structure (zopiclone, zolpidem), which bind in a special "pocket" on the junction of α and γ subunits.

The pharmacological effects of this group of derivatives are manifested by reducing the excitability of the subcortical areas of the brain (limbic system, thalamus, hypothalamus), responsible for emotional reactions, inhibiting the interaction of these structures with the cerebral cortex, and suppression of polysynaptic spinal reflexes.

Benzodiazepines have an analgesic effect in animals, in humans there is a temporary analgesic effect when administered intravenously, which in fact may be due to amnesia, which they cause. Benzodiazepines, unlike barbiturates, do not induce hyperalgesia.

Conclusions. Therefore a very interesting area of study of the activity of new benzodiazepine derivatives is the study of their analgesic activity due to the possible indirect effect on cannabinoid receptors, which can be used in the treatment of patients with pain under chronic stress.

MODERN DRUGS IN THE TREATMENT OF ORPHAN DISEASES

Chornovolenko K. V.
Scientific supervisor: Koiro O. O.
National University of Pharmacy, Kharkiv, Ukraine
stud7data@gmail.com

Introduction. Last year, 2020, the U.S. Center for Drug Evaluation and Research (CDER) approved a fairly broad list of new uses and formulations for existing market positions. Also, analogues of existing drugs were introduced in order to expand the choice for the consumer, and the most interesting part of this is the list of novel drugs, which include newly discovered chemical compounds not previously used in this field.

Aim. Analyze the market for new drugs intended to treat orphan diseases based on the CDER 2020 reports.

Materials and methods. A literature search was performed on PubMed and Medscape, as well as the official website of the U.S. Food and Drug Administration. Information on new drugs approved for rare diseases treatment (such as small cell lung cancer, Chagas disease and spinal muscular atrophy) was analyzed.

Results and discussion. Rare diseases are defined as those with an incidence of less than one in every 2,000 people in Europe. Orphan diseases mean poorly researched conditions, diseases without specific treatment known, and illnesses that are of limited interest only to scientists and physicians. Patients with such disorders often feel neglected and "lost" in the world of healthcare. For therapeutic progress, the rarity of a disease raises challenges. Well-designed clinical trials to assess therapy effectiveness and safety can be difficult to perform because of lack of participants. Patients will be willing to take risk for future advantages if no alternative treatments are accessible. However, the risk–benefit ratio may not be easily measured and in case of unfavorable ratio drug use may be undesirable. If a new drug is not likely to be commonly used, unless costs are high, drug manufacturers may expect small revenue profits, in which case drugs will not be cost-effective. Mentioned factors significantly impede progress in treatment of such rare conditions. Despite these aspects, in 2020, CDER approved 53 novel drugs, including new molecular entities under New Drug Applications, and new therapeutic biologics under Biologics License Applications. In this list there is the drug named ZEPZELCA (lurbinectedin) used to treat adults with metastatic small cell lung cancer with disease progression on or after platinum-based chemotherapy. Lurbinectedin is a

synthetic alkaloid analogue with molecular formula – C41H44N4O10S and molecular weight – 784.87g/mol. It`s skeletal structure is given below (fig.1):

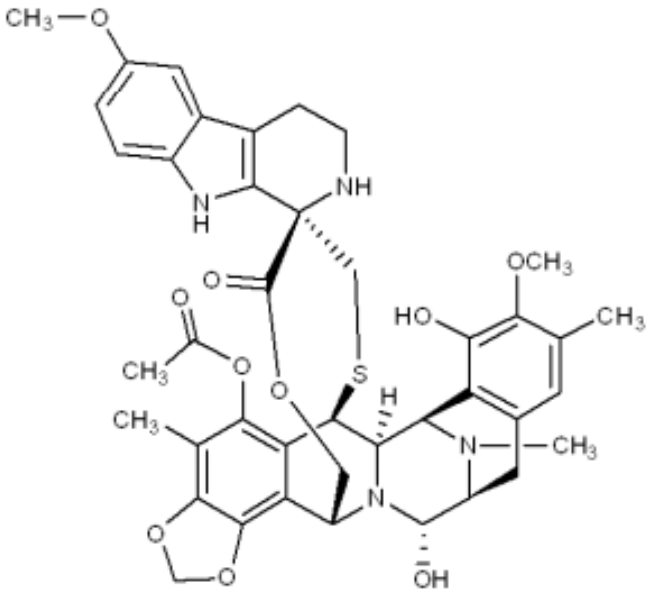

Fig. 1. Skeletal structure of lurbinectedin

The drug is available as a lyophilized powder for solution for injection. Lurbinectedin is an alkylating agent binding guanine residue in the DNA minor groove. This process leads to the conformation changes in the DNA. The creation of adducts causes a cascade of events that can influence the subsequent activity of DNA binding proteins, including certain transcription factors and DNA repair mechanisms, resulting in cell cycle interruption and leads to cell death. In vitro lurbinectedin inhibits the activity of human monocytes and reduces of macrophage infiltration after tumor implantation in mice.

Another drug Lampit (nifurtimox), tablets for oral use, was approved for the treatment of Chagas disease in pediatric patients younger than two years old (fig. 2). Chagas' disease is a rare parasitic disease that can cause congestive heart failure if left untreated.

