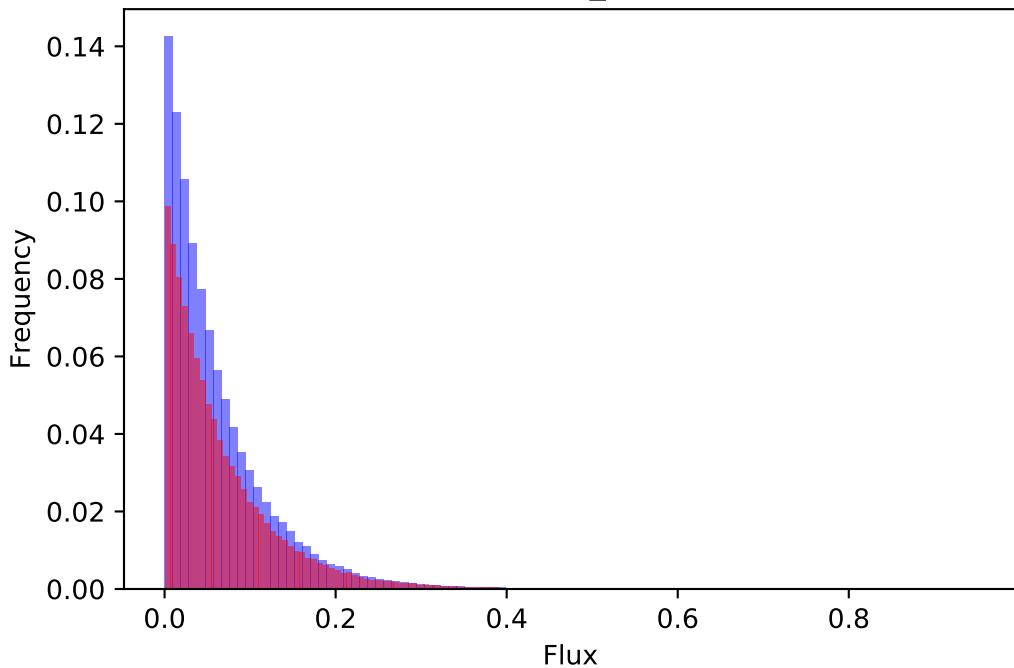
**\*\*523 : Trp\_h --> \*\***



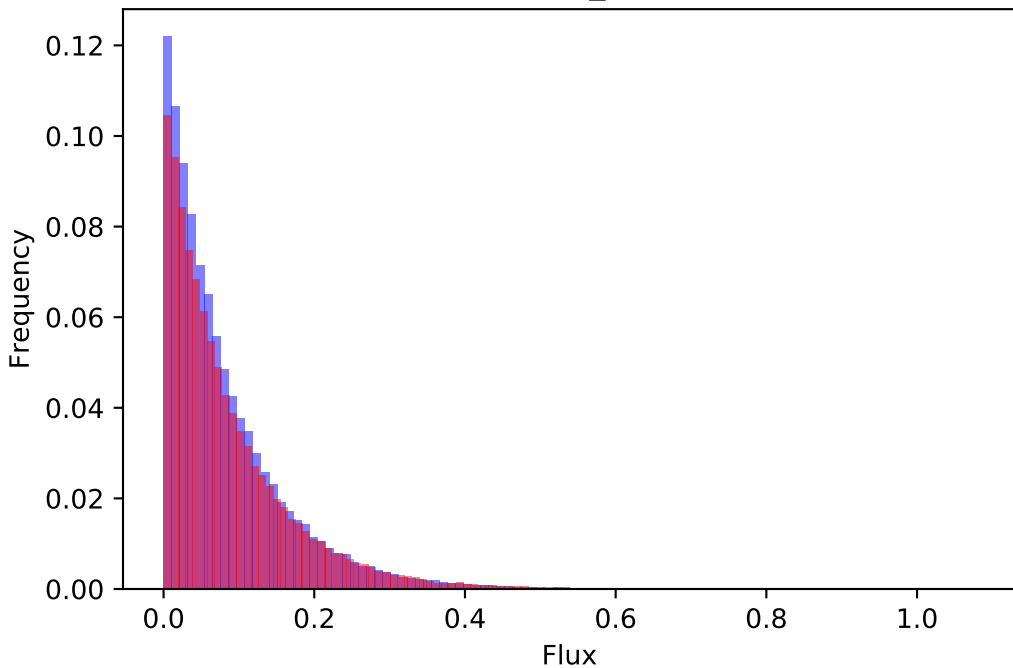
**\*\*524 : Trp\_m --> \*\***



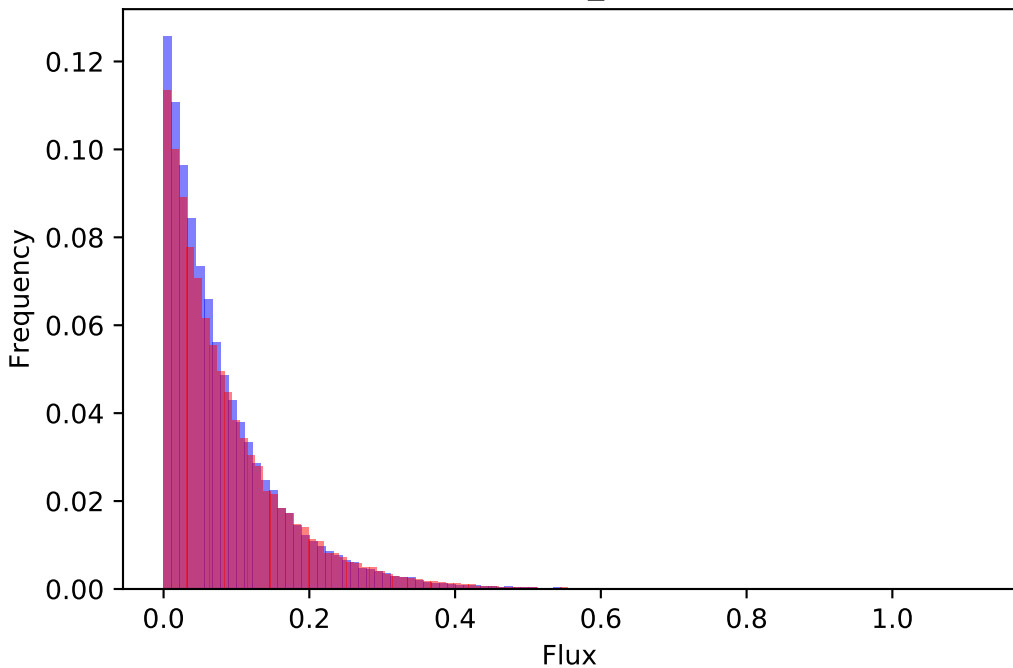
**\*\*525 : Trp\_p --> \*\***



**\*\*526 : Tyr\_c --> \*\***

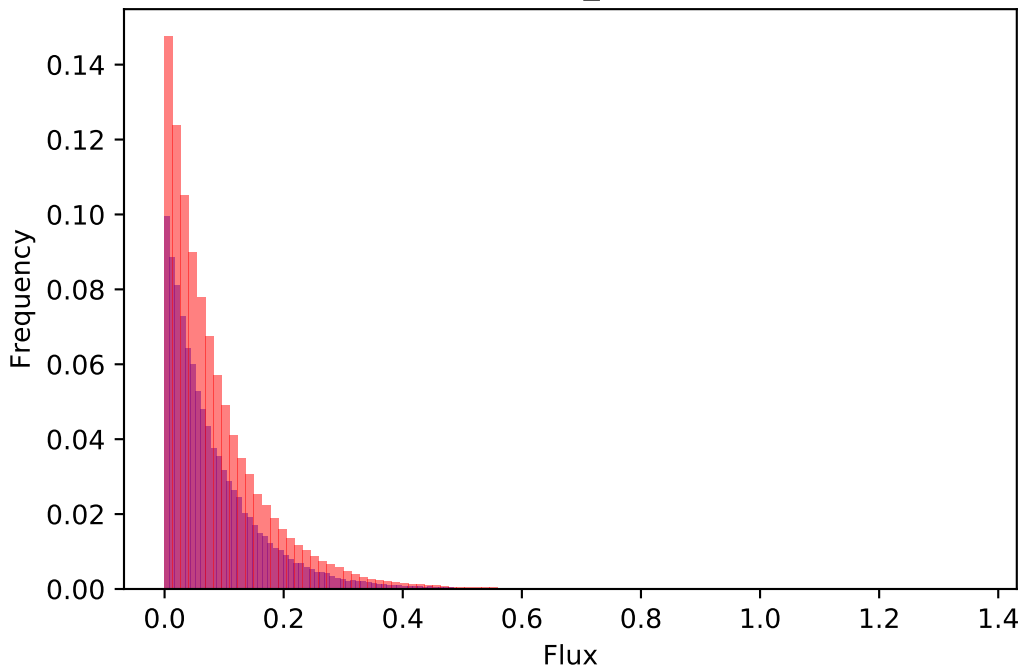


