

Impact of Technology on Genetic Gain - Past, Present and Future

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Forward-Looking Statements

Some of the statements made in this presentation are forward-looking statements. These forward-looking statements are based upon our current expectations and projections about future events and generally relate to our plans, objectives and expectations for the development of our business. Although management believes that the plans and objectives reflected in or suggested by these forward-looking statements are reasonable, all forward-looking statements involve risks and uncertainties and actual future results may be materially different from the plans, objectives and expectations expressed in this presentation. All information in this presentation is as of the date marked on the cover page, and Trans Ova Genetics undertakes no duty to update this information unless required by law.

Mission-Vision



The Application of Genetic and Reproductive technologies to meet the world's needs for enhancing animal protein production.

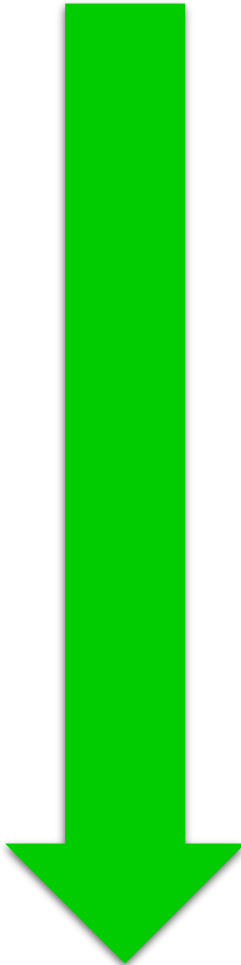
History

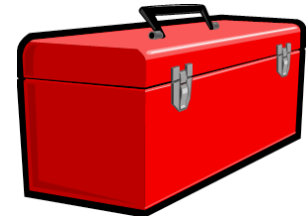
Trans Ova Genetics established for over 35 years



Embryo calves produced by Trans Ova Genetics 1985

Selection Information – Genetic Tool box

- 
- Visual appraisal
 - Pedigree information
 - Pedigree verification
 - Performance data
 - Progeny values and accuracy
 - Economic indexes
 - Genetic tests for simple recessives
 - Targeted panels
 - High density panels
 - Genomic enhanced EPDs
 - Imputation



ALL BULLS ARE TO SCALE

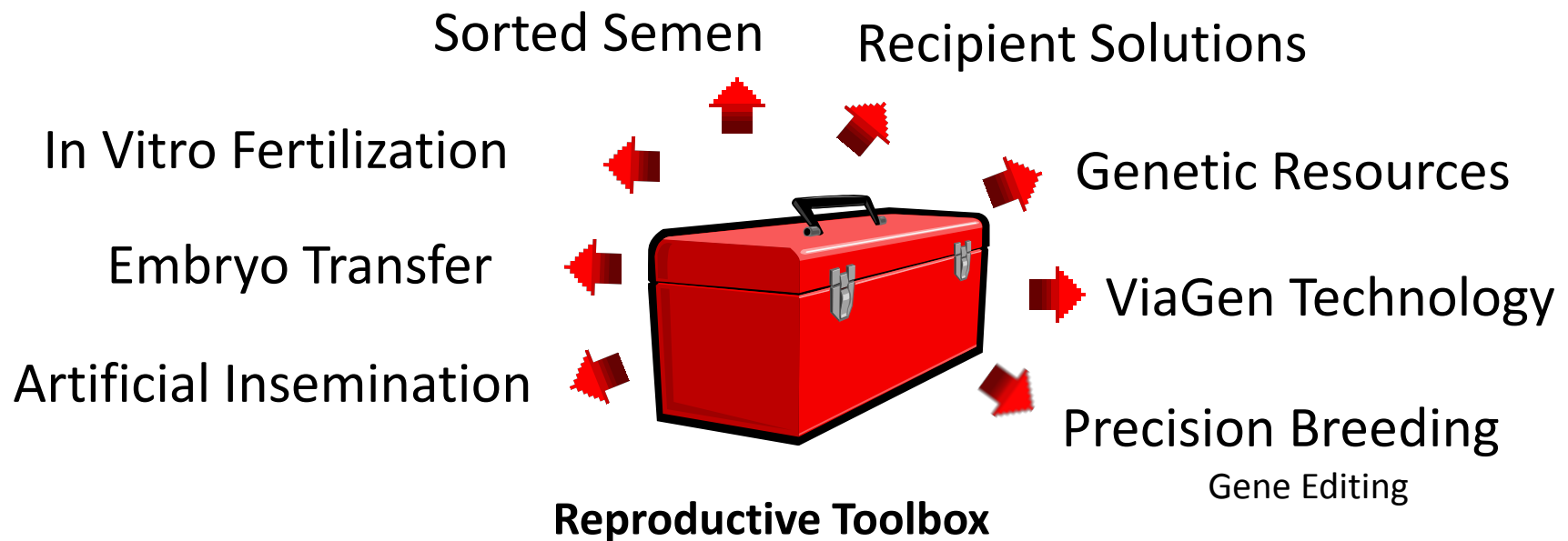
Modern 7 ~ 80"

