Pharm Anal Acta 2018, Volume 9
DOI: 10.4172/2153-2435-C1-034

Chemogenomics driven discovery of endogenous polyketide anti-infective drugs from endosymbiotic fungi

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In the postgenomic era, a new strategy for chemical dereplication of polyketide anti-infective drugs from fungal endosymbionts requires novel genomics and chromatographic strategies. Despite the focus on synthetic products, natural products serve as a continuing source of novel bioactive metabolites, retaining an immense impact on modern medicine. Fungal endosymbionts are an eclectic group of microorganisms having the capability to chemically colligate the bridge between microbes and associated medicinal plants, due to their relatively high metabolic versatility. The use chemogenomics strategy may enlighten to predict the nature of antimicrobial metabolites during the bioprospecting of fungal endosymbionts for new polyketide anti-infective drugs. Indeed, fungal genome mining reveals the bearing of numerous secondary metabolite gene clusters. Biosynthetic gene clusters encoding polyketide synthase (PKS) type-I gene domains were detected using different sets of degenerate primers. The potential endosymbiont strains which found to bear biosynthetic PKS gene clusters which are promising source for the discovery of novel anti-infective polyketide drugs. Simultaneously, from these potent fungal strains, isolation and purification of secondary metabolites can be carried out using HPLC, column chromatography or preparative thin layer chromatography. The isolated anti-infective metabolites can be characterized using suitable hyphenated techniques. Taking all the above into account, PKS gene is a functional gene of endosymbiotic fungi which might perform an important role in endophytic secondary metabolite production. We have come a long way to find a suitable holistic strategy for the rapid discovery of polyketide anti-infective drugs from endosymbiotic fungi.

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