**\*\*527 : Tyr\_h --> \*\***

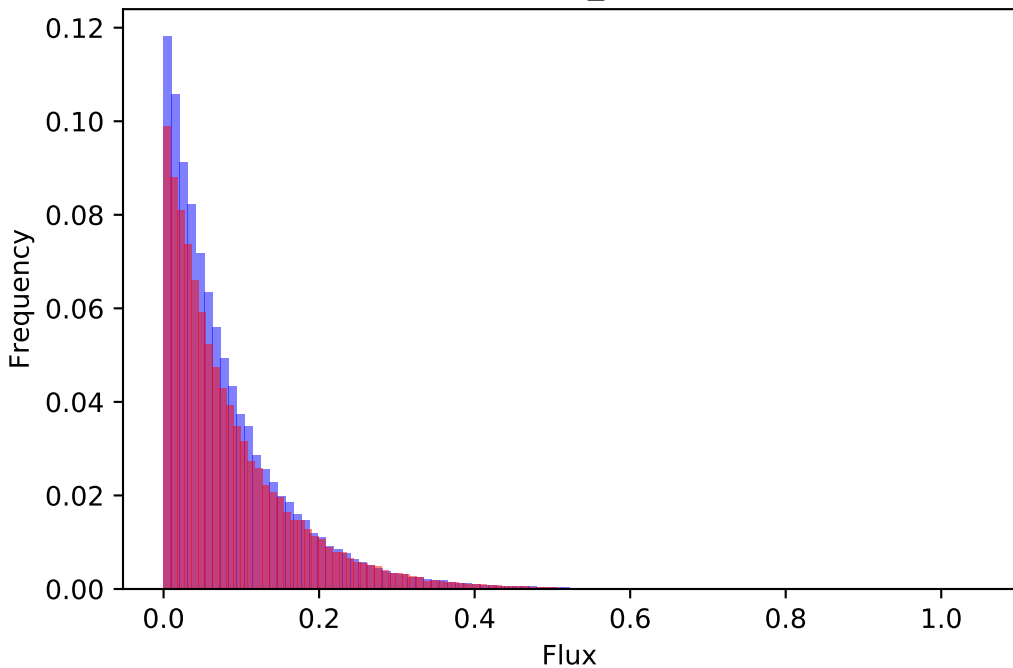




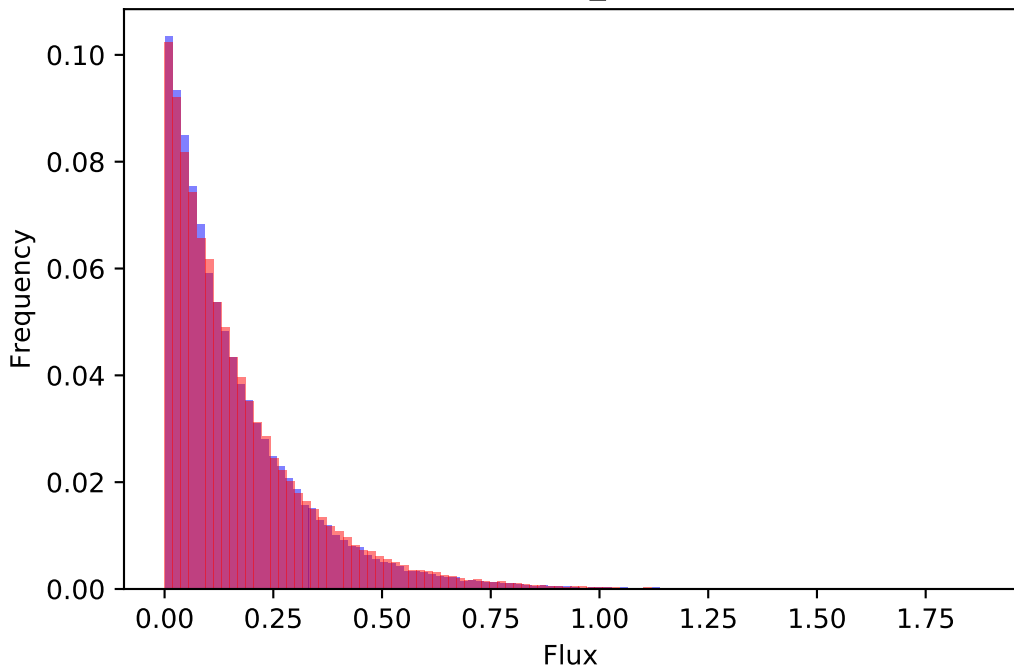
**\*\*528 : Tyr\_m --> \*\***



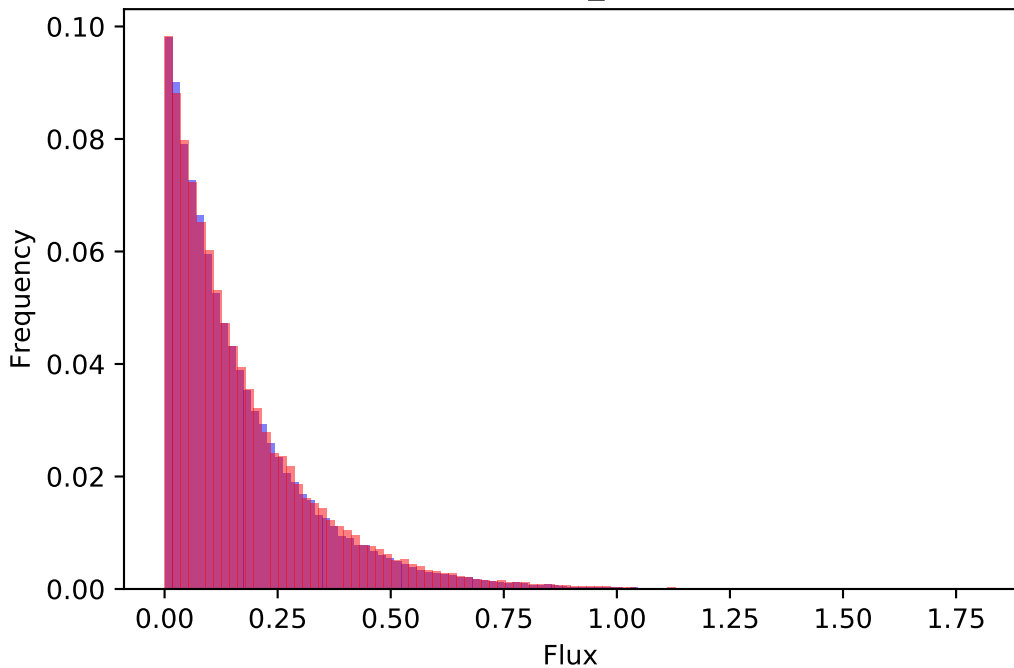
**\*\*529 : Tyr\_p --> \*\***



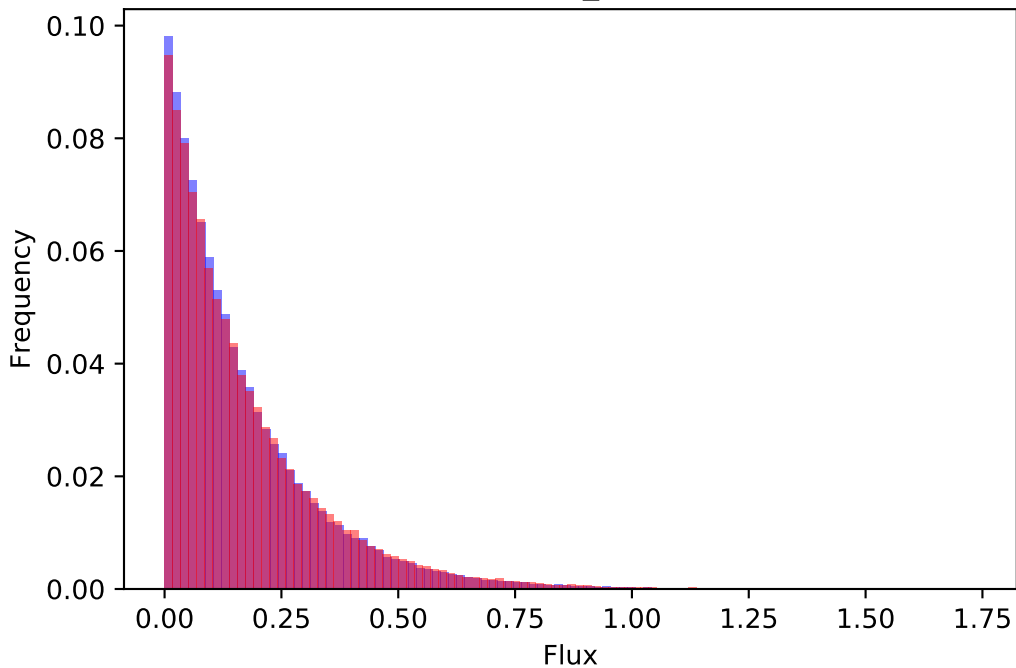
