

NOVARTIS

Novartis has a history of natural products research that can be traced back over 90 years. The company conducts its efforts at using natural sources for obtaining potential drugs or lead substances in accordance with the Convention on Biological Diversity and local regulations. Novartis supports the objectives of the CBD and recognizes the national sovereignty of states over biological resources. Furthermore it supports and wishes to participate in the development of a regime on Access and Benefit Sharing.

Novartis is currently running biosourcing collaborations with institutes in China and Thailand, and shares know-how and the latest technologies with its local collaboration partners. This supports the establishment of a sustainable knowledgebase in modern natural products research.

In its partnerships Novartis puts an emphasis on the education and knowledge transfer. In this regard the company conducts scientific programs in its research facilities in Switzerland or drug discovery lectures on-site for involved scientists and technicians. Besides the contractually defined financial aspects as investments, milestone payments or royalties, Novartis organizes specific trainings for students and young scientists to take part in the development of the natural products skillbase in the partner countries. Thereby the company contributes to the local capacity building related to natural products research and production, to ensure that know-how remains in the country after the expiration of the active collaboration.

Coartem, the company's leading anti-malaria combination therapy, was developed in collaboration with the Chinese government and the Institute of Microbiology and Epidemiology of the Academy of Military Medical Sciences in Beijing. It contains a derivative of artemisinin, a purified natural compound derived from the sweet wormwood plant that has been used for centuries in traditional Chinese medicine to treat fever.

In the cooperation Novartis was responsible for the strategic international patent application, the elaboration of a stabilised formulation of Coartem as well as technical, production and knowledge support to China. Training of Chinese scientists, production chemists, and project leaders, fostered the progress of the project and accelerated implementation in China.

When in 2001 Novartis entered into an agreement with the WHO to provide Coartem at no profit, the demand rose dramatically, as African countries decided to use it as first line treatment. The manufacturing of the scale up of what had been developed together with Chinese authorities and companies had to happen in a decisive way to ensure that supplies of Coartem met demand. Production capacity of Coartem increased from 100,000 treatments in 2002 to 100 million treatments in 2006, which is the equivalent of 1.5 billion tablets.

Novartis invested in manufacturing infrastructure, increasing and diversifying the supplier base for the production of raw material and transitioning a largely wild crop to commercial plantation cultivation. After scaling up production in Switzerland, Novartis transferred the knowledge of scale-up procedures back to China and supported the upgrading of production facilities to international standard manufacturing practices. Today the active ingredients are produced by various Chinese companies and by Novartis Switzerland.

Though the Chinese remain central to the supply of artemisinin, Novartis has also formed additional partnerships, e.g. with East African Botanicals, to balance climatic risks while significantly increasing agricultural cultivation of *Artemisia annua* in Kenya, Tanzania and Uganda.