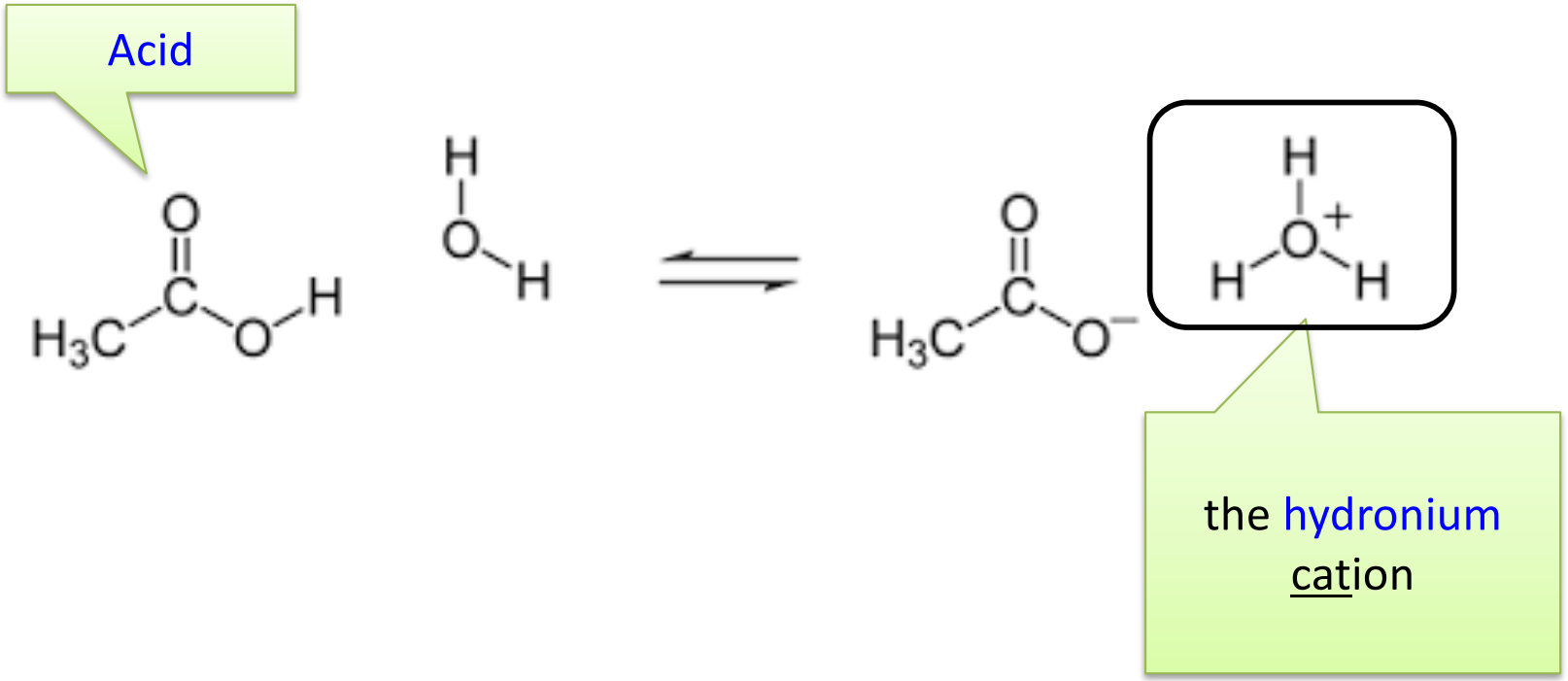
pH

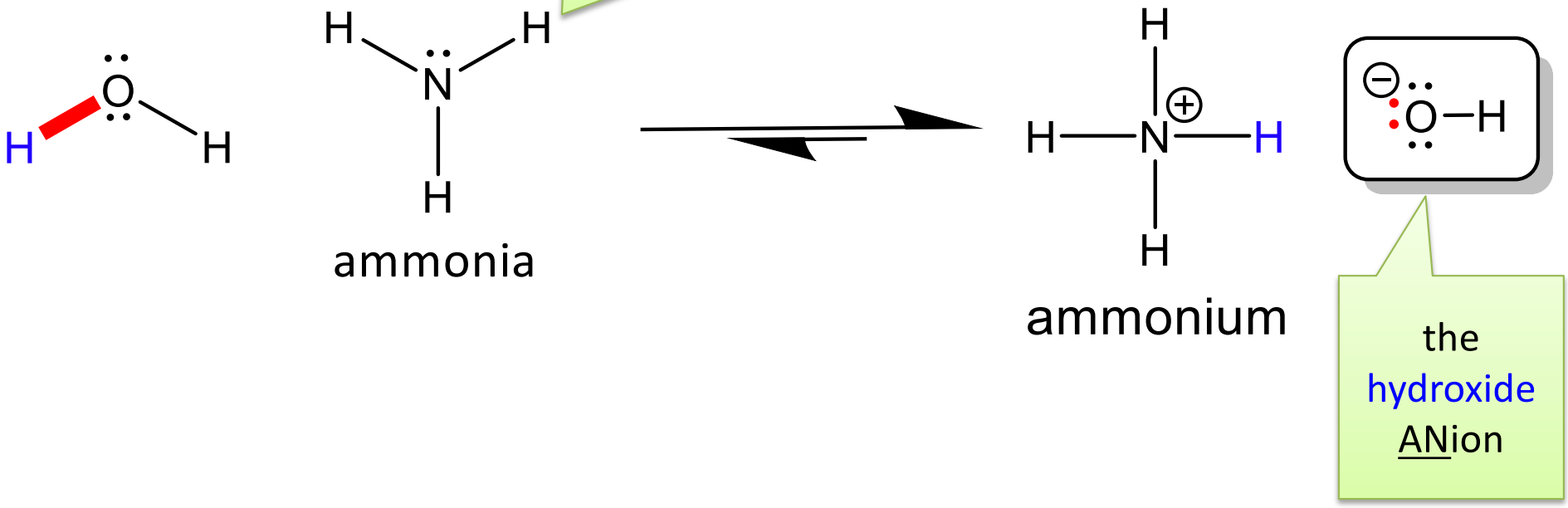
Alkalkine vs. Acidic



- Acidic molecules release protons (H^+).
- Giving a proton from water creates a cation with a special name – *hydronium ion*.

Alkalkine vs. Acidic

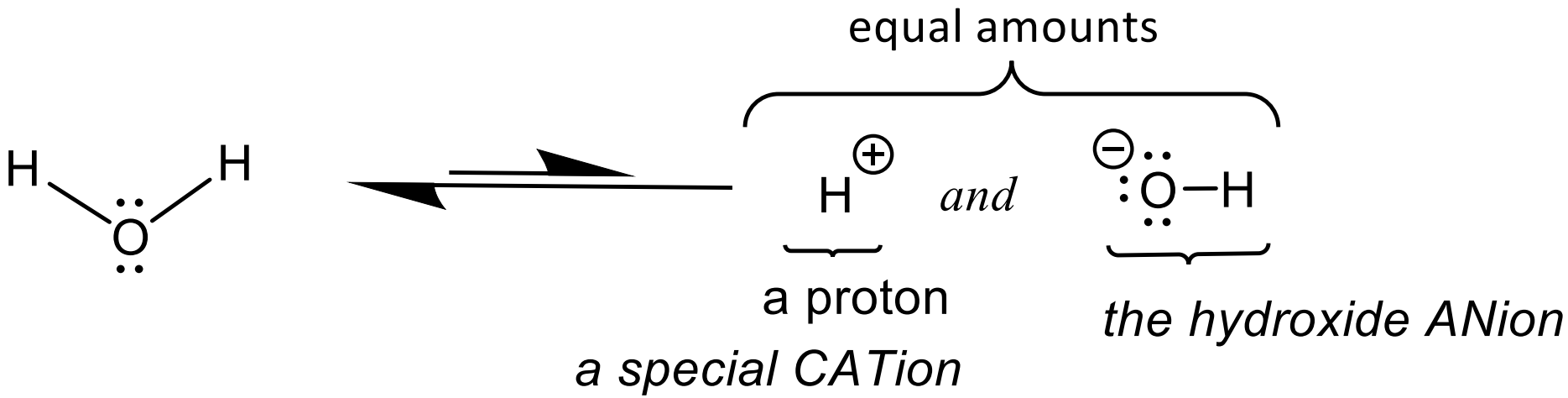
Bases (alkaline substances) produce many hydroxide ions when mixed with water



- Some molecules are the *opposite* of *acidic*. They take protons from other molecules; they are basic or alkaline.
- Taking a proton from water creates an anion with a special name – *hydroxide*.

