

# History of Growth Promotants in the US-Merck Technical Service

## Growth Promotants

<u>Year</u>	<u>Growth Promotant</u>
1954	Oral Diethylstilbestrol (DES)
1956	Estradiol Benzoate + Progesterone implant (Synovex-S)
1957	DES Implant
1958	Estradiol Benzoate + Testosterone implant (Synovex-H)
1968	Oral Melengestrol Acetate (MGA)
1969	Zeranol 36 mg implant (Ralgro)
1972	Oral DES removed from market
1973	DES implants removed from market
1982	Silastic Estradiol 17-beta implant (Compudose and Encore)
1984	Estradiol Benzoate + Progesterone implant (Synovex-C)
1986	Trenbolone Acetate (TBA) implants (Finaplix-S and Finaplix-H)
1991	Estradiol 17-beta + TBA implant (Revalor-S)
1993	Bovine Somatotropin injectable (Posilac)
1994	Estradiol 17-beta + TBA implant (Revalor-H)
1995	Zeranol 72 mg implant (Ralgro Magnum)
1996	Estradiol 17-beta + TBA implant for stocker cattle (Revalor-G)
1996	Estradiol Benzoate + TBA (Synovex-Plus)
1999	Estradiol Benzoate + TBA (Synovex-Choice)
1999	Estradiol 17-beta + TBA (Revalor-200)
2000	Estradiol 17-beta + TBA (Revalor-IS)
2000	Estradiol 17-beta + TBA (Revalor-IH)
2003	Oral Ractopamine (Optaflex)
2006	Oral Zilpaterol (Zilmax)
2007	Estradiol 17-beta + TBA Long Day Coated-Sustained Release implant (Revalor-XS)
2013	Oral Zilpaterol voluntarily removed from the market
2014	Estradiol Benzoate + TBA Sustained Release implant (SynovexOne-Feedlot)
2014	Estradiol Benzoate + TBA Sustained Release implant (SynovexOne-Grass)
2015	Oral Zilpaterol returned to the market
2016	Estradiol 17-beta + TBA Long Day Coated-Sustained Release implant (Revalor-XH)
2018	Oral Lubabegron (Experior)

Wade T. Nichols, Ph.D.



# Approved Implants in the US-Merck Technical Service

Implant	Original/ Generic	Androgenic (mg)	Estrogenic (mg)	Carrier	Anabolic Effect (days)	Approved Uses					
						Suckling calves		Stockers		Feedlot	
						Steers	Heifers	Steers	Heifers	Steers	Heifer
Ralgro	Original	0	36 zeranol	Lactose	70	X	X	X	X	X	X
Ralgro Magnum*	Original	0	72 zeranol	Lactose	70					X	
Synovex-C	Original	0	7.2	PEG	120	X	X			X	
Component-EC	Generic	0	7.2	PEG	120	X	X				
Compudose	Original	0	25.7	Silastic Rubber	168	X		X		X	X
Encore	Original	0	43.9	Silastic Rubber	336	X		X		X	X
Synovex-S	Original	0	14.4	PEG	120			X		X	
Component-ES	Generic	0	14.4	PEG	120			X		X	
Synovex-H	Original	200 Testosterone	14.4	PEG	120				X		X
Component-EH	Generic	200 Testosterone	14.4	PEG	120				X		X
Component TS	Generic	140 TBA		Lactose	105					X	
Finaplix-S*	Original	140 TBA		Lactose	105					X	
Finaplix-H	Original	200 TBA		Lactose	105						X
Component TH	Generic	200 TBA		Lactose	105						X
Revalor-G	Original	40 TBA	8	Cholesterol	120			X	X		
Component-TEG	Generic	40 TBA	8	Cholesterol	120			X	X		
Synovex T40*	Generic	40 TBA	8	Cholesterol	120			X	X		
Revalor-IS	Original	80 TBA	16	Cholesterol	120					X	
Component TE-IS	Generic	80 TBA	16	Cholesterol	120					X	
Synovex T80*	Generic	80 TBA	16	Cholesterol	120					X	
Revalor-IH	Original	80 TBA	8	Cholesterol	120						X
Component TE-IH	Generic	80 TBA	8	Cholesterol	120						X
Synovex-Choice	Original	100 TBA	10	PEG	120					X	
Revalor-S	Original	120 TBA	24	Cholesterol	120					X	
Component TES	Generic	120 TBA	24	Cholesterol	120					X	
Synovex T120*	Generic	120 TBA	24	Cholesterol	120					X	
Revalor-H	Original	140 TBA	14	Cholesterol	120						X
Component TEH	Generic	140 TBA	14	Cholesterol	120						X
Revalor-200	Original	200 TBA	20	Cholesterol	120					X	X
Synovex-Plus	Original	200 TBA	20	PEG	120					X	X
SynovexOne-Grass	Original	150 TBA	15	PEG with a slow release proprietary	200?			X	X		
Revalor-XS	Original	200 TBA	40	Cholesterol with Proprietary timed release coating	200-?					X	
Revalor-XH	Original	200 TBA	20	Cholesterol with Proprietary timed release coating	200?						X
SynovexOne-Feedlot	Original	200 TBA	20	PEG with a proprietary slow release coating	200?					X	X

