THIRD GENERATION VACCINE FOR WORLD ERADICATION OF POLIOMYELITIS

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Great efforts have been undertaken by the World Health Organization to achieve eradication of poliomyelitis, a paralytic disease. At present, two different vaccines are available: inactivated polio vaccine (IPV) developed by Salk based on chemical inactivation of the virus and oral polio vaccine (OPV) developed by Sabin based on live attenuated virus strains. The risks associated with IPV concern the safety of the production process as it is based on highly virulent wild type strains, and in contrast, the OPV risks are associated with the reversibility of the attenuated viruses to a transmissible paralytic form. There is therefore a need for a new generation polio vaccines capable to overcome outbreaks and manufacturing risks.

With the evolution of molecular virology of Sabin vaccine strains, it is now possible to design extremely genetically stable and hyperattenuated strains without the associated reversion risks. Sabin poliovirus strains were therefore genetically modified giving rise to the third generation of polio vaccine strains [1, 2].

In the present work we have explored the possibility of using the already well-established IPV production process, developed at our site [3] and integrated worldwide [4] for the production and manufacturing of third generation of IPV strains. Specifically, we have produced third generation vaccines in animal component free medium and at 50-L pilot scale. The product obtained did show acceptable yields and was immunogenic in rats. Together, our results indicate that the third generation vaccine strains produced under the flexible platform process are potential candidates which provide increased biosafety during manufacturing which is necessary after polio eradication. In addition, the flexibility and scalability of the process constitute a platform for the production of a large range of vaccines worldwide.

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