**\*\*530 : Val\_c --> \*\***



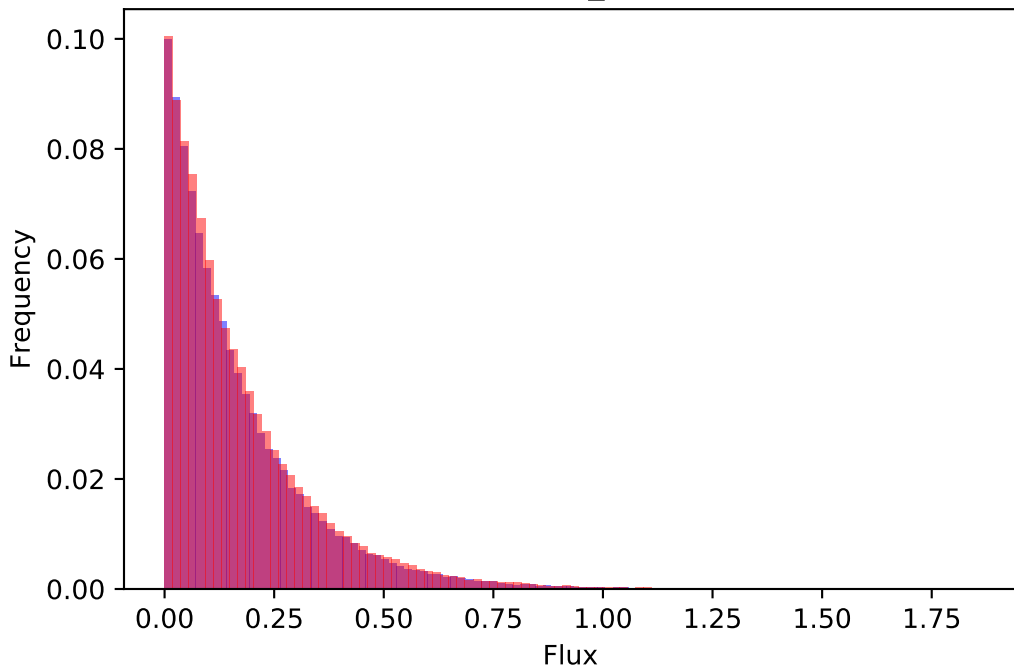
**\*\*531 : Val\_h --> \*\***



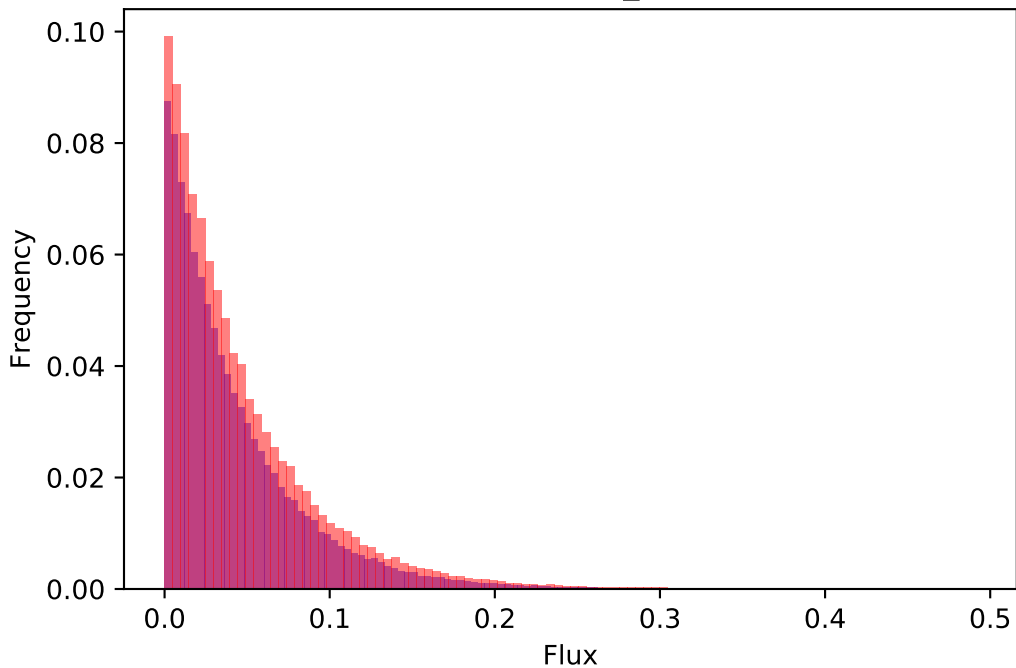
**\*\*532 : Val\_m --> \*\***



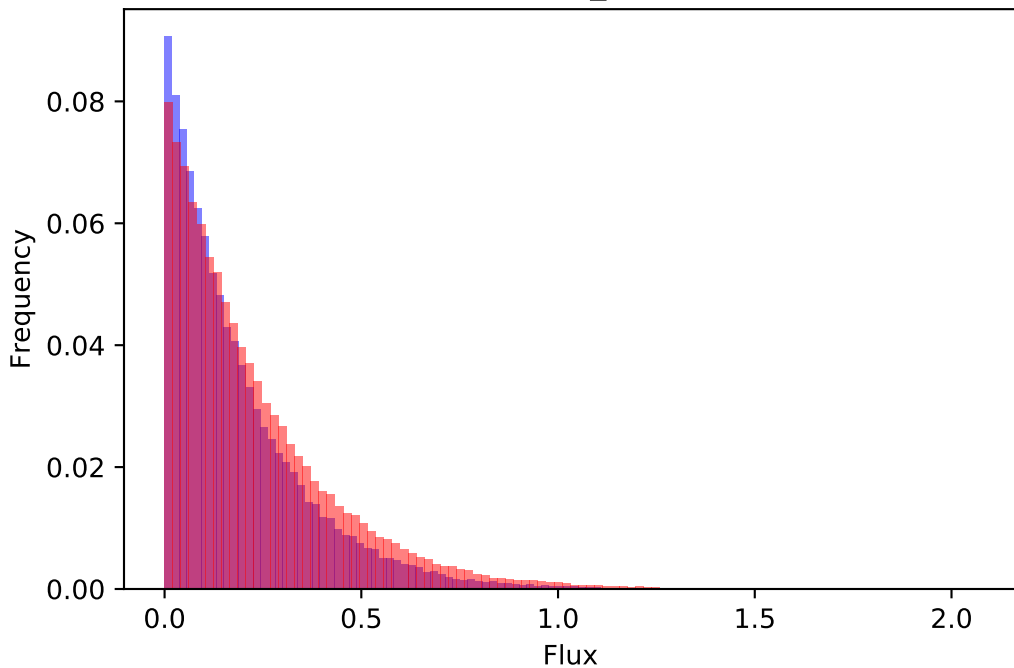
