**Introduction:** The identified SNPs in regulatory regions of SLC22A4 (OCTN1) and SLC22A5 (OCTN2) genes encoding influx transporters are associated with the response of CML patients to imatinib in the first line (Jaruskova et al. 2017). Moreover, the SNP rs460089 in the promotor of SLC22A4, was significantly associated with a probability of TFR in EURO-SKI patients after imatinib cessation (Machova et al. EHA 2019). OCTN1 and OCTN2 genes are probable evolutionary copies and the SNP rs460089 was identified to be in high linkage disequilibrium with seven other regulatory SNPs located in introns of both genes. Thus, the regulatory loci of the OCTN1 may regulate expression of OCTN2 and vice versa. This work focused on the imatinib intake efficacy by OCTN2.

**Results:**

1) OCTN2 (SLC22A5) is highly expressed in KCL-22.

2) Cell intake of carnitines is slower compared to imatinib (IM) intake.

3) Preincubation with IM reduces cell intake rate of carnitine.

4) Preincubation with carnitine does not reduce cell intake rate of IM.

5) OCTN2 inhibition by VINORELBINE (VNR):

- Blocks carnitine cell absorption in KCL-22
- Reduced IM cell intake in KCL-22

**Conclusions:**

- The OCTN2 specific carnitines intake was significantly reduced in the presence of imatinib in KCL-22 and HBT-153 cell lines.
- High doses of carnitine in preincubation did not influence imatinib intake capacity.

- This observation is in line with the knowledge that imatinib is transported through other known imatinib transporters.
- The observed non-equal competition between imatinib and carnitine intake can lead to the carnitine intracellular deficiency manifested by a disruption of skeletal muscle mitochondrial density and can cause side effects like fatigue, muscle pain or cramp associated with rhabdomyolysis. This hypothesis requires experiments focused on impact of carnitine deficiency caused by imatinib competitive intake on metabolism in muscle cells.

**Methods:** Cells: KCL-22 (CML), HTB-153 (human rhabdomyosarcoma, ATCC). RT-PCR and the RT² Profiler™ PCR Array Human Drug Transporters. Intracellular concentration of imatinib and carnitines: quantitative LC-MS/MS MRM mode. Chromatographic separation - XBridge Amide column (150x2.1mm, 5μm; Waters, Milford (MA, USA) coupled to tandem MS QTRAP 4000 (Sciex, USA).