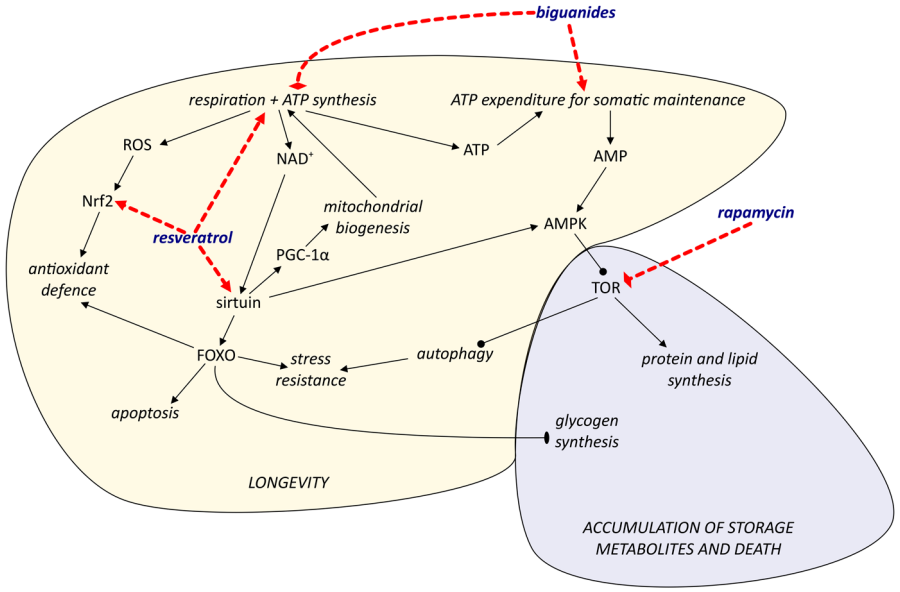

Figure 10.4 Summary of molecular mechanisms of action of the most prominent CR mimetics that act on the cellular level.

10.7 Conclusion

We would classify CR mimetics into "inhibitors of food consumption", "inhibitors of primary catabolism" (acarbose, 2-deoxyglucose) and "true mimetics" (resveratrol and rapamycin), which likely affect energy and nutrient sensing pathways (Figure 10.5).

However, it is not always easy to delineate the main mechanisms of action for a CR mimetic. Metabolic and signaling pathways in cells and organs are tightly tangled. Thus, known CR mimetics likely act *via* different pathways simultaneously. Even those that are supposed to block food consumption may also influence metabolism, affecting signaling molecules, and *vice versa*. It has been revealed that resveratrol and preparations of *Rhodiola rosea* suppress appetite.[227] It is difficult to conclude whether these preparations prolong life span by their anorectic activity and subsequent induction of CR or by their interaction with signaling proteins, which then lead to diminution of appetite. In previous sections we described the role of important signaling pathways, FOXO and mTOR, in the regulation of the foraging behavior of animals. Activation of FOXO or inhibition of mTOR can both boost appetite.[294,295,297,332] However, it was found that over-expression of FOXO in *D. melanogaster* can suppress appetite.[333]

One can notice that the CR mimetics described in this chapter are all secondary metabolites produced by plants, fungi or bacteria. They also affect many targets in cells and likely act *via* multiple pathways. These observations suggest co-evolution of heterotrophic multicellular organisms with plants,