REGULATING RUMENSIN: DEFINING ANTIBIOTIC FEEDS IN THE U.S. IN THE WAKE OF RESISTANCE

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DISCUSSING ANTIBIOTIC RESISTANCE AT NATIONAL AND INTERNATIONAL SCALES

- Antibiotics in general v. an antibiotic in particular

**Human use:**
- Penicillin
- Aureomycin
- Terramycin

**Nonhuman use:**
- Monensin

Side #1: It should be regulated the same way as other antibiotics
Side #2: It’s not the same – it’s an ionophore
RUMENSIN’S STORY

1. Development of nonhuman-specific antibiotics to combat contemporaneous resistance issues
2. Replacement of a problematic feed technology (DES) with a different, less problematic one
3. Larger debate about how material works in the body (classification and the role of the rumen)
I. COMBAT RESISTANCE
MONENSIN

*Streptomyces cinnamonensis.*

Analyzed by Pearl Liu Chen (1964), pictured left.
MONENSIN

Lilly Research Images from 1974 catalog. Trade Literature Collection, NMAH.

Image from “Biological Applications of Ionophores” (1976) by Berton Pressman.
SULFAQUINOXALINE (SQ)

From “History of the Discovery of Sulfadiazine as a Coccidiostat” (2008), by William Campbell.
MONENSIN FOR CHICKENS

Coban advertisement in *Feedstuffs Magazine*, July 5, 1976.
II. THE “SUCCESSOR” TO DES

### Timeline of DES Approval, Use, and Bans in the United States, 1941 – 1980

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1941</td>
<td>FDA approves DES for treatment of menopausal symptoms in humans</td>
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<tr>
<td>1947</td>
<td>FDA approves DES as miscarriage preventative in humans; DES implants also approved for use in chickens</td>
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<tr>
<td>1954</td>
<td>FDA approves feeding cattle DES</td>
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<tr>
<td>1957</td>
<td>FDA approves DES implants for cattle</td>
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<tr>
<td>1959</td>
<td>DES implants for chickens banned by FDA; poultry industry fights against ban</td>
</tr>
<tr>
<td>1966</td>
<td>Official ban of DES implants in chickens</td>
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<tr>
<td>1971</td>
<td>FDA advises doctors to stop prescribing DES during pregnancy in humans</td>
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<tr>
<td>1972</td>
<td>FDA bans DES cattle feed; requires 120-day withdrawal for DES implants</td>
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<tr>
<td>1973</td>
<td>FDA bans DES implants in cattle</td>
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<tr>
<td>1974</td>
<td>U.S. Court of Appeals overturns implant and feed bans in cattle because the FDA failed to hold the proper hearings</td>
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<tr>
<td>1977</td>
<td>FDA holds DES meetings</td>
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<tr>
<td>1979</td>
<td>First successful trial takes place over DES injuries in humans against Eli Lilly; FDA bans all use of DES in cattle</td>
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INTRODUCING RUMENSIN

A Purina advertisement in the Iowa-based Carroll Daily Times Herald. Published on December 26, 1975, sixteen days after its official FDA approval.

Rumensin advertisement in Feedstuffs Magazine, January 5, 1976.
III. RUMEN CONVERSION
“IONOPHORE” CLASSIFICATION

Drugged feed may be harmful

By WARREN E. LEARY
AP Writer

WASHINGTON — New tests indicate a powerful drug used in feeds to fatten animals may be getting into food products even though its potential effects on humans have not been studied, according to a scientist.

Dr. Berton C. Pressman of the University of Miami said Tuesday a sensitive new test he has developed shows that, contrary to previous studies, carbamyl ionophores pass through the tissues and blood of animals before being excreted.

The Tampa Times,
September 12, 1979.

Ionophores help cattle gain

Ionophores — used for years to control parasites in poultry — can also increase weight gain in beef cattle.

In cattle, ionophores work by altering the rumen environment. Most of the direct action of ionophores is in the rumen and gut.

These additives don't affect the carcass or leave residues when used according to label instructions. Ionophores are also highly cost-effective, he said.

Ionophores can improve feed efficiency by 15 percent in feedlot cattle. Effects are slightly different in pastured cattle. There is no real effect on feed efficiency but weight gain usually improves 5 to 10 percent.

Two ionophores are now cleared for pastured beef cattle. Rumensin and Bovatec are cleared only for weaned animals — pastured stockers or feeders — and not for cow-calf operations. These additives may cause milk-fat depression if fed to lactating cows.

Rumensin can be fed daily or on alternate days, but Bovatec should be fed daily.

Neither Rumensin nor Bovatec are approved for free-choice feeding. They must be hand-fed in a mixture of at least one pound of grain per day per animal. They should be mixed carefully following directions.

—Woody Love, UW-livestock specialist

The Country Today,
April 9, 1986
APPROACHES TO RISK

• Definition of “growth promotant” in EU
• Distinction of “human environment” in U.S. Federal Register
• Monensin in future human medicine
• Monensin as “feed efficiency” tool, helping with methane reduction
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THANK YOU

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