as nasal or pulmonary administration may be preferable. The oral route subjects a drug to numerous barriers—chemical, physical, enzymatic—that may not otherwise be relevant with non-oral administration.

Likewise, formulation plays a very significant role in the preclinical development of a drug candidate. Liquid, semisolid and solid dosage forms nearly always contain excipients that will stabilize and sometimes modify solubility or improve the bioavailability of the active pharmaceutical ingredient (API). Yet, these excipients may have properties that go beyond improving the delivery of the API. Excipients may also possess irritation/inflammation potential. Or, they may alter permeability of barrier membranes resulting in systemic exposure to environmental or ingested toxicants.

Thus, the preclinical scientist must consider many factors when determining the most appropriate route of administration and formulation. Complexity of formulations leads to higher risk and cost during scale-up and commercialization. The route of administration must be amenable to all potential patients and provide a net convenience and accessibility that is relative to the frequency and duration of dosing, the severity of the disease, and the cost of the delivery system.

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