

Solving solubility

The insoluble nature of some compounds prevents the oral dosing of the treatments they enable. Innovation and precision engineering in equal measures have now overcome that problem, so that insolubility is no longer a barrier to oral delivery.

The preferred route of drug administration is oral dosing, either as a capsule or a tablet. Unfortunately, many compounds that may provide effective therapy either cannot be delivered in this way or are delivered sub-optimally in pill form. As more insoluble compounds exit discovery and drug safety, and as effectiveness becomes ever more crucial, technologies that enable compounds to be delivered in this way are increasingly in demand.

‘Many compounds are highly efficacious or active at their therapeutic target, but they cannot be dosed orally,’ says Stephen Perrett, vice president, Portfolio Development for speciality pharmaceutical company Eurand. ‘Pharma needs a technology to change this and in Biorise we have just that. Biorise renders drug substances in an activated form, which is able to pass into the body when swallowed. Importantly, the chemical nature of the drug is not changed, meaning that its original efficacy and safety remains relevant. In addition, the final product is a dry powder that can be delivered as easily as a capsule or tablet.’

Specialist expertise

Eurand develops, manufactures and commercialises enhanced pharmaceutical and

biopharmaceutical products. Through its ability to combine a range of proprietary pharmaceutical formulation technologies with state-of-the-art US and European manufacturing facilities, it is a recognised leader in its field.

‘We have one of the broadest oral drug delivery technology platforms in the sector,’ says Perrett. ‘It is a huge challenge to reliably and reproducibly apply a technology to such an extent that it becomes a commercial reality. This is evidenced by the multiple products sold globally that contain our technologies. Our most recent approval was Amrix, an extended release formulation of cyclo-benzaprine, which is marketed in the US by Cephalon.’

Biorise technology is commercialised in Europe by Novartis in the product Mesulid Fast, a fast-onset formulation of the NSAID pain-reliever nimesulide. As well as allowing drugs to act more rapidly, Biorise also allows Eurand to take a water-insoluble compound, one which would not be absorbed and would pass through the body when swallowed, and transform it so that it can be absorbed and hence provide effective therapy.

The Biorise process transforms drugs to a nanocrystalline or amorphous state, which is highly activated and would normally rapidly

Biorise can increase the speed of drug absorption, which is particularly important in pain relief.

revert back to its original insoluble crystalline form. This is prevented by the use of stabilising materials, which are already used in marketed pharmaceutical products.

What the Biorise process does is just as important as what it does not do: it does not modify the chemical nature of the drug, it does not necessitate the introduction of any solvents or unapproved materials, and it does not expose the drug to heat stress.

‘In the amorphous state, the drug molecules are in a condition similar to their being in solution,’ explains Perrett. ‘We can prevent these molecules from reverting to a crystalline state using our carrier systems, which expand only when they contact water in the body. This results in a liberation of the stabilised molecules that can then rapidly pass into the body through the digestive tract.’

Improved bioavailability

Biorise has caught the industry’s imagination through its ability to produce amorphous drugs that are in a form akin to their being in solution, despite the fact that they are insoluble. ‘It’s a simple and contained process,’ says Perrett. ‘In one step you

have a dry powder. We are creating new therapies because we can make new effective compounds dosable. Without this there can be no pharmaceutical product.’

Biorise has important applications for existing drugs. It can increase the speed of drug absorption, which is particularly important in pain relief. It is not uncommon for a drug to have less than 50% oral bioavailability in marketed forms. By maximising their bioavailability, a reduced amount of drug can be used for equivalent therapeutic effect, meaning the product is safer and more likely to have a consistent therapeutic effect.

Eurand is building on the bioavailability enhancement platform technology, incorporating a focus on sustained release applications of poorly soluble drugs. This innovation has already opened up a route for the oral delivery of many compounds. **WPF**

Company profile

Eurand is a global speciality pharmaceutical company that develops, manufactures and commercialises enhanced pharmaceutical and biopharmaceutical products based on its proprietary drug formulation technologies. Visit: www.eurand.com.