\* Implant approved but not marketed at this time

Wade T. Nichols, Ph.D.

Animal Health

# Implants Approved for Suckling Calves

**RALGRO**  
(zeranol)

**36 mg Zeranol**

**Steers and Heifers**



**7 mg Estradiol**

**Steers and Heifers**

**Note: Not to be applied before 45 days-of-age**

**Elanco**  
**Compudose**

**26 mg Estradiol**

**Steers**

**Elanco**  
**Encore**

**44 mg Estradiol**








**Steers**

**DREAM IT.  
ACHIEVE IT.  
TOGETHER.**



# Stocker Cattle Implants

TBA = Trenbolone acetate  
E = Estradiol

	36 mg Zeranol	Stocker Steers and Heifers
	14 mg E	Stocker Steers
	26 mg E	Stocker Steers
	44 mg E	Stocker Steers
	200 mg Testosterone, 14 mg E	Stocker Heifers
	40 mg TBA, 8 mg E	Stocker Steers and Heifers
	150 mg TBA, 15 mg E	Stocker Steers and Heifers

DREAM IT.  
ACHIEVE IT.  
TOGETHER.



# Feedlot Heifer Implants

TBA = Trenbolone acetate  
E = Estradiol

**Estrogen-Only**

**RALGRO®**  
(zeranol)

36 mg Zeranol

Elanco  
**Compudose®**

26 mg E

Elanco  
**Encore®**

44 mg E

**Mild  
Combination**



200 mg testosterone, 14 mg E

**Moderate  
Combination**



80 mg TBA, 8 mg  
E

100 mg TBA, 10 mg  
E

140 mg TBA, 14 mg  
E

**Aggressive  
Combination**



200 mg TBA, 20 mg E

200 mg TBA

**Long-Acting  
Combination**



200 mg TBA,  
20 mg E



200 mg TBA,  
20 mg E

DREAM IT.  
ACHIEVE IT.  
TOGETHER.

# Feedlot Steer Implants

TBA = Trenbolone acetate  
E = Estradiol

**Estrogen-Only**

**RALGRO®**  
(zeranol)



36 mg Zeranol

7 mg E

14 mg E

26 mg E

44 mg E

**Mild Combination**



80 mg TBA, 16 mg E

100 mg TBA, 10 mg E

**Moderate Combination**



120 mg TBA, 24 mg E

**Aggressive Combination**



200 mg TBA,  
20 mg E

**Long-Acting Combination**



200 mg TBA,  
40 mg E



200 mg  
TBA, 20 mg  
E

DREAM IT.  
ACHIEVE IT.  
TOGETHER.