Answer on Question #78569, Chemistry / Organic Chemistry

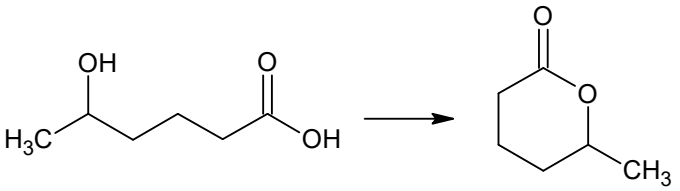
Question:

Which of three acids - a) 3-hydroxyhexanoic acid; b) 5-hydroxyhexanoic acid; c) 2-hydroxy-5-chlorohexanoic acid - form lactide and which form lactone? Write the cyclization schemes. What are the similarities and differences of these reactions?

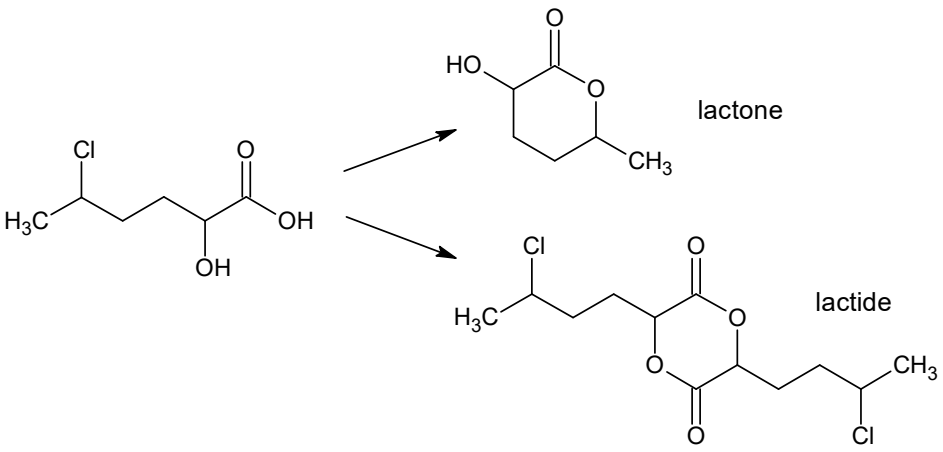
Answer:

a) 3-hydroxyhexanoic acid does not form lactide or lactone.

b) 5-hydroxyhexanoic acid forms lactone:



c) 2-hydroxy-5-chlorohexanoic acid forms lactide and lactone (at different conditions):



Similarities: Both processes (forming lactide and lactone) are reactions of esterification. Lactide and lactone are esters of acids.

Differences: Forming of lactone is the intramolecular reaction. One molecule of the acid reacts with itself. Forming of lactide is the intermolecular reaction. Two molecules of the acid react with each other.