Classic 2 ~ 50"

Miniature 003 ~ 40"



The Toolbox



Why use ART?

Assisted reproduction tools coupled with
genomic enhanced selection will accelerate:

genetic gain 2X – ?X

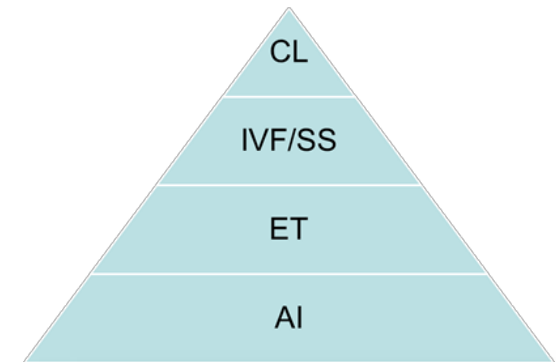
AI started in 1950's

ET started in 1970's

IVF started in 1990's

GP/Cloning started in late 1990's

SS started in 2000's



Hierarchy of ART

Embryo Transfer – *in vivo*, *in vitro*

ET allows you to increase the genetic impact of superior females.

More than one calf per year out of those really good COWS.



Embryo Production by IVF TOG Early 90's

IN VITRO
FERTILIZATION

AT

TRANS 
genetics

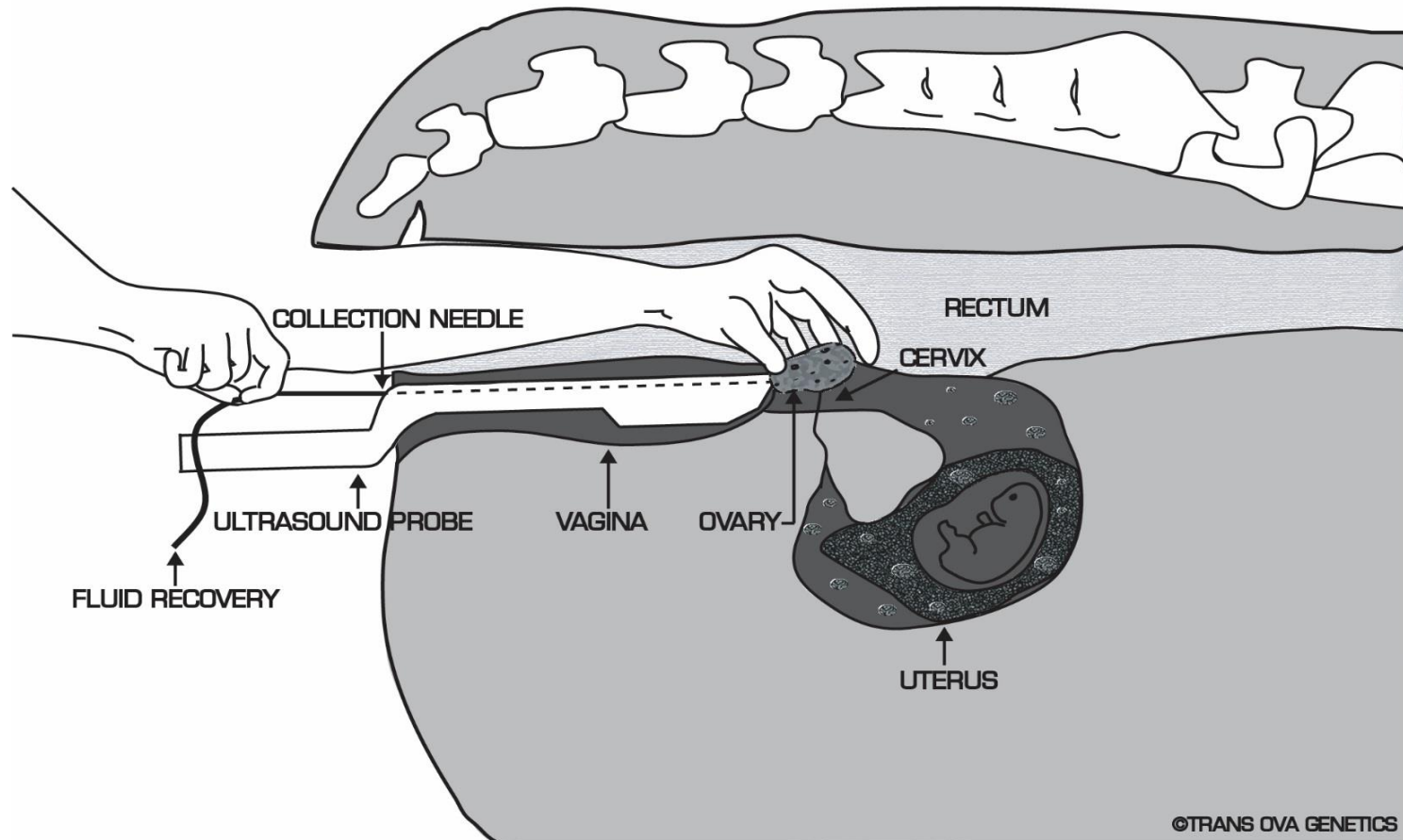


IVF

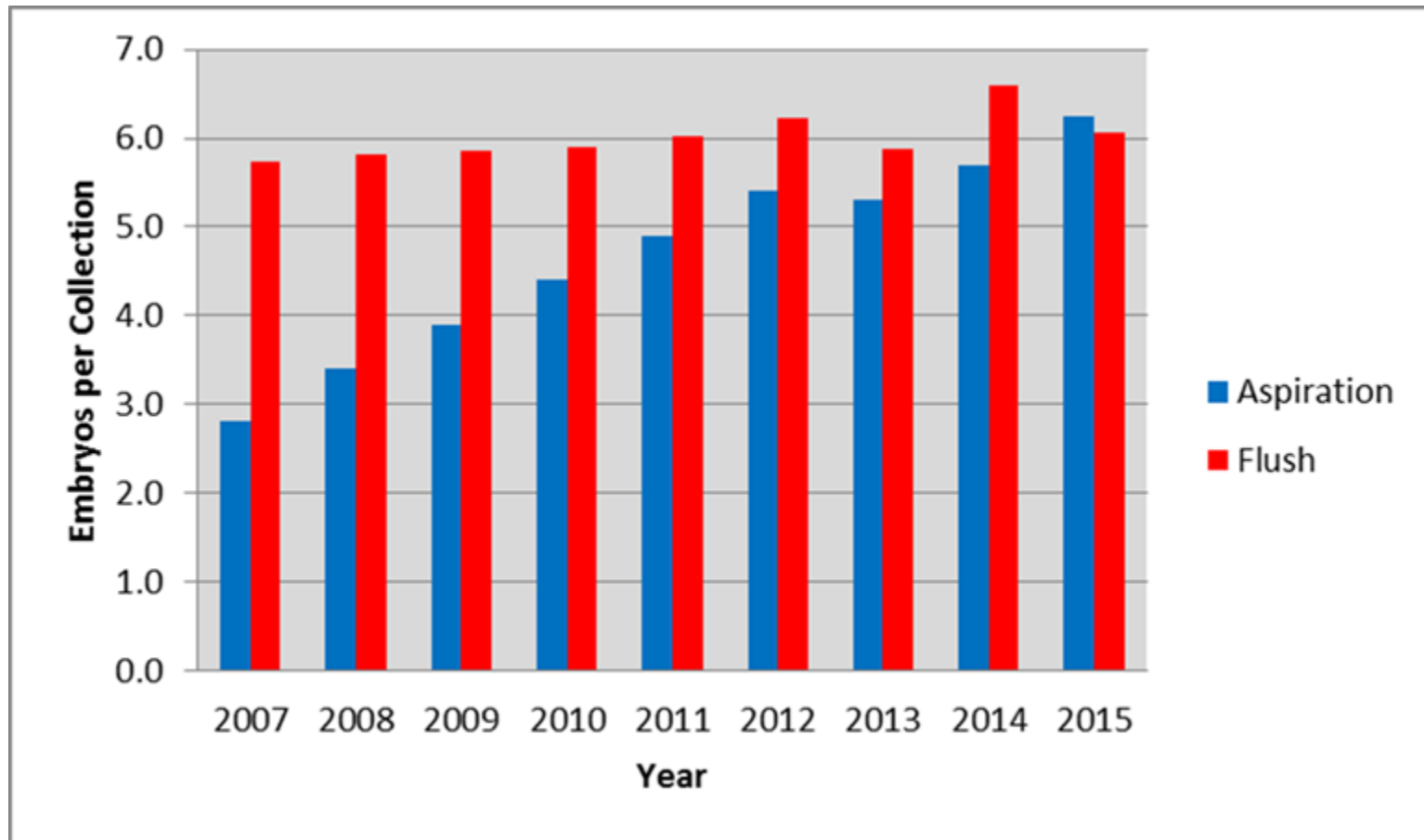


Transvaginal Ovum Pick-up

TRANSVAGINAL OOCYTE RECOVERY



Embryo averages TOG



