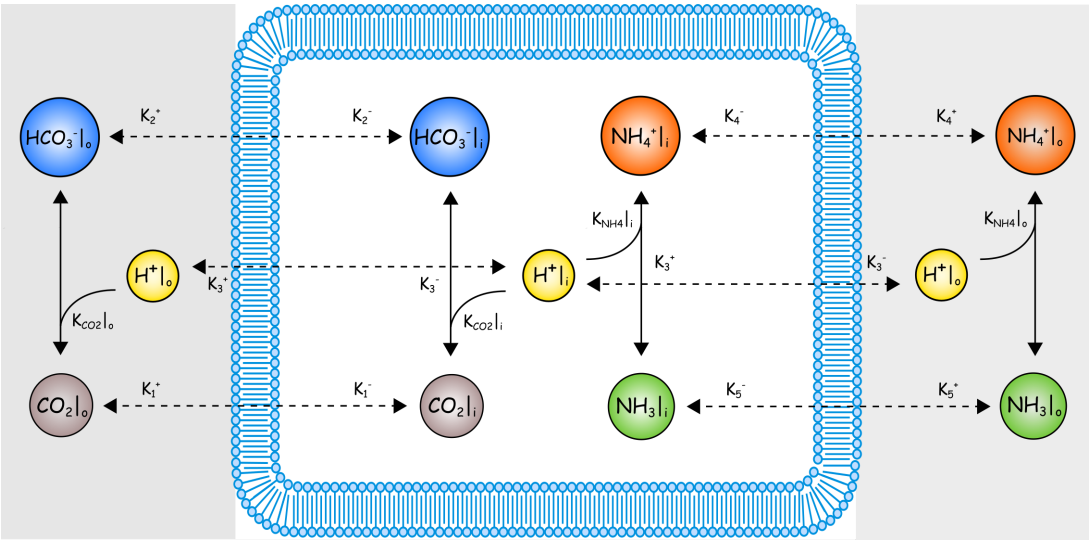
Acid-Base Physiology

Soroush Safaei

1 Introduction

2 Bond Graph Modelling



2.1 The biomolecular cycle

2.2 Causal analysis

2.3 Electrogenic modelling

2.4 Parameters

Table 1: Reaction Parameters

Reaction	k_f	k_r	$K_{eq} = k_f / k_r$	κ
Re1	0.0375	1	7.94e−7	0.5071
Re2	567.8	1	5.6e−10	289136
Re3	100000	20		
Re4	100000	20		
Re5	100000	20		
Re6	100000	20		
Re7	100000	20		
Re8	100000	20		
Re9	100000	20		

3 Simulation

3.1 Validation

Table 2: Species Parameters

Species	K
$CO_2(int)$	0.0375
$HCO_3^-(int)$	567.8
$H^+(int)$	100000
$NH_3(int)$	100000
$NH_4^+(int)$	100000
$CO_2(ext)$	100000
$HCO_3^-(ext)$	100000
$H^+(ext)$	100000
$NH_3(ext)$	100000
$NH_4^+(ext)$	100000