

## **NORINE : a recent database highlighting a large biodiversity among NRPS peptide structures and activities**

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In cells, the classical peptide and protein biosynthetic pathway implies successive transcription and translation processes, as a gene (DNA) is first transcribed into RNA which is then converted into proteic sequence by specialized structures : the ribosomes. Bacteria and fungi also use an alternative ribosome-independent biosynthetic pathway to elaborate active small peptides. This “thiotemplate” mechanism allows peptidic synthesis via huge enzymatic complexes called NRPS for non-ribosomal peptide synthetases consisting of modularly organized multi-enzyme complexes which represent at the same time template and biosynthetic machinery. The molecules synthesized by NRPS are short (two to about fifty monomers), include a high density of non proteogenic amino acids and often contain amino acids connected by bounds other than the peptidic or disulfide ones. The originality of the NRPS peptides is also held on their primary structure rarely linear, related to the way of biosynthesis. Indeed, many of them are branched, partially or totally cyclic. Many modifications such as amino-acid epimerization or methylation, adding of sugar, lipid or functional groups are also often encountered. These particularities, together with the numerous biological (ranging from antibiotics to siderophores) and physico-chemical (biosurfactant) activities render the NRPS products of great interest. Different bioinformatic tools were recently generated in relation with NRPS mechanism. They focused on structure prediction of synthetases as well as specificity of adenylation domains which recognize the amino acid residue incorporated in the peptide. Nevertheless, none of them focused on the products which can actually be evaluated to more than 400. So we have created the database NORINE (for NOn Ribosomal peptides), a resource on NRPS peptides which will be soon available on the web at the following address : <http://bioinfo.lifl.fr/norine/>. The use of this database gave us an overview on the panel of the NRPS peptides synthesized. Examples of the biodiversity of the monomers incorporated, the structures of the products and the activities highlighted through the resource will be presented.