**\*\*533 : Val\_p --> \*\***



**\*\*534 : starch3\_h --> \*\***

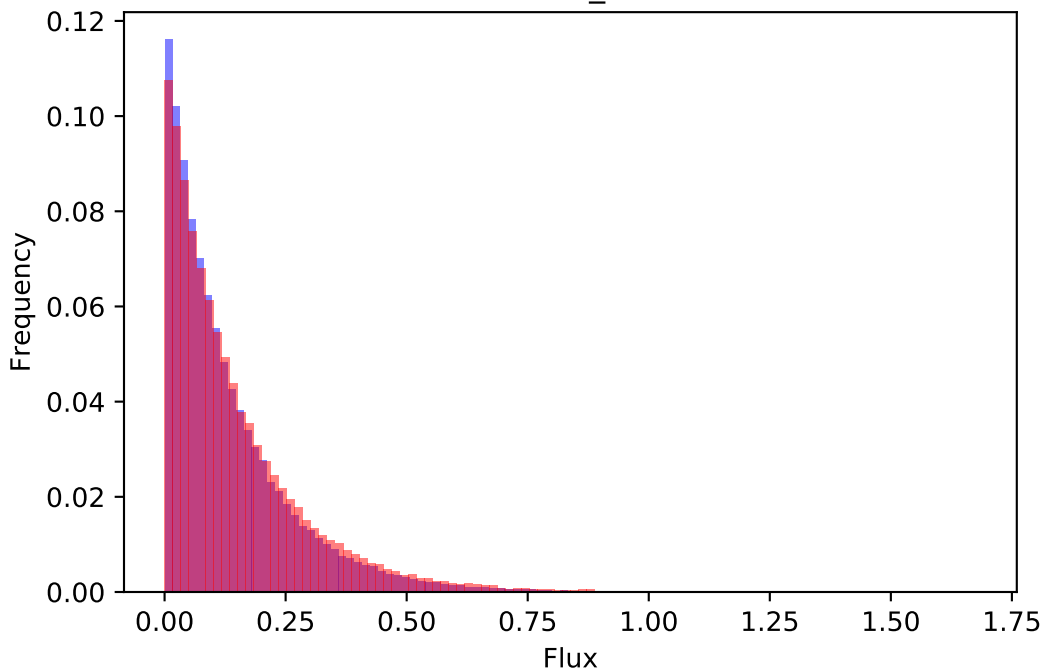


**\*\*535 : Glc\_c --> \*\***

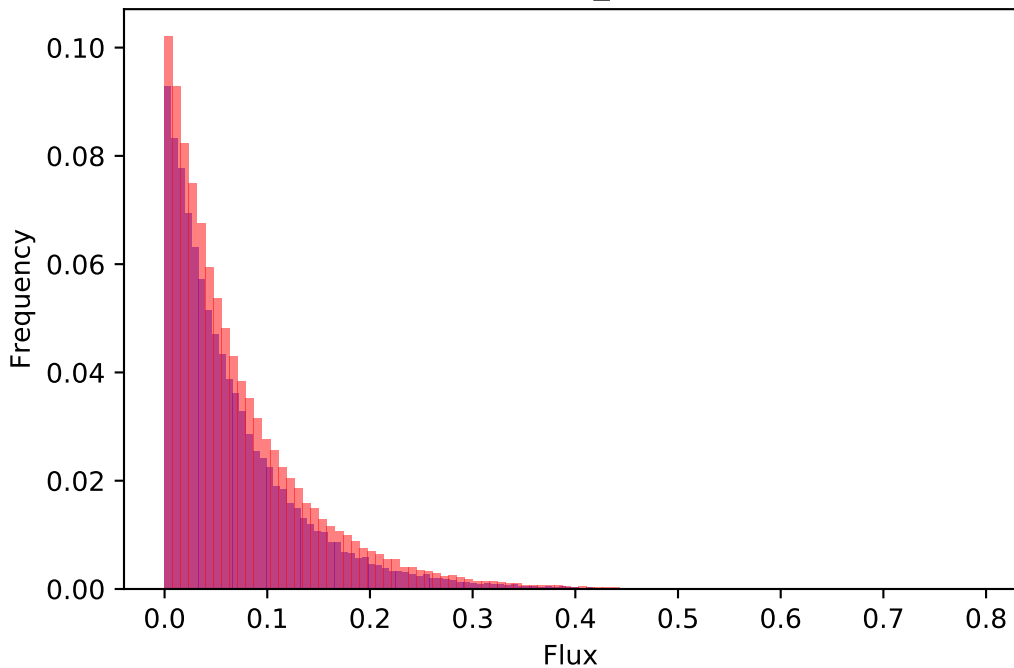




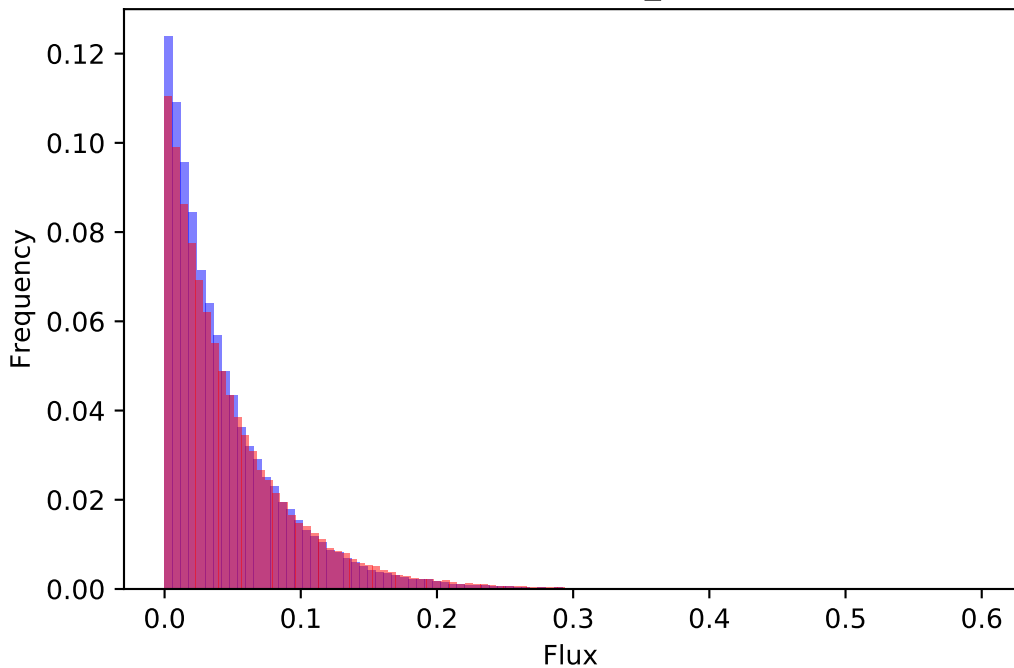
**\*\*536 : Frc\_c --> \*\***



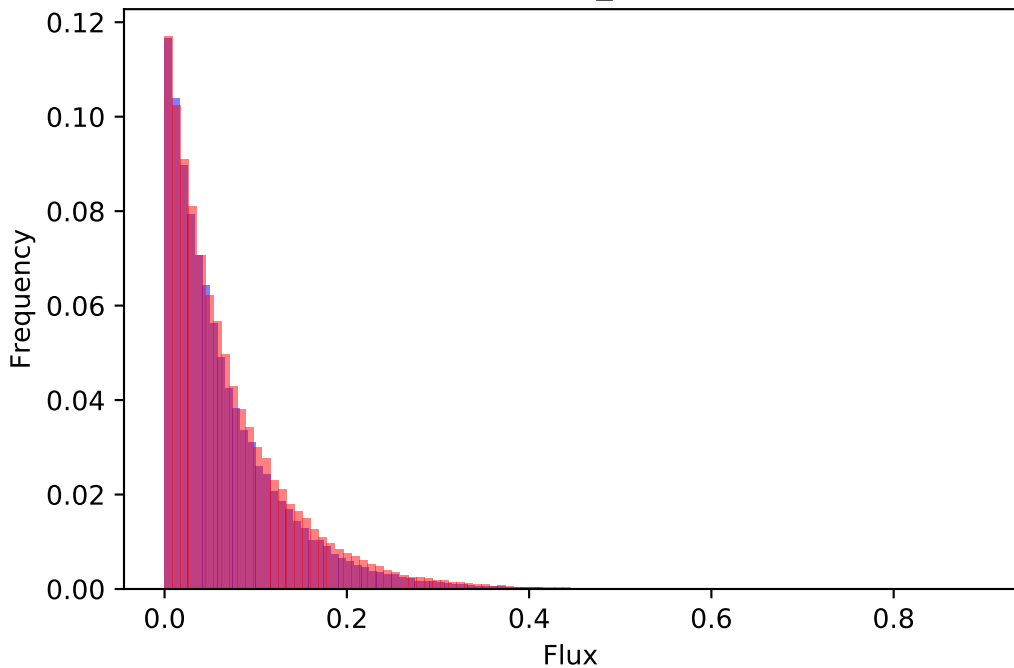
