1. How should I model the gills compartment? Vidal considers that the blood inflow of the compartment is just a part of the Q\_total.
2. Excretion pathways (gills, urine, feces)
   * 1. Urinary excretion.  
        In general the reabsorption of PFAS from urine back to organism is a possible process in fish. We can consider a ratio of Renal elimination to reabsorption (K\_renal) specific for each PFAS substance. The values of K\_renal can be given from Ng et al., (2013) who has estimated both renal elimination and reabsorption rate. Using these ratios makes it easier to fit a Cl\_urine (urinary elimination rate) and then calculate reabsorption rate of pfas. Also, the K\_renal ratio seems to decrease with the increase of chain length of PFAS. (Sun et al. 2022 also approached it this way).   
          
        Ng et al., 2013  
        A picture containing text, font, screenshot, number

        Description automatically generated  
          
        Sun et al., 2022  
        A screenshot of a calculator

        Description automatically generated with low confidence

For the modeling of these processes, we will need a flow rate of urine and the volume of urine existing in the gallbladder of rainbow trout. We can take these values from Curtis et al., 1981. To calculate V\_urine we use the mean maximum volume of the urinary bladder which is 2.20 ml/kg. To calculate Q\_urine we use the mean of urinary flow rates given in Table 2, so

(kg)

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1. Vidal and Grech, based on Nichols, considers that a big part of outflow from muscle and skin compartments goes to kidney compartment.
2. About Enterohepatic circulation

* Cao et al.2022 supports that PFAS are recirculated via the reabsorption from bile back to blood. They estimated the F\_reab parameters for various PFAS substances.

Table

Description automatically generated

* Martin et al., 2013 (dietary) supports that enterohepatic circulation plays important role in fish.
* Rainbow trout Bile flow rate = 75 μL/kg/h by Grosell et al., 2000 (<https://doi.org/10.1152/ajpregu.2000.278.6.R1674>)

1. Urine excretion

Check NG et al., 2013 about how they calculated the urine elimination and reabsorption parameters.

1. In the paper of Falk et al.2015 it seems that the blood concentrations are calculated considering the whole blood volume, not only the plasma volume.