



fungal alpha-amino
adipate reductase

bacterial NRPS modules

fungal
bacterial
fungal
bacterial
fungal
bacterial

alanine-
adenylating
module

cytosine-
adenylating
module

valine-
adenylating
module

fungal and bacterial NRPS and
ACV synthetase modules

3) non-ribosomal peptide
synthetase modules,
and fungal alpha-amino
adipate reductase

fungal NRPS phytotoxin-
and mycotoxin-type modules

fungal NRPS siderophore-type modules

fungal NRPS cyclosporin-type modules

fungal and bacterial acetyl-CoA ligase

other CoA ligases

4) other CoA ligases
and CoA synthetases

fungal CPS1

CPS module A

1) CPS modules

fungal CPS1

CPS module B

fungal CPS2

animal

animal

2) bacterial CoA ligase
as N-terminal module
of NRPSs, PKSs,
and hybrid genes