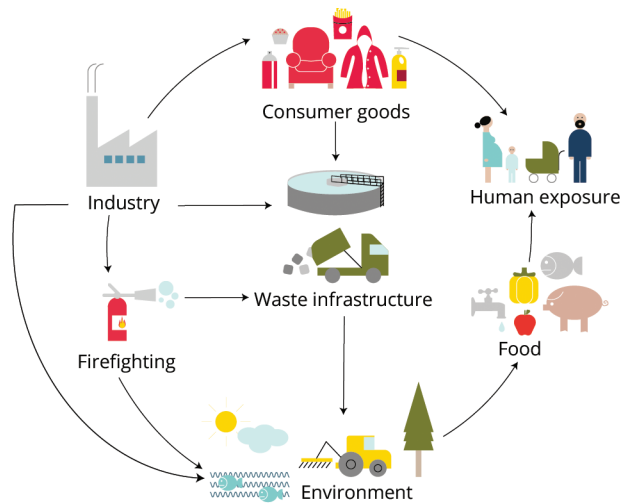


PFAS and Dairy Animals

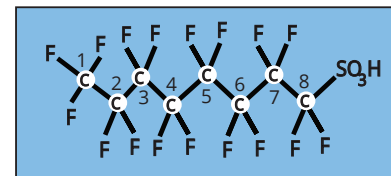
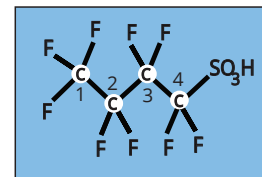
Authors: Ana Jimenez, Glenda Pereira and Juan Romero

Per- and polyfluoroalkyl substances (PFAS) are a group of more than 4,000 chemicals composed of carbon and fluorine bonds. PFAS have been in use since 1940 and are found in various consumer and industrial products because of their resistance to grease, oil, water and heat. Exposure to PFAS via food, water and dust can lead to adverse health outcomes in humans.¹



Sources of PFAS:

industry, consumer goods and firefighting foam



Length of carbon chain and polar head makes a difference:

Cattle can urinate short carbon chains (7 or less), whereas perfluorooctanoic (PFOS, 8) acid bioaccumulates. The sulfonate group in PFOS further restricts its excretion via urine compared to PFAS with carboxyl groups.

Dairy animals can be exposed to PFAS if they eat or drink contaminated feed or water.¹ Long chain PFAS such as perfluorooctanoic acid (PFOS) accumulate in dairy animals because they mostly are not urinated and are re-circulated through the enterohepatic cycle (EHC).² PFOS is present in milk even after the animal consumes clean feed because it can take 39-106 days for 50% of the accumulated PFOS to clear from blood.⁵