Genetic Gain

Genetic Gain= acc x genetic variation x intensity
generation interval

- “Race” – genetic improvement
Young Animals



Today's Elite Genetic Selection



1) Qualify donors via high density genomic chips-GPTAs



3) IVF with sexed/conventional semen

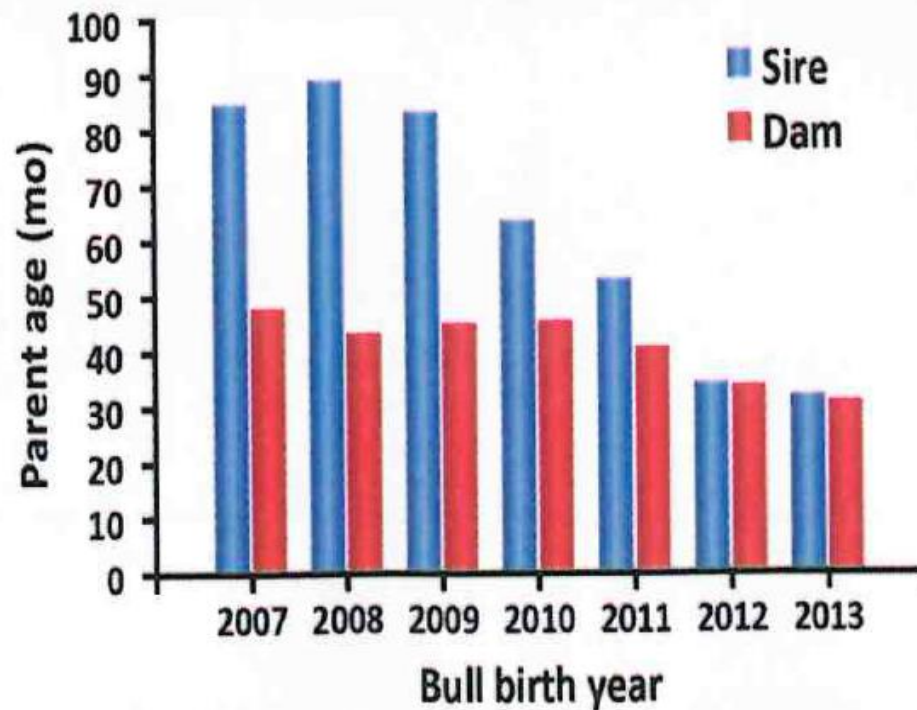


2) Collect juvenile donors

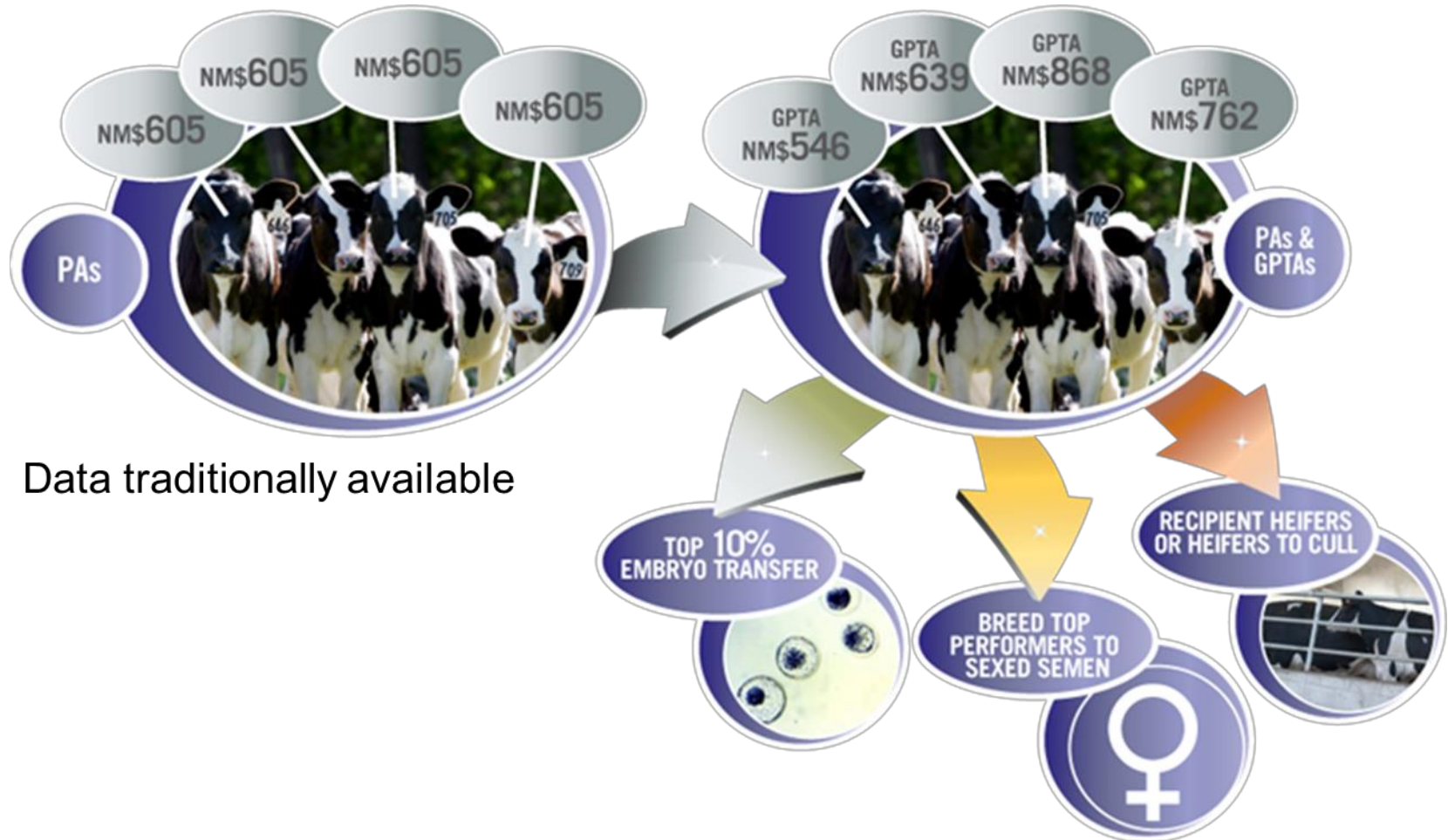