**\*\*537 : Suc\_c --> \*\***



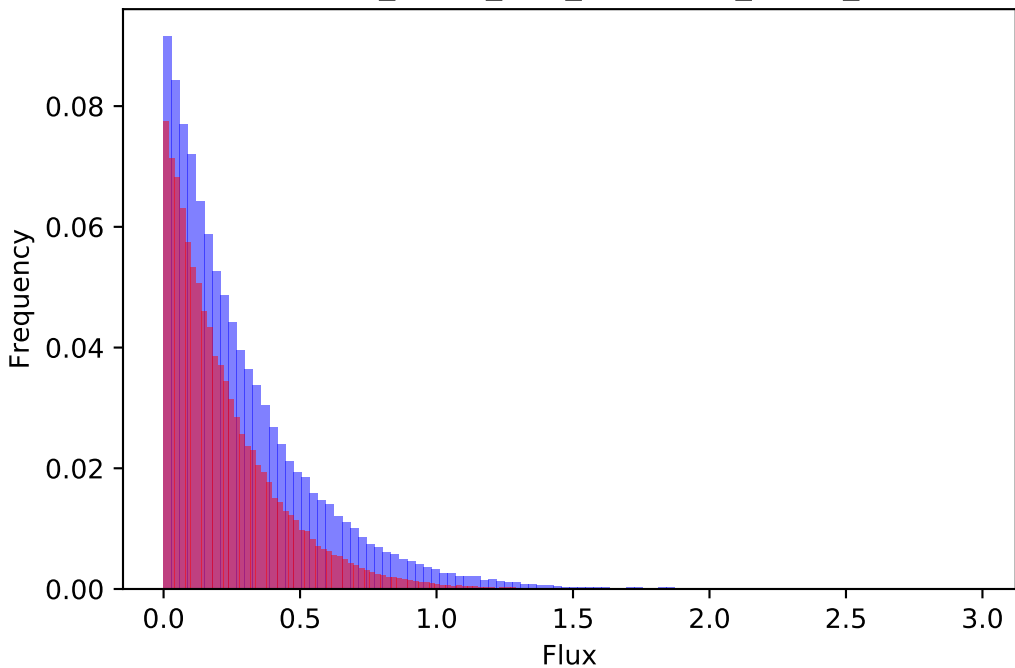
**\*\*538 : cellulose3\_c --> \*\***



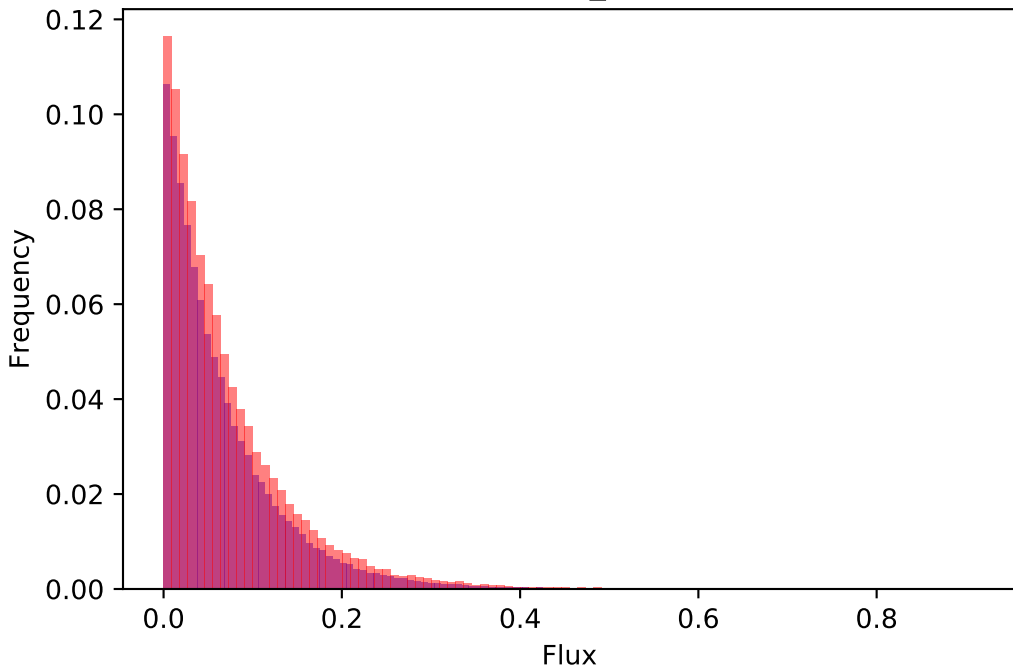
**\*\*539 : Mas\_c --> \*\***



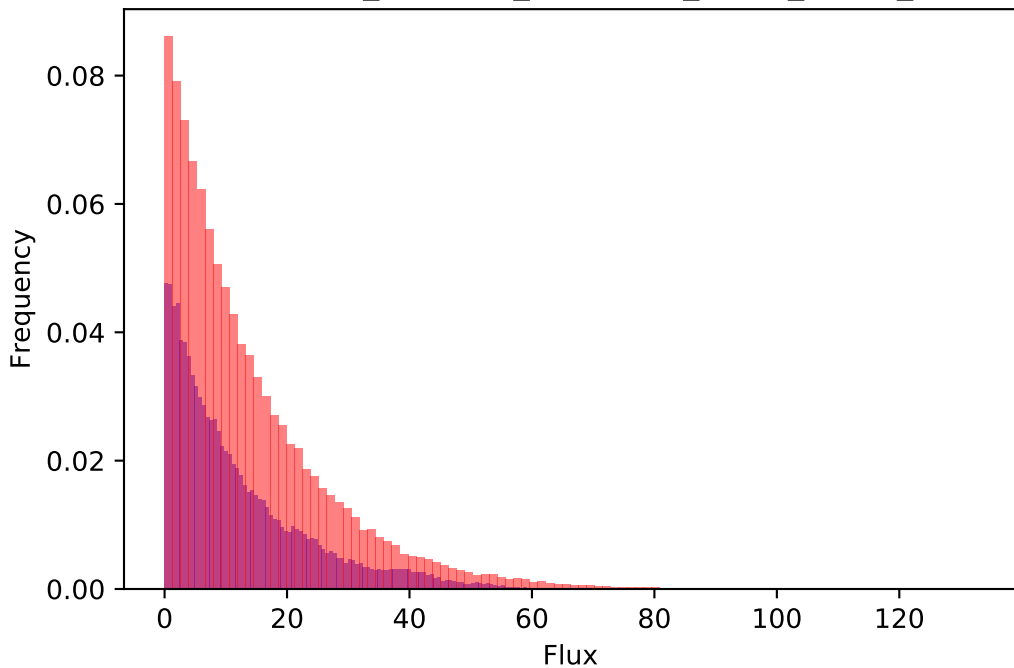