Heifers

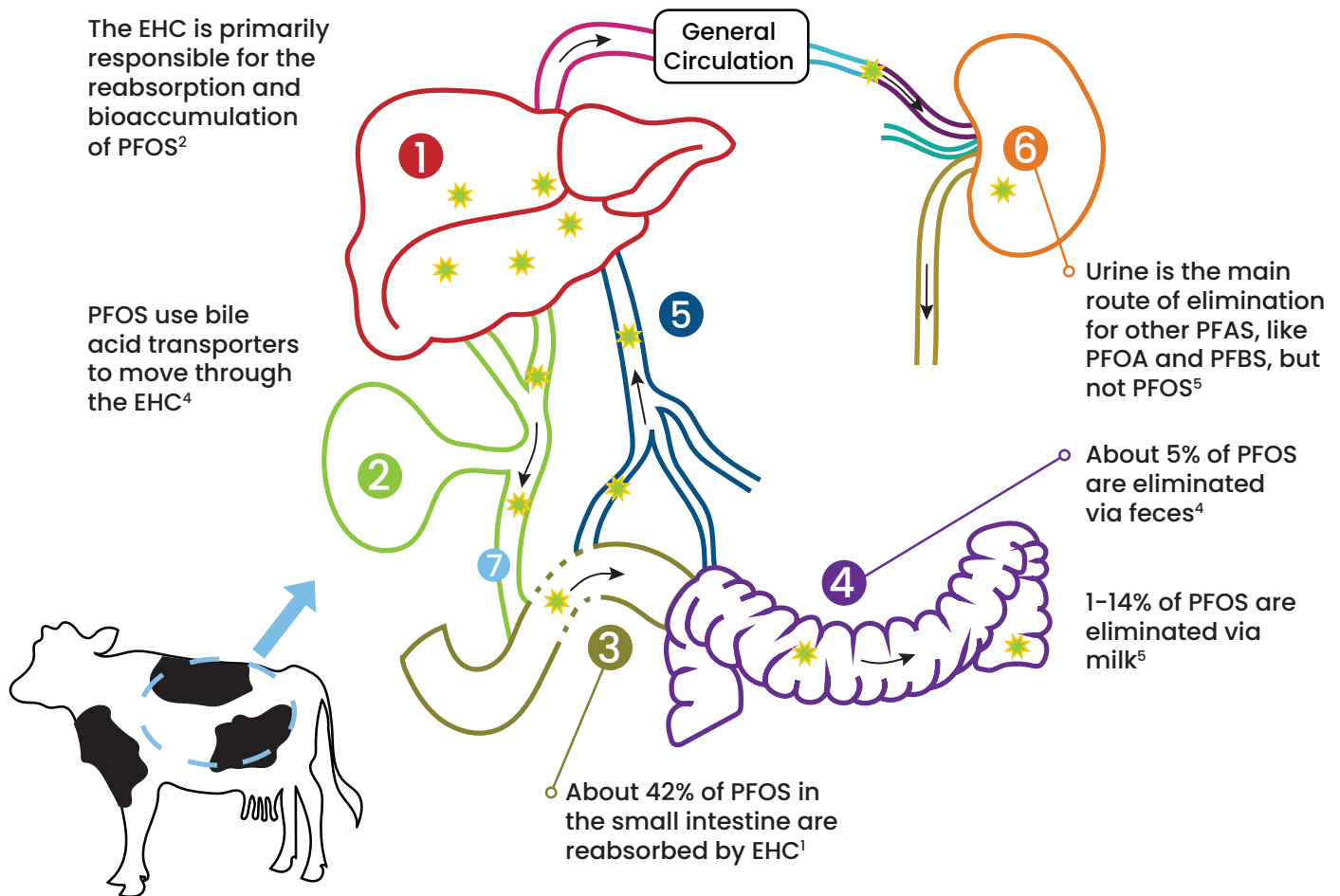
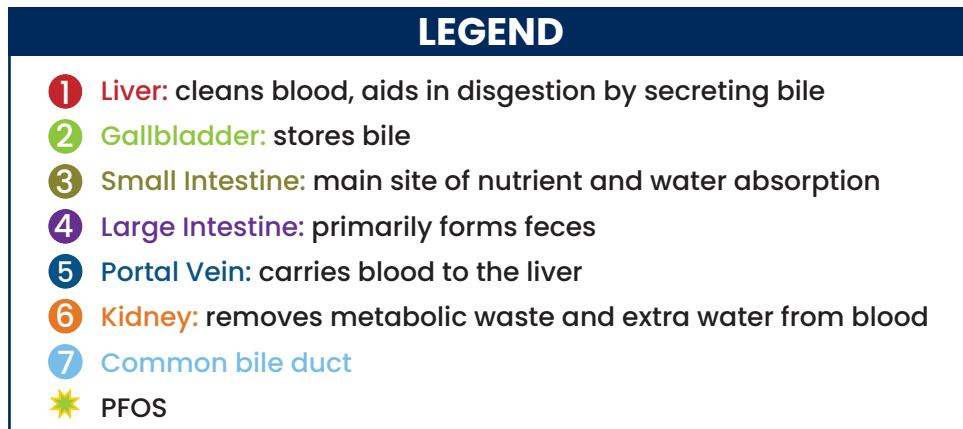
- Enterohepatic circulation (see back) facilitates bioaccumulation of PFOS in the animal until first lactation^{3,4}
- There is potential for reducing PFOS with pre-partum feeding management

Lactating Animals

- Milk is a major excretion route of PFOS in contaminated cattle because it is rich in proteins⁵
- As milk yield increases, PFOS concentration in milk seems to decrease⁶

How do PFOS recirculate?

Enterohepatic circulation (EHC) is the movement of bile acids from the liver to the small intestine and back to the liver. Bile acids are an important component in the movement of PFOS in dairy animals.



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