4) Gestate all embryos-Generation interval

Parent ages for marketed Holstein bulls

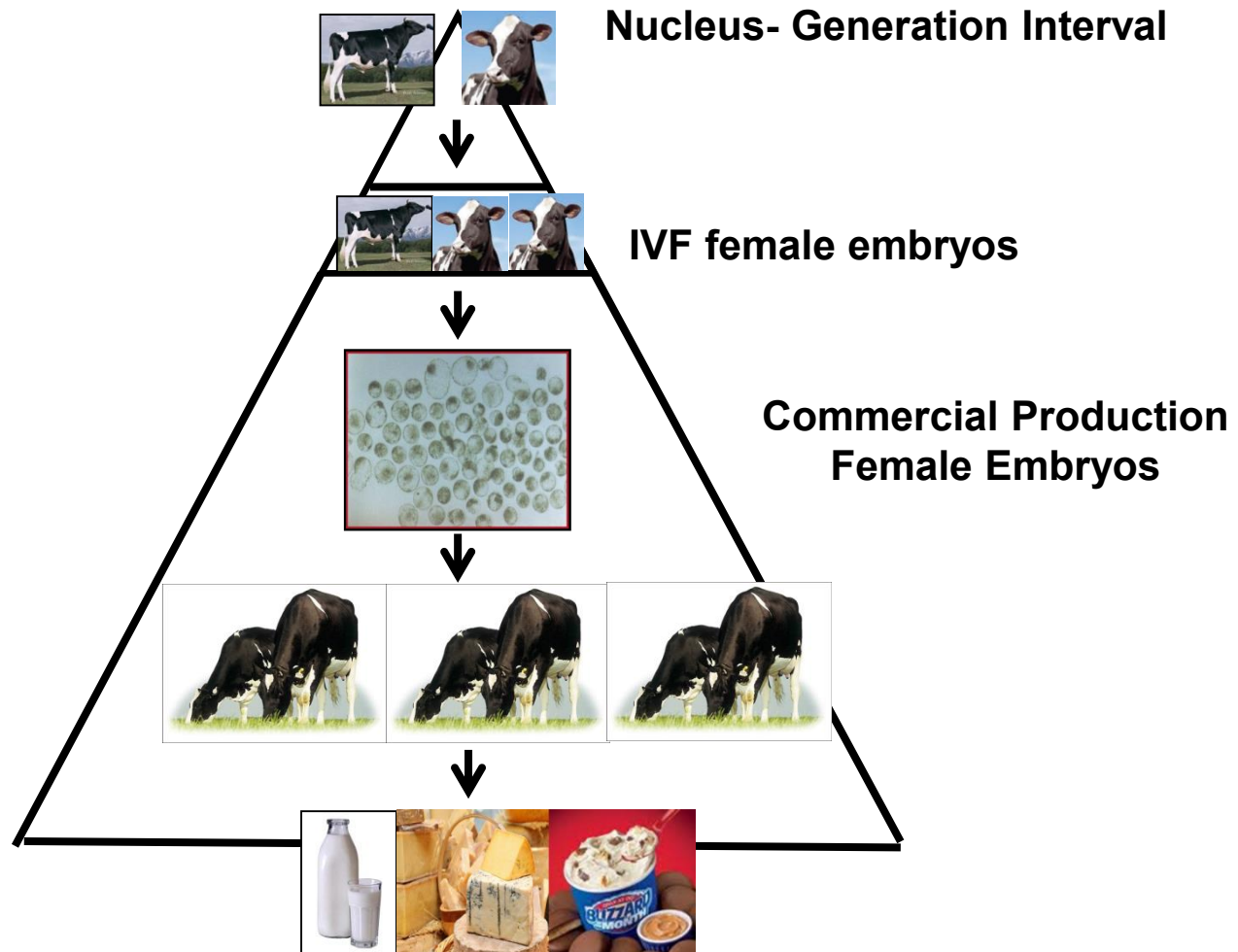


Different Game



Dairy Genetic Evaluation - Large portion of data commercial industry progeny test data.

Future



Implementation to the Industry

Elite sires and Dams



X



Female progeny

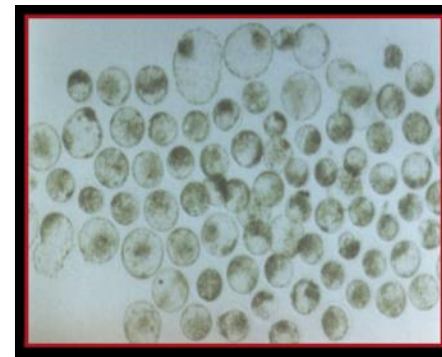
Genetic Selection – Generation interval reduced