**\*\*540 : M\_DASH\_ACP\_h --> ACP\_h + H\_h\*\***

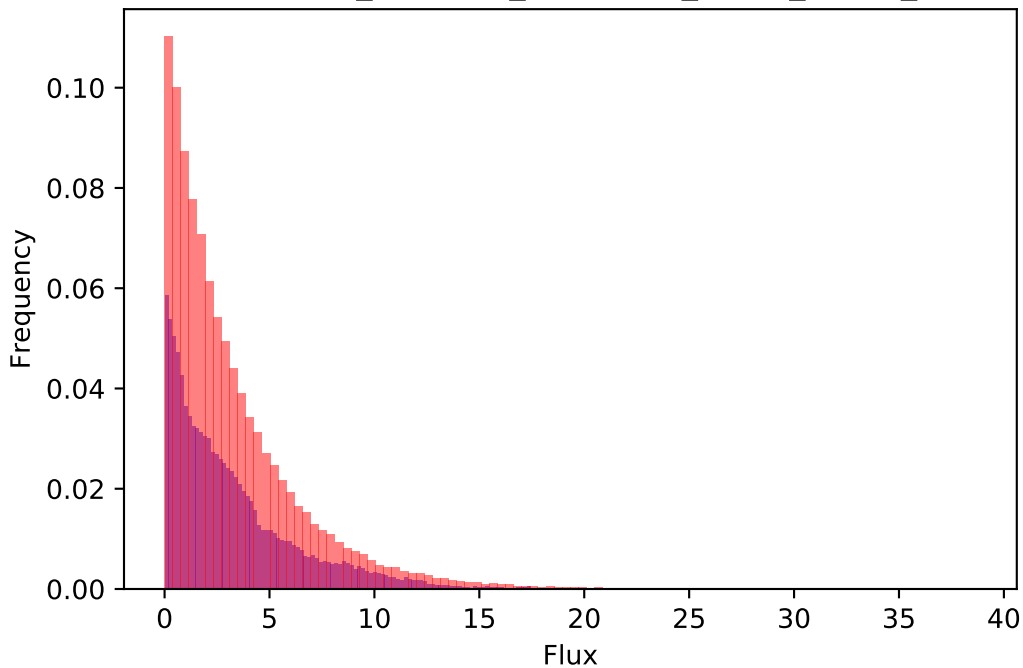
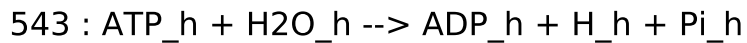


**\*\*541 : Tre\_c --> \*\***



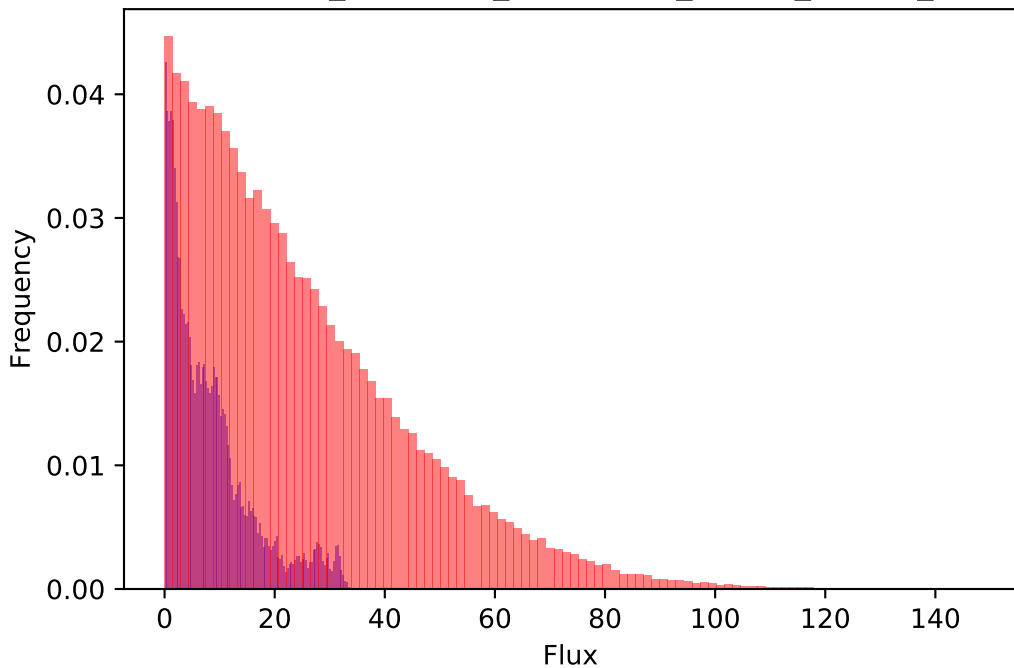
**\*\*542 : ATP\_c + H2O\_c --> ADP\_c + H\_c + Pi\_c\*\***