Relative concentrations of protons and hydroxide ions in acidic, neutral and basic solutions

	Concentration H^+ (protons)	Concentration of ^-OH (hydroxide)	
Acidic pH	High	Low	$H^+ > {}^-OH$
Neutral pH	Equal	Equal	$H^+ = {}^-OH$
Basic pH (Alkaline)	Low	High	$H^+ < {}^-OH$



pH = power of hydrogen

Danish Biochemist working for Carlsberg Laboratories described proton concentration to better measure and communicate its concentration in fermenting solutions

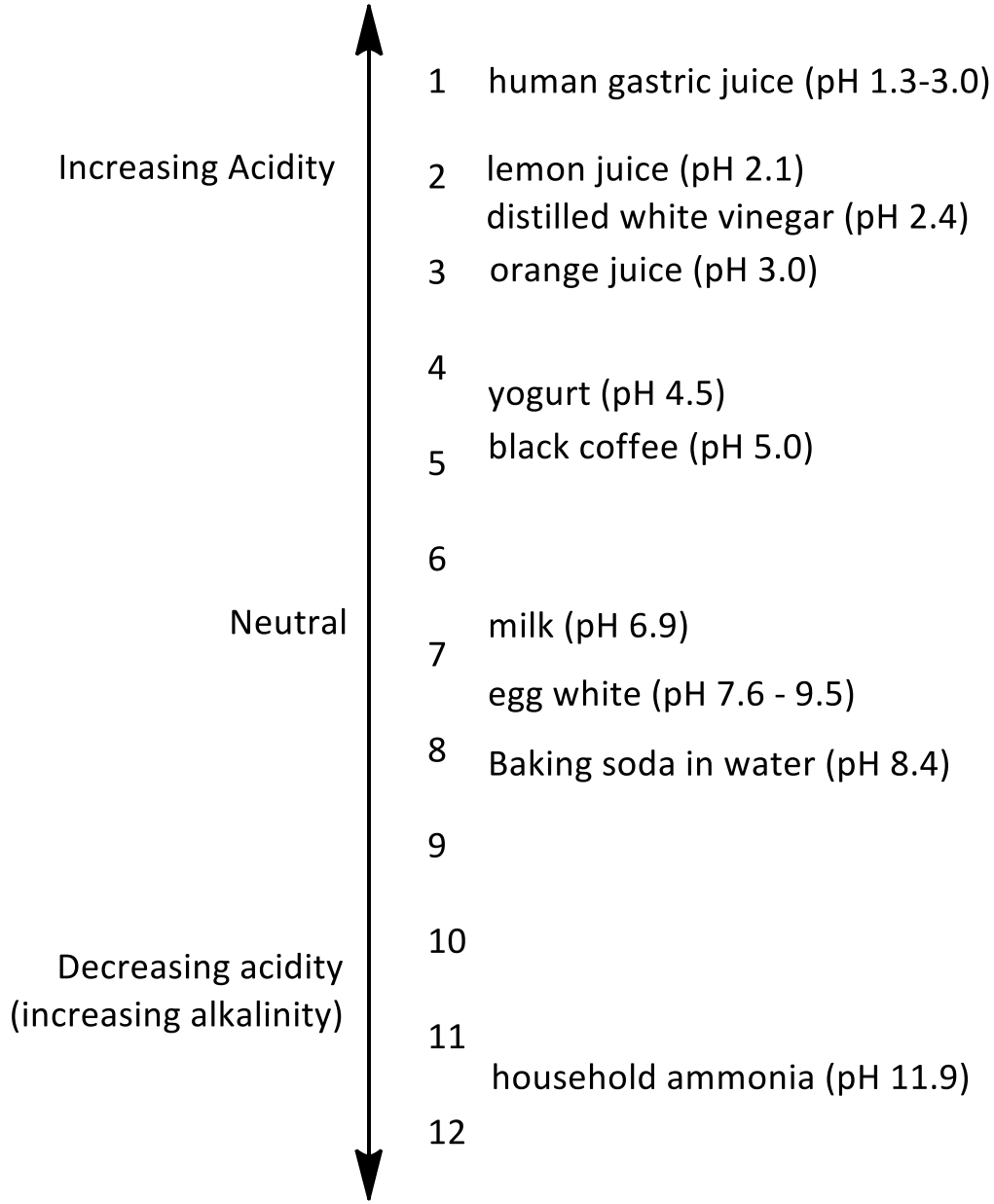
This scale called pH, “p” was used for the *puissance* (French) or *potenz* (German), both words translating to power.