Young female oocyte recovery

Fetal cell line selection

Embryo cell line selection

Biopsy – freeze embryos



OPEN

Acceleration of genetic gain in cattle by reduction of generation interval

SUBJECT AREAS:
BIOTECHNOLOGY
ANIMAL BREEDING

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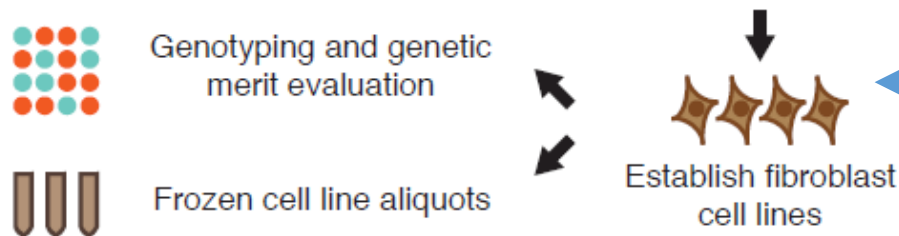
Advanced reproductive technologies

3 weeks



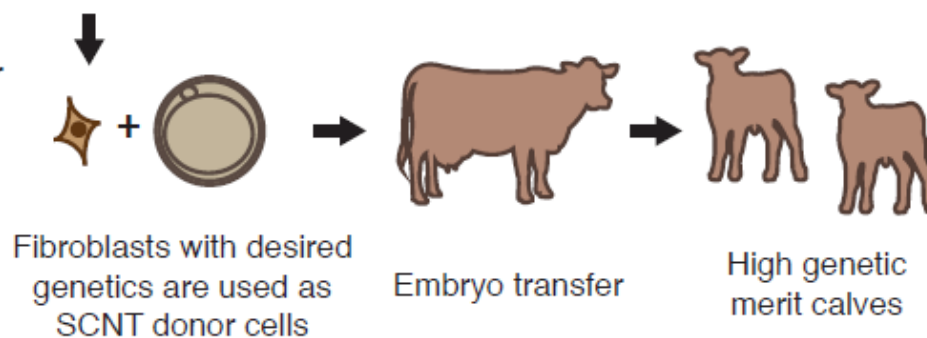
Genomic selection

1-2 months



Somatic cell nuclear transfer (SCNT)

9 months



Fetal cell line selection



Future- Beef

- Generation interval - younger animals?
- Genetic landscape changing?
- Leveraging commercial data like the dairy industry?
- Impact of technology in commercial sector increases?



American Hereford 2009

THANK YOU

QUESTIONS?

www.transova.com