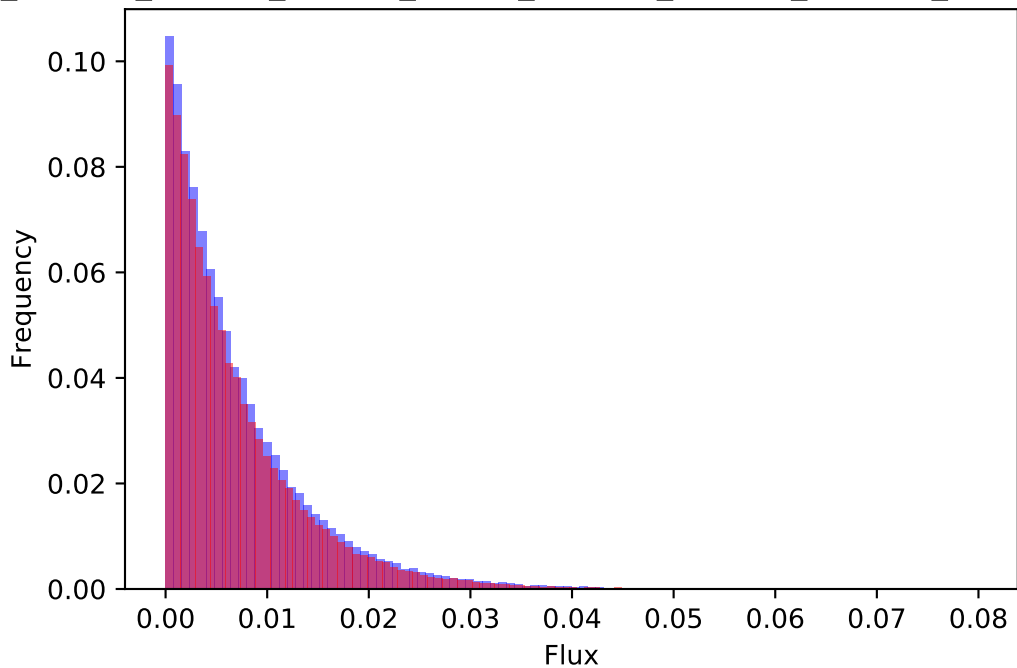




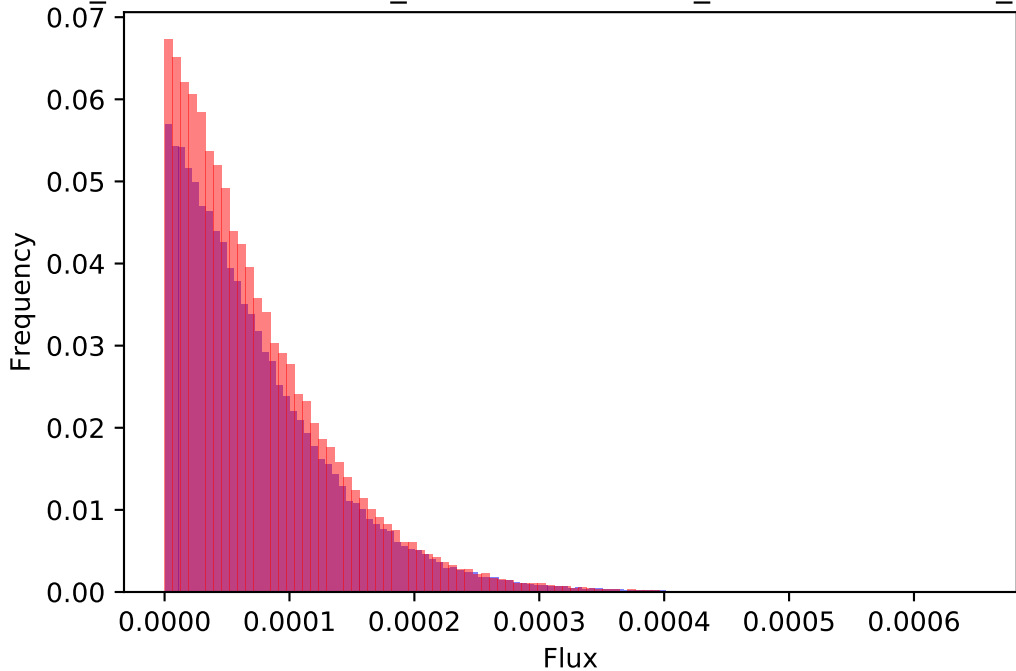
**\*\*544 : ATP\_m + H2O\_m --> ADP\_m + H\_m + Pi\_m\*\***



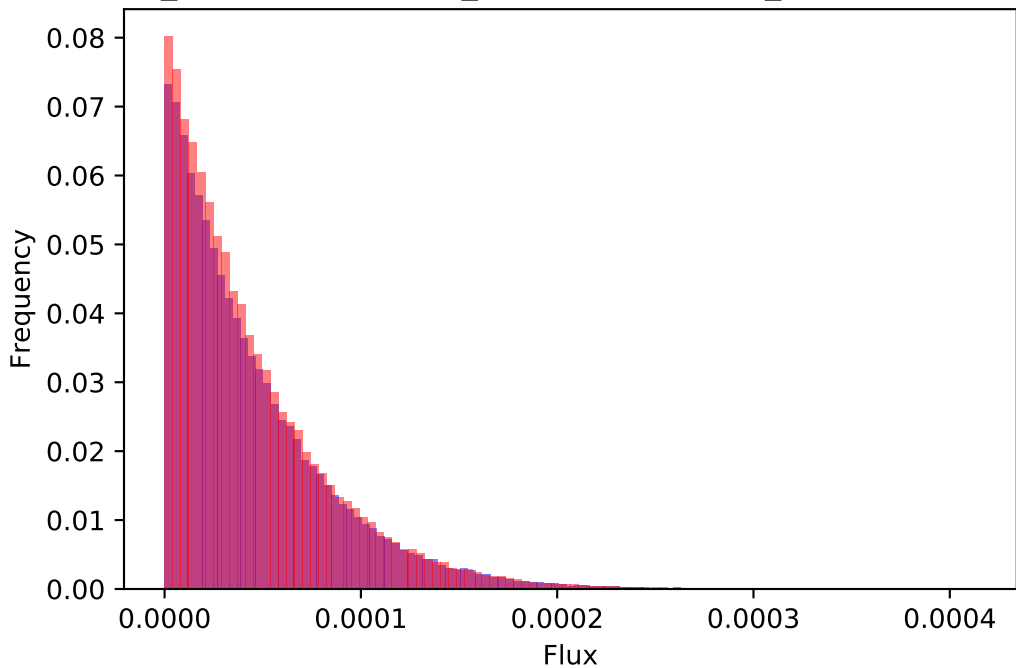
n\_c + Glu\_c + Gly\_c + His\_c + Ile\_c + Leu\_c + Lys\_c + Met\_c + Phe\_c +