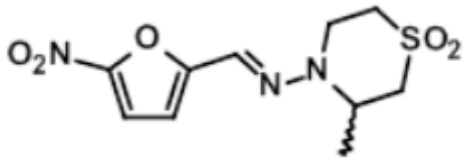

Fig. 2. Skeletal formula of nifurtimox

The mechanism of action of this drug is still not reliably studied. Nifurtimox is known to inhibit the activity of the *Trypanosoma cruzi* – the human microbial parasite. Tests show that the compound is activated by the type oxygen sensitive and oxygen insensitive nitroreductases. This leads to the formation of intermediate active metabolites, which are not significantly harmful to the human body, nevertheless induce DNA damage and cell death of both intracellular and extracellular forms of *Trypanosoma cruzi.*

Evrysdi (risdiplam) is available as a powder for oral solution. It is used for treatment patients two months of age and older with spinal muscular atrophy, which is frequently lethal neurological disorder leading to muscle weakness and atrophy.

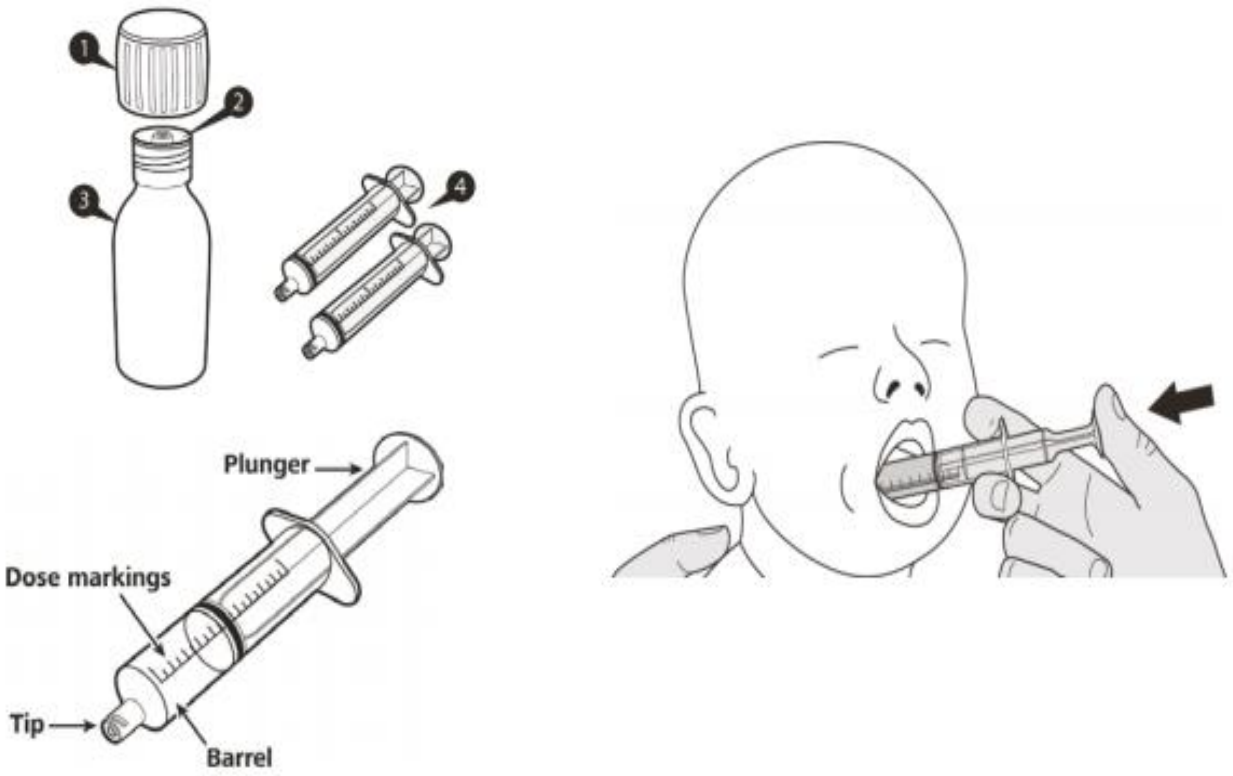

Fig. 3. Evrysdi carton contains cap (1), bottle adapter (2), Evrysdi bottle (3), reusable oral syringes (4), as well as instructions for use, prescribing information and patient information.

Risdiplam is a motor neuron 2 (SMN2) splicing modifier intended to treat patients with spinal muscular atrophy caused by chromosome 5q mutations due to defects in SMN protein. The drug shows a substantial improvement in exon 7 inclusion in transcripts of SMN2 messenger ribonucleic acid (mRNA) and increased levels of full-length SMN protein in the brain.

Conclusions. The treatment branch for rare human diseases now faces many challenges and trade-offs, with people's lives on one side and the economic aspects of developing such expensive drugs to treat them on the other. Nevertheless, such drugs continue to be developed and patented because every person's life is important and unique.

MODERN PHARMACOTHERAPY OF ACNE

Didenko Yu.S.
Scientific supervisor: Riabova O.O.
National University of Pharmacy, Kharkiv, Ukraine
M7elissa7@gmail.com

Introduction: Acne is a chronic multifactorial disease of the sebaceous glands, which manifests mainly at puberty. It is characterized by hyperproduction of sebum, disruption of follicular keratinization, colonization of Propionibacterium acnes and inflammation. The prevalence of acne in adolescents ranges from 50% to 95%, depending on the method of counting lesions. Acne is more common in men than in women in adolescence, but in adulthood the opposite.

Aim: Study of modern standarts of medical care for patients with acne.