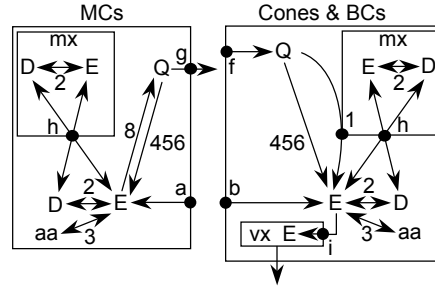
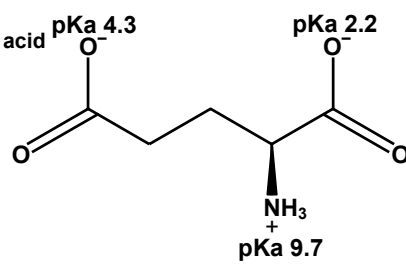


Table 1: L-glutamate (2S)-2-Aminopentanedioic acid
MW:147.13
Zwitterion at pH 6-8

Localization:
rods & cones (≈ 1 mM)
BCs, GCs (5-10 mM)
ACs (0.04-1 mM)
MCs (0.04-0.3 mM)



Metabolism: enzyme	EC	map	site	major reactants	→	products
1 glutaminase	3.5.1.2	G7	mim	Q	→	E
2 aspartate transaminase	2.6.1.1	F4-5	mx c	D + 2-oxoglutarate	↔	E + oxaloacetate
3 multiple transaminases	2.6.1.x		mx c	aa + 2-oxoglutarate	↔	E + 2-oxo acid
4 GMP synthase	6.3.4.1	G1	c	Q + xanthosine	→	E + 5' GMP
5 CTP synthase	6.3.4.2	J7	c	Q + UTP	→	E + CTP
6 glutamine-F6P transaminase	2.6.1.16	D4	c	Q + F6P	→	E + glucosamine-6-P
7 glutamate dehydrogenase	1.4.1.2	H6-7G7	mx	E	↔	2-oxoglutarate
8 glutamate-ammonia ligase	6.3.1.2	G7 H7	c	E	→	Q
9 glutamate-cysteine ligase	6.3.2.2	H7	c	E + C	→	γ glutamylcysteine

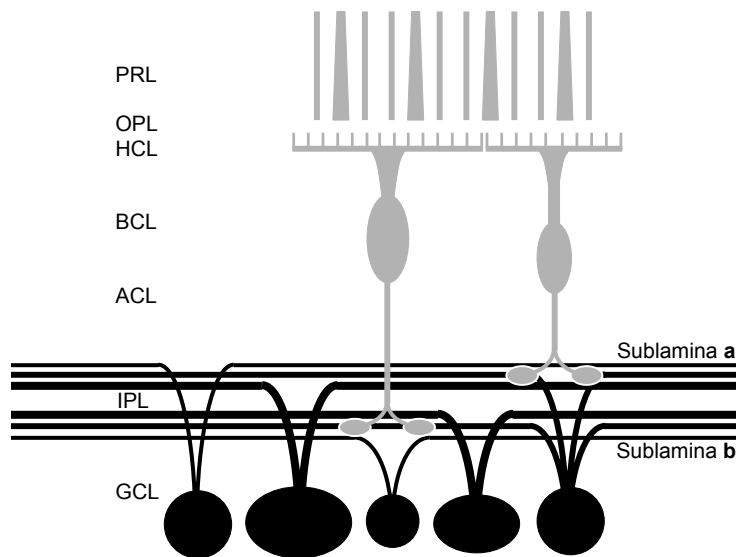
Transporters	TC	Localization
plasma membrane		
a EAAT1 (GLAST)	2.A.23.2.1	∇ Φ MCs
b EAAT2 (GLT1)	2.A.23.2.2	∇ Φ PRs, ∇ cBCs
c EAAT3 (EEAC1)	2.A.23.2.3	∇ ACs
d EAAT4	2.A.23.2.n	∇ not in retina
e EAAT5	2.A.23.2.n	∇ rods
f Glnt (Q import)	2.A.18.6.1	∇ neurons

Transporters	TC	Localization
plasma membrane		
g SN1 (Q export)	2.A.18.6.3	∇ glia
mitochondria		
h D/E antiporter	2.A.29.14.1.2	Φ mim
synaptic vesicles		
i VGluT1, 2	2.A.1.14.13	∇ brain vm

Receptors: Ionotropic	TC	Subtypes	Localization
KA	1.A.10.1.1	KA12, GluR567	∇Φ: OFF cBCs (KA2); ∇: HCs (GluR6,7)
AMPA	1.A.10.1.2	GluR1234	∇Φ: HCs, OFF cBCs, ACs, GCs
Orphan δ	1.A.10.1.n	δ1,2	∇: A17 ACs, other ACs, GCs
NMDA	1.A.10.1.3	NR1abcd, NR2bc	∇Φ: ACs, GCs ∇: rod BCs (NR2b) ∇: cones (NR2C)

Receptors: Heptahelical	Subtypes	Localization
GPCR Class C mGluR Group I Gs	mGluR1,5	∇: ACs, rod BCs (mGluR1α), cBCs (mGluR5a)
GPCR Class C mGluR Group II Gi	mGluR2	Φ: PRs ∇: starburst ACs other ACs
GPCR Class C mGluR Group III Gi	mGluR4,7,8	∇: inner retina (4,7,8)
	mGluR6	∇Φ: ON BCs

Abbreviations			
aa: amino acid	cBCs: cone BCs	pm: plasma membrane	∇: anatomical localization
c: cytosol	F6P: fructose-6-P	px: peroxisome	Φ: physiological localization
ca: carboxylic acid	mim: mitochondrial inner membrane	vm: vesicular membrane	
	mx: mitochondria matrix	vx: vesicle matrix	



Neurons expressing glutamatergic phenotypes include all of the cells using ribbon synapses for signaling: rods, cones, and all BCs (grey). All GCs also display a glutamatergic phenotype but with a different metabolic signature.

PRL photoreceptor layer
 OPL outer plexiform layer
 HCL horizontal cell layer
 BCL bipolar cell layer
 ACL amacrine cell layer
 IPL inner plexiform layer
 GCL ganglion cell layer

All **Metabolism map** loci index the Boehringer Mannheim Biochemical Pathway diagram accessed through www.expasy.org and its mirrors