Søren Sørensen working at the Carlsberg Laboratories in Copenhagen

pH – A measure of H^+

The pH is a different number used to measure the *concentration* or the amount of H^+ ions in solution. **The more protons (H^+) there are, the lower the pH.**

Alkaline or basic molecules produce *very few* H^+ ions, and they can also consume H^+ ions – both effects lower the H^+ concentration and raise the pH.



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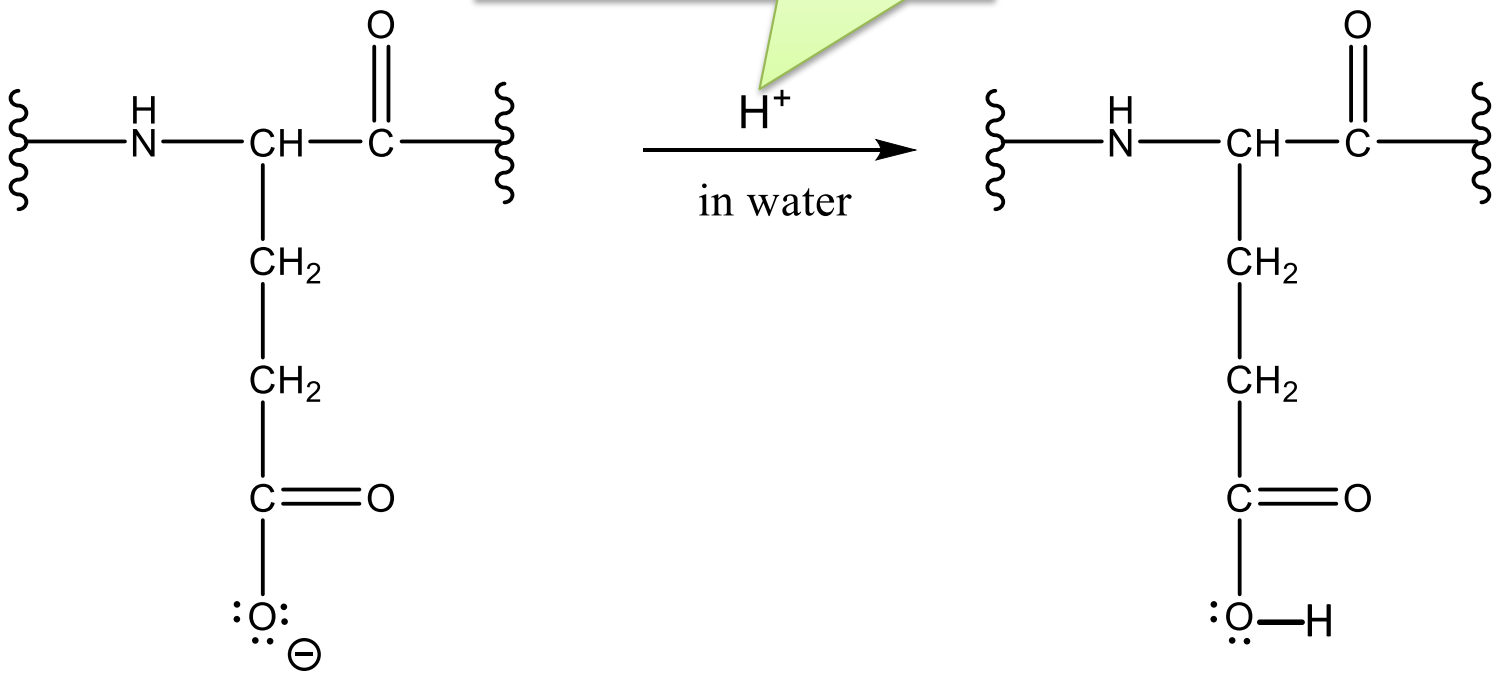
When acid is added to proteins, there are side chains of amino acids that undergo a reaction with the protons (H^+) in the acid .The reaction changes the overall charge of the amino acid. Using the structures show below – show the expected product of a reaction between the indicated side chain and a proton or the anion, hydroxide.

H^+ has been added in the form of an acid



Use of acids in food and cooking

Ceviche is a raw or partially cooked shrimp and seafood acidified by citric acids in lemon and limes – the lower pH reduces many harmful bacterial growth and denatures/tenderizes the seafood.

Using Weak Acids to Make Ceviche.
Raw shrimp is made tender and tangy by weak acids in citrus juices.