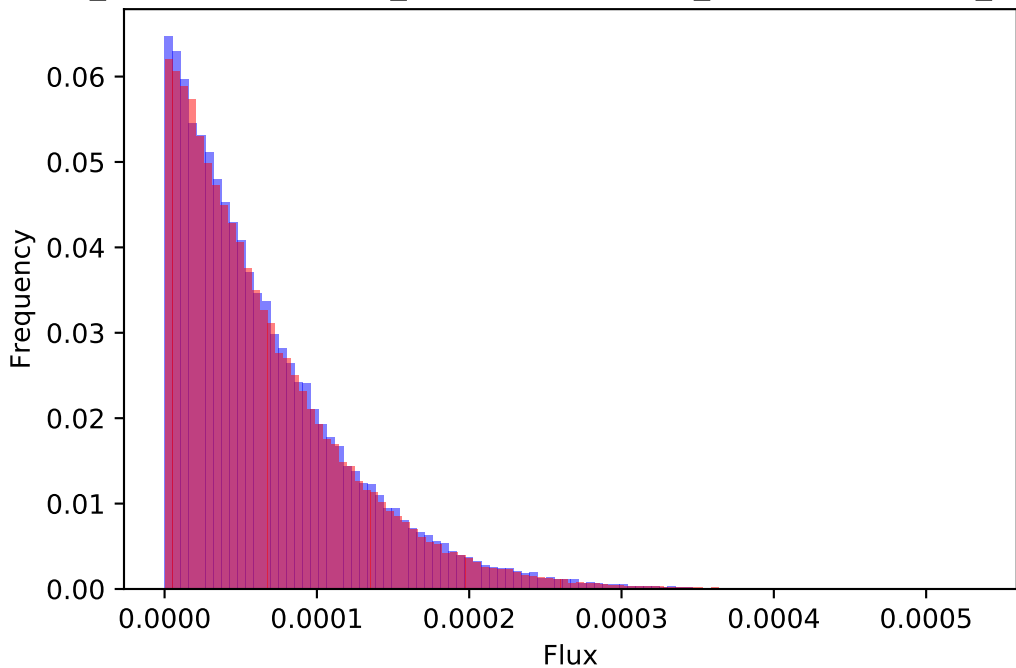
99 Mal\_m + 2.27742 Mas\_c + 30.37981 Met\_c + 14.60727 Orn\_h + 59.



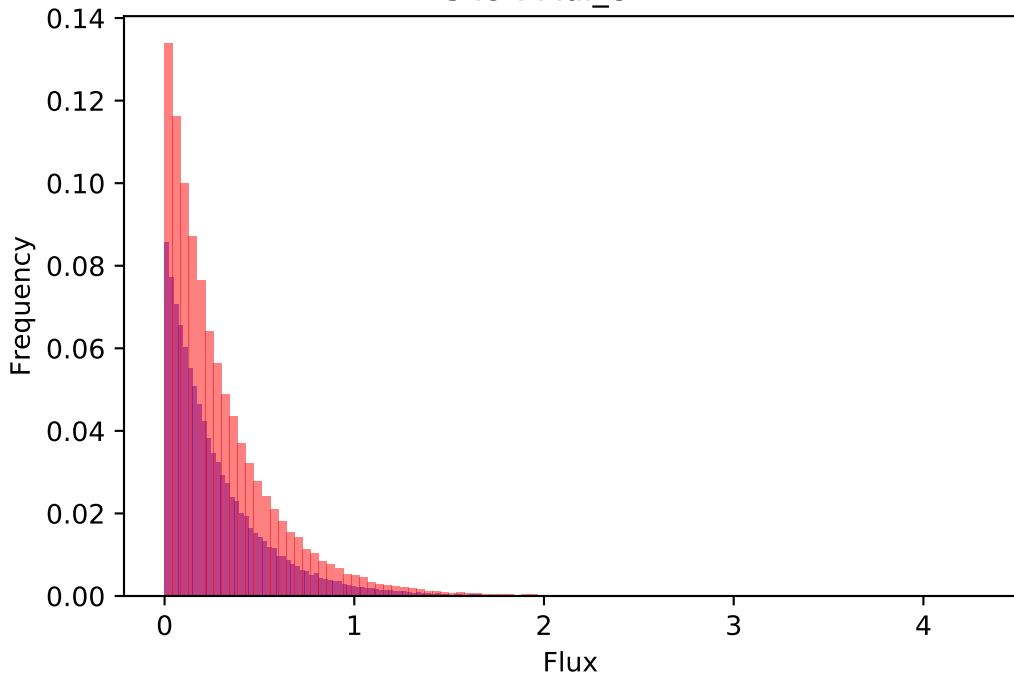
.89856 Mal\_m + 5.37965 Mas\_c + 51.81818 Met\_c + 9.64682 Orn\_h +



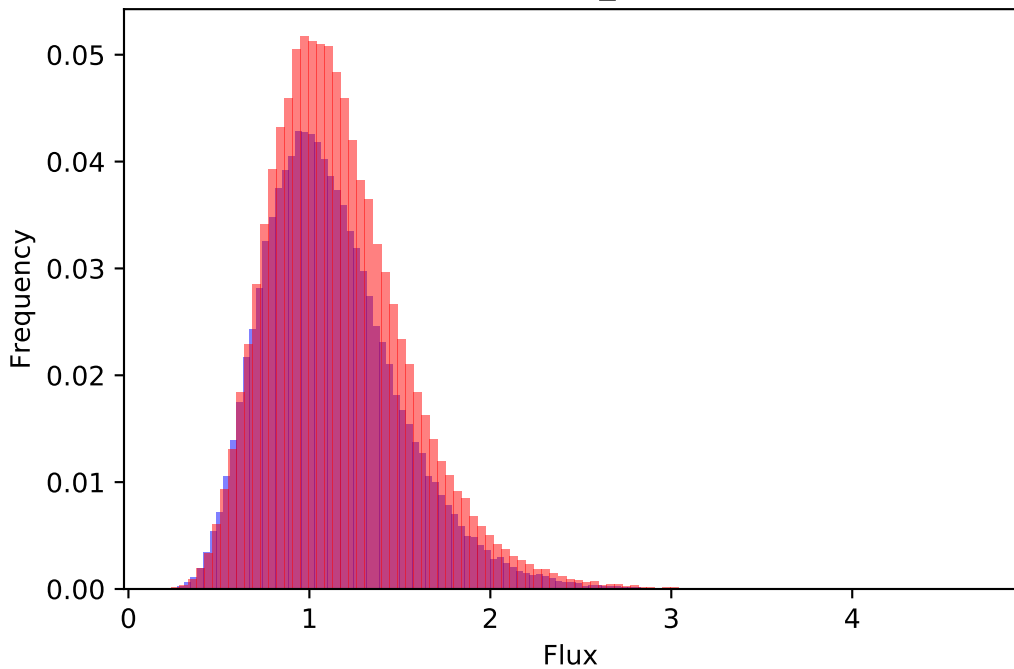
$$41 \text{ Mal\_m} + 2.60958 \text{ Mas\_c} + 33.61497 \text{ Met\_c} + 1.58654 \text{ Orn\_h} + 66.6$$



**\*\*549 : Mal\_c --> \*\***



**\*\*550 : Fum\_c --> \*\***



**\*\*551 : starch1\_h --> \*\***

